Polytechnic of Turin

College of Engineering and Management

Master of Science in Engineering and Management

Master of Science Thesis

Innovative financing techniques in the automotive market: a case study in Italy

Supervisor:

Prof. Marco Cantamessa

Candidate:

Francesco Audasso

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Ringraziamenti

Questa non sarebbe la conclusione del mio percorso universitario senza la disponibilità e il supporto dei colleghi che ho avuto in Santander: grazie Paolo, Stefan, Pier, Fabio, Massimo, Luisa e gli altri ragazzi della Direzione Commerciale. Grazie in particolare a Leo, Vale, Mar, Marco.

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Grazie alla mia famiglia: la libertà, tranquillità e sicurezza che mi avete trasmesso sono state decisive.

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Premise and scope of work

The automotive market is one of the most important for the global economy. During last years, it is experiencing a stressful period, mainly due to the growing uncertainty in the field of laws connected with emissions and pollution: diesel engines are slowly been banned by European regulators, carmakers are trying to develop new, more eco-friendly engines, and customers prefer to delay the purchase of a new car, while struggling to understand which will be the best option to pursue.

In this scenario, it is critical for consumer banks and credit organizations to propose new and effective products that enable customers to lower the uncertainty level, increase their trust in carmakers and allow a more flexible mobility model.

As a case study, the candidate is proposing to analyse the solutions adopted by Santander Consumer Bank to overcome this difficult market juncture, namely the new loan called "DoubleYourCar[1]" (DYC). In particular, Santander Consumer Bank is evaluating, at an Italian and European level, new financial plans that focus more on flexible mobility. The candidate is disserting on a pilot project realized by a large car dealer that involved the Bank to insert mobility services into its TCM loans.

The first chapter is dedicated to the analysis of the market environment, at first by focusing on the competitive agents acting on the global scene, then by highlighting the main market trend (the switching from ownership to use) and the initiatives of competitors to exploit it. In addition to this, the writer is explaining the strategic drivers which determined the birth of new kinds of financial products to match the needs that arose from the disruptive arrival of (H)EVs on the market. The last paragraph faces the increasing upcoming of the so-called *bridge solutions*, i.e. shades of loans that enable customers to switch from an internal combustion engine vehicle to an electric vehicle.

The second chapter deals with the idea of the project, starting from the market needs that pushed Santander Consumer Bank to develop a dedicated

[1] *Invented name*

loan, analysing all activities involved in the process and focusing on the candidate's role in each one of them.

In the third chapter, the candidate is analysing the product-planning phase. A preliminary market research was carried out to identify the customer requirements with a high level of accuracy. After that, the team developed a feasibility study to establish whether the project was concretely viable. The following phase was characterized by the selection of a possible partner to develop the project with.

The product design phase is dealt with in the fourth chapter. The writer concentrates mainly on the processes that drove the choice of the loan structure, of the interest rates and on the commissions that grant the minimum profitability requirements. The next step deals with duration of the pilot: how long should it be and how many cars should be available to meet expectations. Product design phase ends with the approval of Legal&Compliance department of the bank.

A critical phase in the development of the project was the advertising. In the fifth chapter it is explained how the marketing office chose whether to outsource or internally build the advertising campaign, which key points to communicate in the campaign, and how to reach customers (is a local radio ad better than a commercial printed on newspapers? Which channel is more effective on the target audience? Which is the best message to drive customers' attention on?).

The last two chapters are dedicated to the project launch and monitoring phases: through internal sales analysis, feedbacks from the dealers and CRM activities, the effectiveness of the project will be assessed and, eventually, it will be evaluated if further potential developments should be carried out.

Chapter 1

The market environment

The global economic outlook of 2018 was unclear. Economic and political uncertainty related to rising global trade tensions and the slowdown of the Chinese economy are expected to persist for some time, clearly with an unfavourable impact on global economic growth. Moreover, the effects of a (managed or no-deal) Brexit on the economy are likely to start being felt in the coming months.

The automotive market is living a difficult period (started in 2018 and going on in 2019 as well), mainly due to three different factors: the uncertainty about Brexit, which is spreading concerns throughout the main national markets; the commercial war between China and the USA; the issues related to diesel-powered vehicles, that push owners either to quickly sell their cars, or to use them until dismission.

This overall situation forced carmakers, consumer banks and credit institutions to come up with innovative products, both on financial and technological side.

The chapter deals with the analysis of global automotive market, by starting from the macro trends and then focusing on the Italian condition. After that, the candidate is explaining the main drivers of the electric vehicles global market in the future; finally, financing techniques commonly exploited to drive customers from the concept of ownership to the one of use are briefly introduced.

1.1 Market competition

The automotive market has always been one of the most important in the world, because of both the number of workers employed and the turnover generated. The competitive environment is populated by a few big

manufacturers, usually structured in big groups of two or more brands, and a great number of medium- and small-sized suppliers. This global scenario reflects on continental and national markets.

1.1.1 Competitive environment

This paragraph is dedicated to analyzing the competition level in automotive industries. The Porter's five forces model is adopted to do so.

Threat of new entrants: low

Entry barriers are very high. On one side, sunk costs are consistent, because automotive industry is capital intensive and starting a new brand requires a huge amount of money to purchase industrial equipment and facilities, and to hire skilled staff. On the other hand, existing brands represent a critical obstacle: unless the newcomers enter the market with a very innovative and differentiated product, they will struggle to gain market shares. Another significant factor is brand reputation, which is still a major competitive advantage for existing brands. New players would have to focus intensively on product design and quality. Although access raw material is relatively easy, achieving economies of scale can be difficult, especially for small brands.

Threat of substitutes: weak

Owning a car is still enabling people to enjoy the highest grade of accessibility and convenience. Alternative means of transport like plane, train, bus and taxis do exist and are widely adopted, but cars are the most preferred by the largest majority of population. Furthermore, owning a car is seen as a status symbol, a matter of prestige.

Bargaining power of suppliers: low

Most of suppliers in the industry are small players, so they have to play per the rule set by carmakers. The brands exert a huge power because raw materials are usually available at plenty so they can switch between suppliers with small or no transaction costs at all.

Bargaining power of customers: moderately strong

Corporations and government agencies are likely to buy fleets, which raise their bargaining power towards carmakers. However, a large part of the buyers are individuals that purchase their own car, and these people have much less power. Both small and large buyers can switch to another brand or to an alternative mode of transportation without incurring in high switching costs. All in all, none of the buyers (whether big or small) is a serious threat of backward integration. Anyway, the bargaining power of customers is moderately high, and brands try to gain buyers' loyalty by manufacturing good quality cars and by offering competitive prices.

Competitive rivalry in the industry: strong

There are few recognized and influential brands in the industry, and each

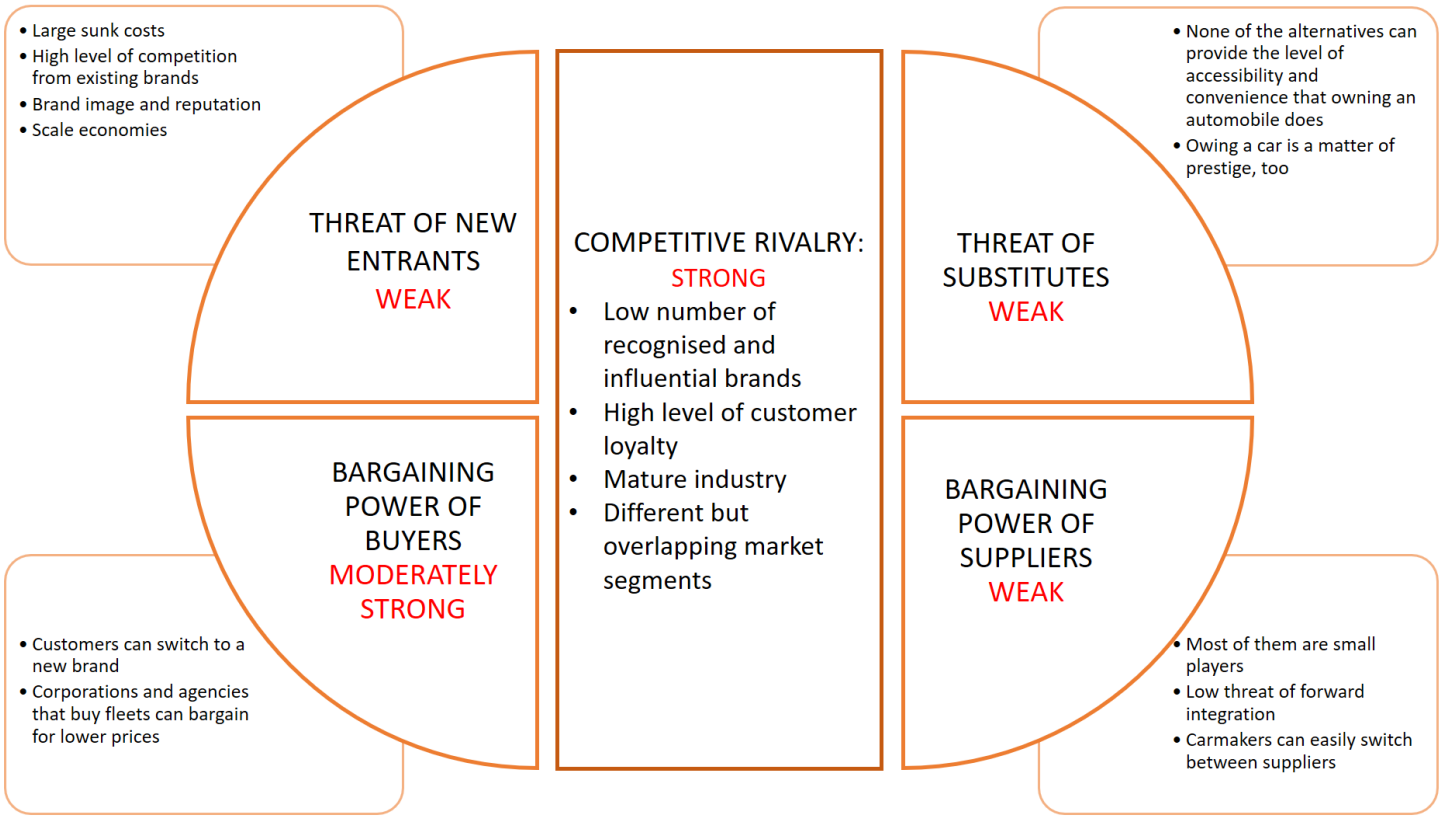


Figure 1.1 – The Porter's five forces Analysis of global automotive market

one of them trying to abandon the market will suffer very large losses. Furthermore, the industry is mature, and customers are usually loyal to brands. The market is divided in segments, but most of them are overlapping each other. Brands compete on the basis of price, design, quality, technology, customer safety and several other points. Overall, competition in the auto industry is a strong force rather very strong.

1.1.2 Global market

Global automotive market is slowing its growth, mainly due to the decrease of Chinese market, that in 2018 marked a decline in registered vehicle of 4% over 2017 (the first year-to-year decrease since 1990), and the US market, that was substantially stable with a 0.3% decrease over the previous year. The main reason that lead to this scenario is the commercial war between USA and the Chinese government, and it had consequences at a global level.

In South America, full-year 2018 results were 7% higher than in 2017, with more than 3.7 million cars sold last year. This result was primarily driven by the Brazilian market, which grew by 12.6% in 2018 to reach 2.1 million units registered (Figure 1.2).

World new passenger car registrations

	2018[2]	2017	% change 18/17	% share 2018
EUROPE	18,059,040	18,066,422	-0.04	22.9
EU[3]	15,158,874	15,136,590	+0.1	19.2
EFTA	465,612	493,965	-5.7	0.6
RUSSIA	1,681,348	1,475,391	+14.0	2.1
TURKEY	486,321	722,752	-32.7	0.6
UKRAINE	77,805	79,465	-2.1	0.1
OTHERS-EUROPE[4]	189,080	158,259	+19.5	0.2
NORTH AMERICA[5]	16,677,937	16,842,523	-1.0	21.1
of which the US	*13,901,586*	*13,964,066*	*-0.4*	*17.6*
SOUTH AMERICA	3,729,802	3,484,482	+7.0	4.7
of which Brazil	*2,089,105*	*1,854,570*	*+12.6*	*2.6*
ASIA	36,664,644	37,152,203	-1.3	46.4
CHINA	23,185,905	24,016,153	-3.5	29.4
JAPAN	4,378,933	4,376,887	+0.05	5.5
INDIA	3,506,331	3,300,404	+6.2	4.4
SOUTH KOREA	1,517,322	1,481,501	+2.4	1.9
OTHERS-ASIA[6]	4,076,153	3,977,258	+2.5	5.2
MIDDLE EAST/AFRICA	3,828,132	4,050,131	-5.5	4.8
WORLD	78,959,555	79,595,761	-0.8	100.0

SOURCE: IHS MARKIT, ACEA

Figure 1.2 - Global car registrations

1.1.3 European market

Overall in 2018, passenger car registrations in the *EU* remained pretty stable compared to the year before (Figure 1.3). The year started on a strong note, but due to falling demand during the last four months of 2018, full-year growth was only +0.1%. Ahead of the introduction of the new WLTP test in September, car registrations saw an exceptional boost over the summer (Figure 1.4), which led to a drop in demand during the following months. Although the 2018 increase is very modest, it still marks the fifth consecutive year of growth in car sales, with almost 15.2 million units registered in total across the European Union.

Top 5 – New passenger car registrations in the EU

	2018	2017	% change 18/17
GERMANY	3,435,778	3,441,262	-0.2
UNITED KINGDOM	2,367,147	2,540,617	-6.8
FRANCE	2,173,481	2,110,748	+3.0
ITALY	1,910,025	1,971,345	-3.1
SPAIN	1,321,438	1,234,932	+7.0
EU[7]	15,158,874	15,136,590	+0.1

SOURCE: ACEA

Figure 1.3 - European car registrations

Demand was mostly driven by the Central European countries, where new car registrations grew by 8.0% in 2018. Results were diverse among the five major EU markets, with Spain (+7.0%) and France (+3.0%) posting growth, registrations falling slightly in Germany (-0.2%) and demand contracting in Italy (-3.1%) and the United Kingdom (-6.8%) last year.

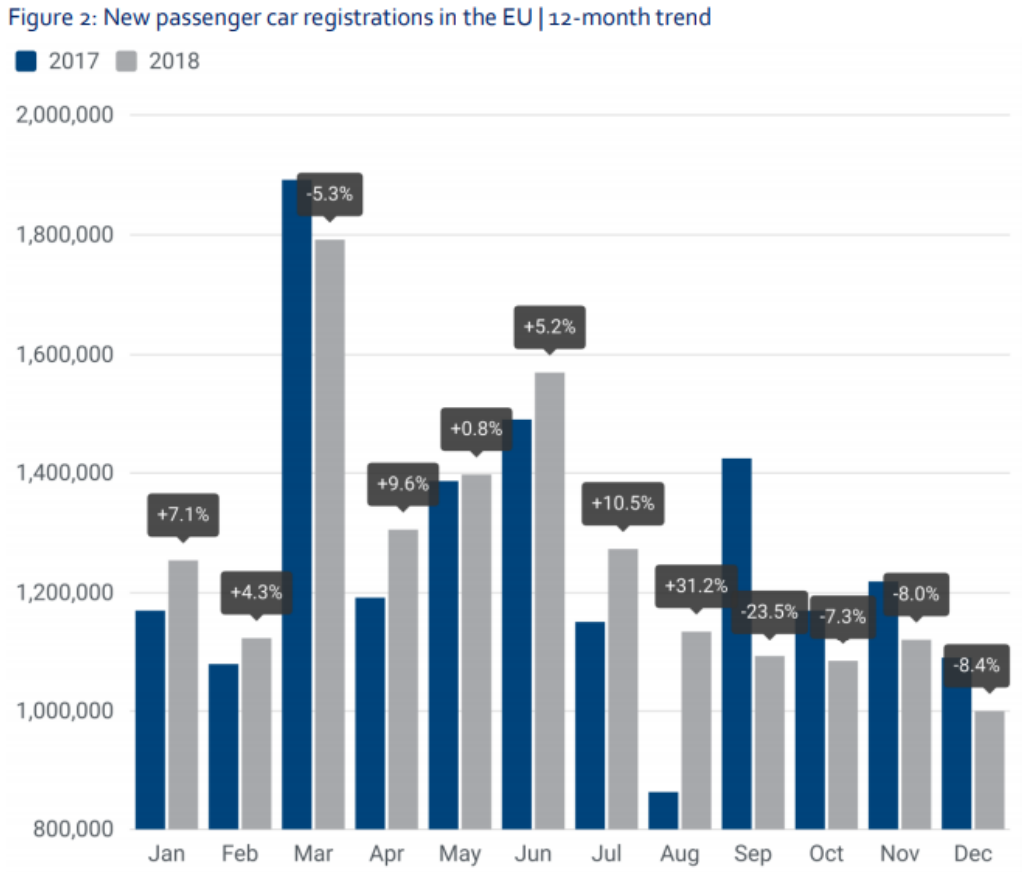


Figure 1.4 – EU car registrations in 2018, month-by-month trend – Source ACEA

1.1.4 Italian Market

In 2018, 1.91 million new passenger vehicles were registered in *Italy*. Since the late 1990s, the Italian car market (statistics include passenger cars and light commercial vehicles - LCVs) has fluctuated between 1.4 million and 2.8 million units (Figure 1.5). After peaking in 2007 at over 2.7 million units, the market started a 6-year long decline, including double-digit losses in 2008, 2011 and 2012, to its lowest volumes in the aftermath of the global financial crisis. In 2015 and 2016 the market recovered sharply with double digit increases, followed by a growth of nearly 7% in 2017, but remains far below pre-crisis volumes. In 2018, sales slightly declined again.

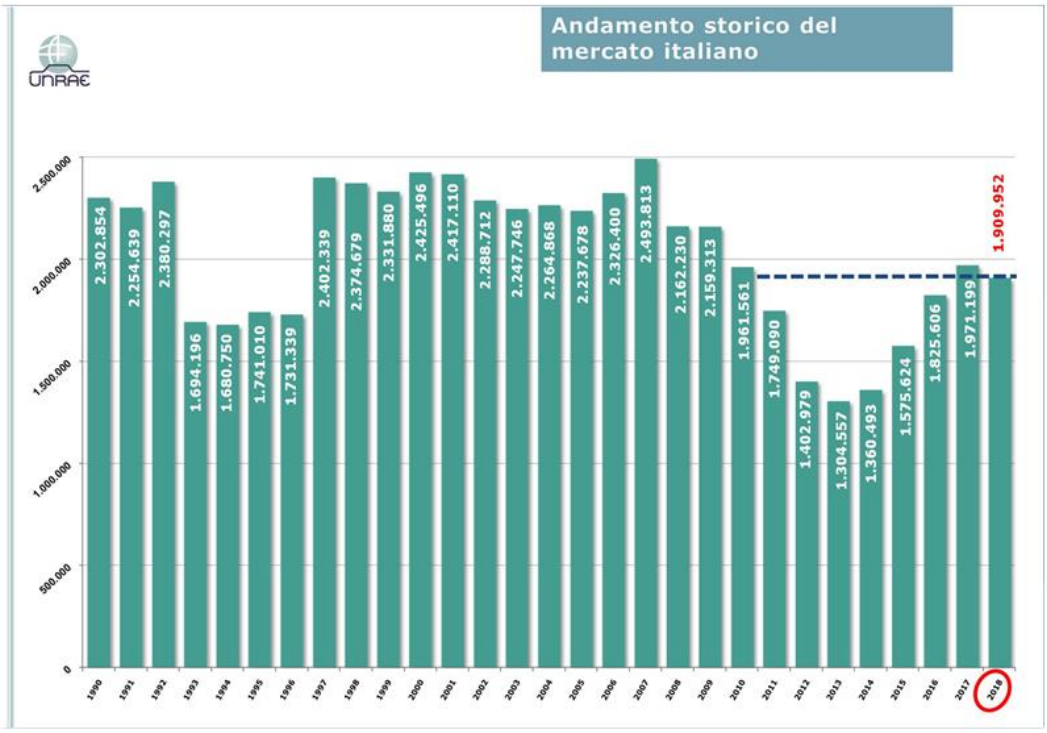


Figure 1.5 – Italian automotive market, yearly registrations – Source UNRAE

By considering fuel types, diesel-powered vehicles were the most penalized in 2018: their market share shrank by 5% to 51.2% of total Italian market. Petrol and (H)EVs gained from the falling of diesel, and they gained 2.6%, 1.1% and 0.16%, respectively. Natural gas and LPG-powered vehicle stayed stable at a cumulated market share of about 8.5%.

By analysing customer categories, we can see that private customers account for the 19.7% of total market share. Rentals (of which more than 60% are long-term) register 22.7% of the total, consolidating the growth over 2017 by 0.4%, after a 18% growth from 2016 to 2017. Business customers (companies and societies) lose 8.9% from 2017 and established at 20.1% of market share.

The car stock in Italy totalled 39,018,170 vehicles in 2018, which are on average 11 years old (about 9 years for CNG/LPG vehicles and over 14 years for gasoline). Vehicles aging is a serious problem in Italy, because it has been constantly growing since 2008. Italy has one of the highest rates in Europe, due in large part to the lack of suitable public transport

infrastructure. As far as environmental issues are concerned, Italian car stock is still very polluting: according to UNRAE report, more than 1 circulating car out of 3 in 2018 is Euro 3 standard or lower, and 29% are Euro 4.

Furthermore, total CO_2 emissions have increased by 2% from 2017 to 2018 (Figure 1.6). That is mainly due to the increase in the number of gasoline-powered cars (that emit higher carbon dioxide quantities), while diesel engines are slowly lowering in number. Still, the national average is 114.2 g/km, one of the lowest in Europe, thanks to the market mix: it is more oriented to lower categories (mainly A- and B-segment cars) than other countries.

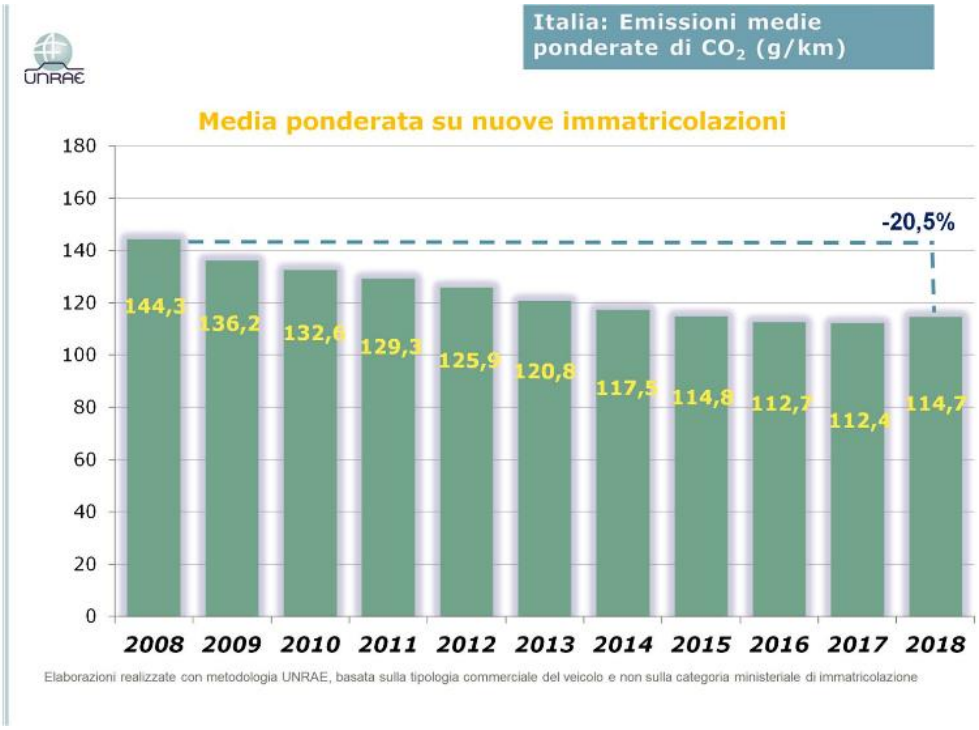


Figure 1.6 – Weighted average CO_2 emissions (g/km) of new registrations, Italian market – Source UNRAE

The second-hand market is experiencing an opposite trend of the new car market. In 2018, more than 5.6 million used cars were sold, with an increment of 4.4% over 2017. On average, traded cars are 9 years old, a

figure that is very close to the age of the circulating car stock (11 years). More than 40% of traded cars are 10 or more, anyway, while the market share of vehicles aged between 4 and 10 lost 3%, reaching 27% of the total.

1.2 A new perception of mobility: from ownership to use

Modes of transport of people and things are facing a deep transformation, due to different needs, habits, operators, cultural and behavioral schemes. A new mentality based on the use of the vehicle, which is now a tool and not a status, is diffusing, with positive results on innovation, costs, social and environmental sustainability. In this scenario, automotive industry and, moreover, services, are gaining a more and more critical position. Besides that, other players of digital economy and energy utilities are rising, facing the big challenges of electric vehicles and sharing mobility.

Technology evolution is easing this change in the way people perceive and live their primary need of mobility. In the last years, automobiles have been equipped with more and more advanced devices, starting from navigation and infotainment system, black-boxes (often bundled to insurances) and ADAS (Advanced Driver Assistance Systems). Next steps will be new, greener engines and automation, that will bring people in the era of *mobility as a service*.

1.2.1 Loans and TCM

Customers have been buying cars using loans for decades, but this business model is being overcome in the last years. In particular, a standard loan is usually structured with an initial down payment followed by a certain number of installments, which are all the same, from the first to the last. This financial product enables the customer to avoid spending the whole sum at the moment of the purchase, and to the seller to gain more thanks to the interests paid on the loan. This credit structure entails that the buyer

becomes owner of the car since the deposit, even if she technically has still to pay for the vehicle.

Starting from mid-80s, an evolution of standard loans in automotive industry was developed by J. E. Wolfington: the so-called *Trade Cycle Management* (or *TCM*). TCM is a particular kind of loan that, instead of financing the entire car value, allow customers to make a decision after a predetermined number of installments (usually, 24 or 36): keep the car, replace it or leave it. This is possible thanks to the *Guaranteed Future Value* (*GFV*): it is the minimum value, set a-priori by the dealer and the customer, that the car will have at the expiry of the loan. If, at that time, the vehicle will have a higher value that what had been forecasted, the customer may use that difference as a down payment to buy a new car. That allows to keep installments relatively low on a short term. The buyer is allowed to substitute her car more frequently and the seller gets the possibility to increase client loyalty. TCM, which arrived in Italy in 1994, was the first step towards the concept of *Total Cost of Ownership* (*TCO*): instead of thinking at the car as a sum of different expenses (price, insurance, maintenance), the owner should realize that she pays for the use of it, that means she pays a monthly installment which is all inclusive. TCM and GFV allow that kind of thinking, because potentially, by paying 0€ deposit, installments correspond to monthly TCO.

Nowadays the market is turning more and more in the direction of mobility as a service: even if loans and TCM may look to be old-fashioned instruments, they paved the way to new types of solutions, such as leasing and rental, that will probably be the most adopted by customers in the next years.

1.2.2 Leasing and rental

Leasing is a hybrid kind of financing, because it's basically halfway between TCM and rental. This vision of the leasing is taken from the point of view of a private consumer. Actually, the leasing was born as a business instrument for companies. The structure of leasing entails a credit supplier,

called lessee, that is buying the vehicle on behalf of the customer, called lessor, to whom it is granted the use of the vehicle against payment of a monthly installment. By its own nature, the leasing contract entails a residual value (RV) that, like in TCM, can be paid by the lessor to acquire the vehicle ownership at the end of the depreciation schedule. Leasing differentiate by TCM because the customer is not entitled the ownership of the car until she chooses to redeem it by paying the RV. Clearly, using a piece of equipment without having to insert it in the balance sheet is a consistent fiscal advantage to companies and corporations, especially after the economic crisis of last years: many companies switched from trying to have the highest operating costs as possible (to pay less taxes), to trying to have the least possible (not to come up with a negative net income). For this reason, (individual) companies have always been the main target of leasing contracts, but this trend is recently changing. In Italy, although car registrations decreased of 3.3% over the previous year, leasing contracts gained +9.8% in 2018. Main reasons of this trend include: the chance to get an all-inclusive monthly payment (use of the car, insurance, car tax, maintenance, tires replacement); partially escape from uncertainty of regulations: *dieselgate* forced organizations like the EU to penalize this kind of fuel, and customers prefer to avoid risks of buying a car that potentially will be banned from circulation in the next few years.

Rental is the most "use-oriented" type of financing: it can entail an option to redeem the vehicle, but is mainly chosen by companies whose employees run high mileages, so that they do not worry about reselling an exhausted asset. Rentals conventionally divide in short-term (between one day and eleven months) and long-term (from 2 to 5 years).

In 2018, the Italian market of short-term rental marked contradictory indicators. On one side, rentals duration increased by 4.7%, and their number of 3.2% as well. On the other side, there was a decrease in revenue-per-rental (-1.4%) and revenue-per-day (-2.8%). To face margin reduction, companies are involved in services evolutions to grant higher and higher quality standards, in a scenario of more intense rivalry on the market.

Long-term rental registered a positive year in 2018. Car registrations increased of 2% up to 309.000 units, with a total fleet of more than 900.000

units and a market share that shifted in 5 years from 10 to 14%; the total annual revenues generated by long-term rentals is 5.5 billion Euros. The private sector activities pushed the growth: in 2018 total signed contracts were 40.000, a 60% yearly increase over the 25.000 registered in 2017[2].

When dealing with the causes that determined the above liveliness of leasing and rental markets, it is mandatory to look at the general picture of environmental and pollutions issues. Since the *dieselgate* scandal of 2015/16, the public opinion and the mass media have started a demonization of diesel, thus causing its slow decline. The following year, Paris hosted the first Clean Air Forum, and in the 12th Concawe Forum of March 21st 2017, many studies established that new diesel engines (Euro 6D-temp) emit 96% and 95% of, respectively, PM and NO_x less than a Euro 1 engine: it is clear that improvement of air quality is only a matter of replacing the circulating car stock with newer vehicles. The role of leasing and rental in this scenario is crucial. In Italy, while the average age of circulating car stock is 11 years, more than 80% of cars used with rental or leasing are less than 2-years-old, and more than 95% are less than 4-years-old. Diesel is still the preferred fuel, as fleet-managers chose it by more than 70% in 2018, because it's still the cheapest fuel (also considering that average mileage of company-fleets is more than 28.000 km/year, and that preferred cars belong to high-end segments by 60% of the stock). The decrease of diesel market share encouraged alternative fuels (LPG, natural gas, hybrid and electric vehicles), that now represent 7.5% of rented stock. The most significant increase was registered by EVs, that had a 150% increment over 2017, from 2.000 to 5.000 units. These figures are residual if compared to the whole market (13.000 EVs on a stock of more than 38 million cars), but rental EVs represent more than 60% of the total.

It is difficult to forecast which fuel type will be the most chosen by fleet managers in the next years. Most probably, interest and evolution towards electric vehicles will increase with growing rate. A drop in prices, new technologies, more diffused charging stations and wall boxes will support it. Furthermore, alternative fuels such as hybrid, LPG and natural gas will gain market shares. It is likely that diesel and petrol will face a slow

[2] *All figures in this page are taken from Assilea Report, 2018*

decline, but revival periods are not unlikely. The diffusion of hybrid and electric cars will encourage a positive transformation of automotive industry as a whole. For sure, financing structures that promote use rather than ownership will play a key role on this scenario, because forecasting costs, easiness of second-hand selling, speed and convenience of recharge and residual values of EVs is still too complicated.

1.3 Electric vehicles and bridge solutions[3]

This paragraph deals with so-called electric vehicles (EVs): they include BEVs (no combustion engine, are totally powered by batteries) and PHEVs (Plug-in Hybrid Electric Vehicles, can travel totally electric short distances thanks to batteries, usually 40 to 50 km).

EVs nowadays represent a residual fraction of the automotive market, although their expansion is running at very fast rates. However, the evolution of the sector can happen only through a solid and lasting financial incentives policy by institutions and governments.

Experts say that EVs will be even more interesting if their use was intensive: urban deliveries, fleets used for car-sharing and corporations. On one side, the increase in demand of EVs due to this exploitation is enabling suppliers and OEMs to reach scale economies faster; on the other hand, public opinion is getting used to see and accept a new kind of mobility linked to EVs, and drivers are getting prepared for future choices.

In this paragraph, the candidate is analysing the EVs market on the points of view of market and sales (including charging infrastructures), policies and regulations, and the environmental challenge.

1.3.1 Global electric market outlook

[3] *All figures of this paragraph, unless otherwise specified, are taken from IEA (International Energy Agency) "Global EV outlook 2019"*

The global stock of electric passenger cars (PLDVs: Passenger Light Duty Vehicles) reached 5.1 million units in 2018, an increase of 63% from the previous year (Figure 1.7). This is similar to the year-on-year growth rate of 57% in 2017 and 60% in 2016. Battery electric vehicles (BEVs) account for 64% of the world's electric car fleet.

Around 45% of the world's electric car fleet was located in the People's Republic of China (hereafter "China") in 2018, compared to 39% in 2017. The stock of electric cars in China almost doubled between 2017 and 2018 to reach 2.3 million. In 2018, Europe accounted for 24% of the global stock of electric cars at 1.2 million (of which 0.96 million were in European Union countries) and the United States accounted for 22% with 1.1 million. By far, Norway was the global leader in terms of stock share in 2018, with 10% of electric cars in its total car stock. Even with the ongoing expansion of electric car sales, only five countries, including four Electric Vehicle Initiative (EVI) members, had an electric car stock share higher than 1% in 2018: Norway (10%)5, Iceland (3.3%), Netherlands (1.9%), Sweden (1.6%) and China (1.1%).

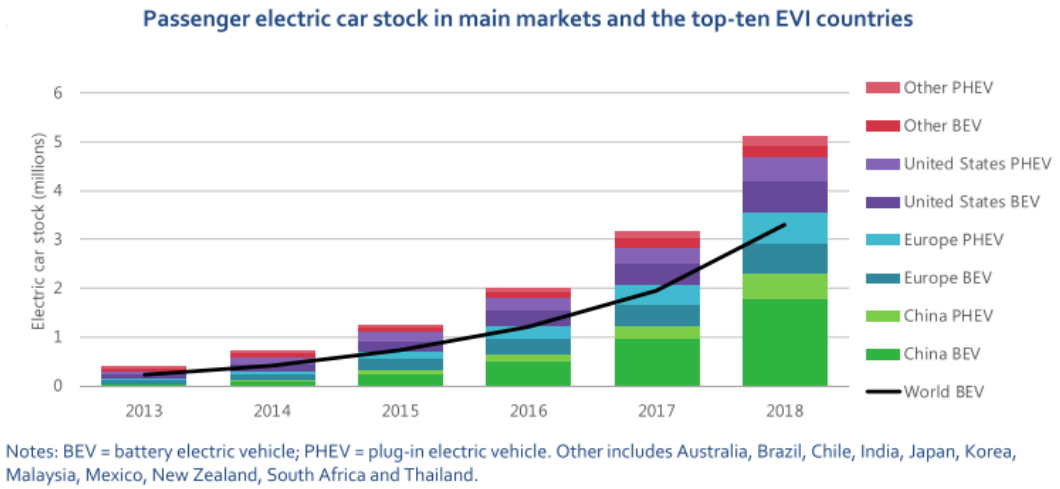


Figure 1.7 – Global diffusion of EVs from 2013 to 2018

Global electric car sales were close to 2 million in 2018, after having reached the 1 million mark in 2017. This represents a year-on-year growth

in electric car sales of 68% between 2017 and 2018, a strong rate comparable to 2015 (68%), after two years of weaker growth.

China remained the world's largest electric car market with nearly 1.1 million electric cars sold in 2018, up from almost 600,000 in 2017, and accounting for 55% of the global electric car market (Figure 1.8). This increase contrasts with the overall decline in the total of all passenger car sales that took place in China, with respect to 2017, highlighting further the dynamism of its electric car market.

In 2018, Europe was the second-largest electric car market with sales of 385,000 units. The United States, the third-largest electric car market, had sales of 361,000 units.

In Europe, the increase in electric car sales in 2018 is 31% relative to 2017, a growth rate that is lower than 2017 relative to 2016 (41%) and below the global average. Europe hosts the countries with the largest penetration of electric car sales. Norway approached 50% in 2018, more than 2.5-times the next highest country, Iceland (17.2%) and six-times higher than Sweden, which has the third highest (7.9%). In terms of sales volumes, Norway is followed by Germany, United Kingdom and France. Denmark and the Netherlands, where sales had declined in 2017, rebounded strongly in 2018.

Sales in the United States rose by 82% in 2018, faster than the rate of the global market, a big increase compared to just 24% growth the year before. The release of the Tesla Model 3, with sales that fully cover the additional 134,000 BEVs sold in 2018 (compared with 2017), helps to explain this trend (Marklines, 2019).

In 2018, electric car registrations in Canada were 44 000 units, more than double the 2017 level.

Japan is the only major electric car market where sales fell between 2017 and 2018 (-8%). Other markets where electric car sales dropped, such as India, South Africa and Mexico, have much smaller electric car volumes.

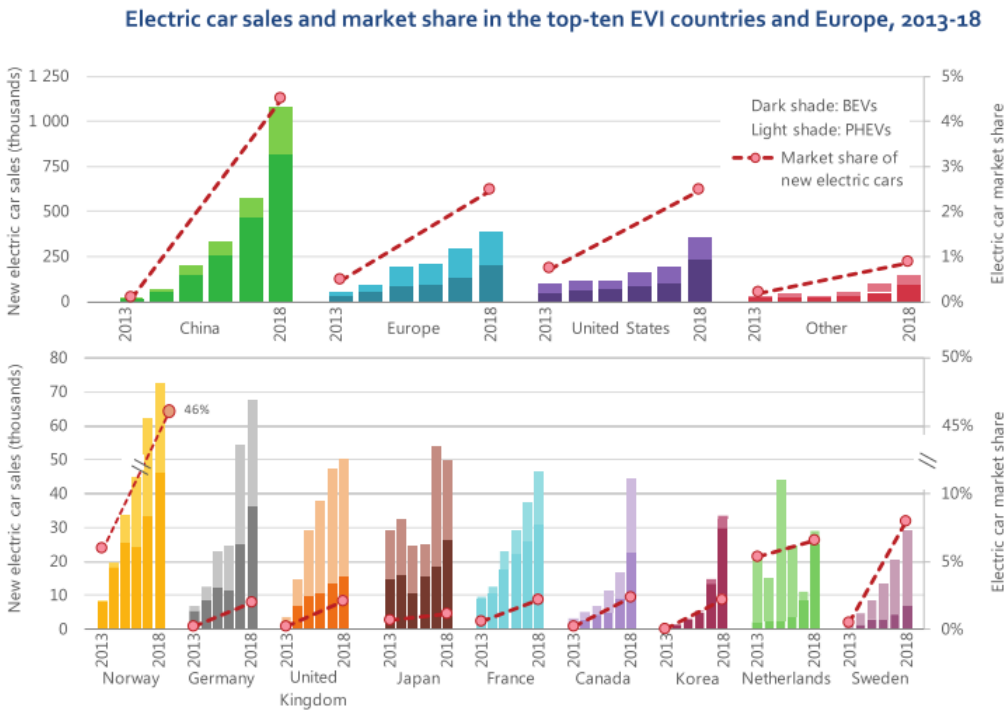


Figure 1.8 – EVs sales in most relevant markets

Globally, more than two-thirds of electric car sales in 2018 were BEVs. This share has been steadily increasing from 50% in 2012 to 68% in 2018. This is consistent with China's rapid electric car sales growth, as it is a BEV-dominated market (76%). The share of PHEVs in sales dropped in the United States from 47% in 2017 to 34% in 2018, due to strong BEV sales, in particular the Tesla Model 3. Europe remained a strong market for PHEV sales. PHEV sales dominated in Finland (86%), Sweden (75%) and United Kingdom (69%). In contrast, the PHEV share in electric vehicles (EV) sales significantly decreased in 2018 compared to 2017 in Japan (47% versus 67%) and the Netherlands (14% versus 22%).

1.3.1.1 Charging infrastructure

The number of charging points worldwide is estimated at 5.2 million (end-2018), up 44% from 2017 (Figure 1.9). Most of this increase was in private charging points, accounting for more than 90% of the 1.6 million installations in 2018. Publicly accessible installed fast chargers numbered 144 000 and slow chargers numbered 395 000 by end-2018.

Gathering reliable statistics on *private chargers* is challenging, given methodological issues to track level 1 chargers (i.e. residential electrical outlets not exclusively used for electric cars) and the lack of information collected on level 2 chargers (i.e. using a dedicated connector, with less than 240 Volts) installed on private property.

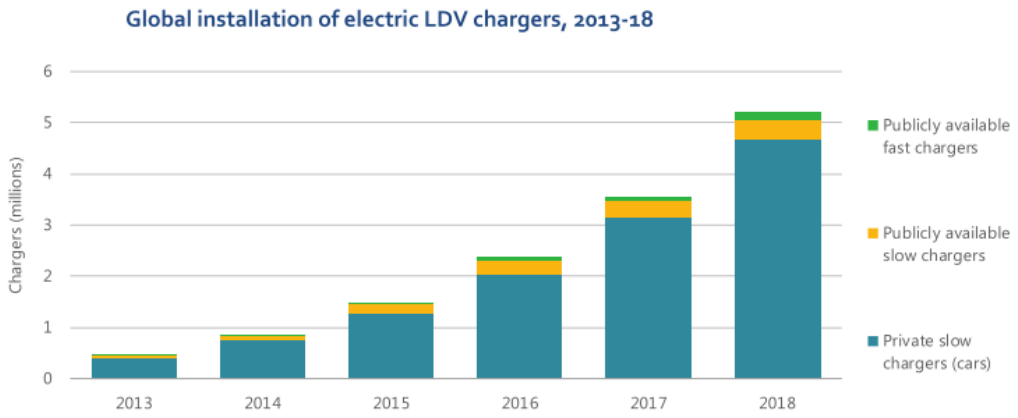


Figure 1.9 – Global stock of charging points

The data shown in Figure 1.9 are based on the assumption that, in all countries except China and Japan, each electric car is coupled with 1.1 private charger (level 1 or level 2), either at home or the workplace. In China and Japan, the estimate is one private charger per 1.5 cars. These ratios are based on observations for major EV markets such as the Nordics region of Europe and the United States, where the ratio of electric cars to private chargers is close to 1, and where EV owners tend to charge at home in the vast majority of cases.

The global number of *publicly accessible chargers* reached 539,000 in 2018, up 24% from 2017 levels. The growth rate of new installations of publicly accessible chargers is slowing in comparison to previous years (30% in 2017, 80% in 2016). In 2018, China remained the country with the largest installed publicly accessible charging infrastructure, accounting for half of the global total (Figure 1.10). Worldwide, in 2018, around a third of the publicly accessible chargers installed were fast chargers. In China, almost half of the newly installed publicly accessible chargers were fast, whereas in Europe and the United States a large majority were slow chargers.

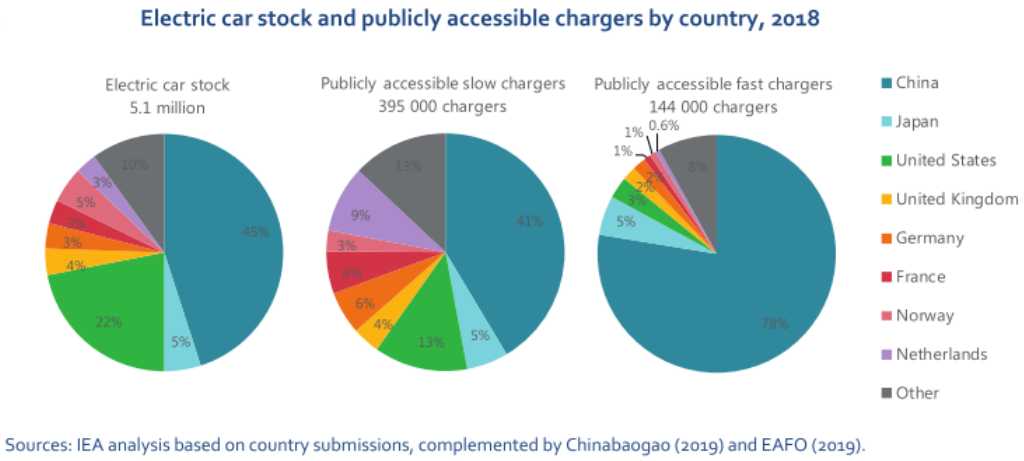


Figure 1.10 – Electric car and charges stock by country

The global number of publicly accessible chargers per electric car has decreased from 0.14 in 2017 to 0.11 at the end of 2018. This ratio remains higher than 1 charger per 10 electric cars, which is recommended by the European Union Alternative Fuels Infrastructure Directive (EC, 2014). Many leading countries in terms of electric car deployment remain below the global average of 1 charger per 10 electric cars: this is the case in Norway and the United States, with a ratio of 1 charger per 20 electric cars. Conversely, the Netherlands and Denmark have a relatively high number of publicly accessible chargers per electric car (about 1 charger per 4-8 electric cars). Therefore, the need for extensive publicly accessible charging infrastructure as a prerequisite for EV deployment is not automatic; it

depends on specific country features, such as population density (availability of access to home charging for each EV driver), access to workplace charging infrastructure and vehicle range.

1.3.1.2 EVs market in Italy

According to latest report available (Smart Mobility Report, by Energy&Strategy group of the School of Management of Politecnico di Milano), updated to the first 7 months of 2019, the Budget Law approved in late 2018 gave a strong boost to national EV market. For the first time, with more than 6,000 BEVs registration in the first half of 2019, the threshold of 1,000 registration per month was crossed, with a year-over-year increment of 113%. However, when considering Italian automotive market, EVs still represent less than 1% of total annual car registration (actually, 0.5%).

The main trend of Italian EVs market is the strong reliance on national and regional incentives. The 2018 Budget Law set the so-called "ecobonus" (up to 6,000€) for non-polluting vehicle, but some regions applied an additional contribution of up to 3,500€. If considering incentives on parking in some cities, exemptions on car tax and free access to restricted traffic zones, it is easy to understand the unexpected boom of electric car registrations. As an example, Lombardy enacted, in October 2019, a new law that gives from 2,000€ to 8,000€ for registrations of new, non-polluting cars. Summing up to 6,000€ (given by the State), new EV owners could grab up to 14,000€ of discount, which almost halves the price of a new electric car.

Speaking of Italian charging infrastructure, there are currently more than 8,000 recharging points, 3,500 of which are public, while the remaining are private with public access (20% are fast-charging, in line with European average). Geographical distribution is concentrated in the Northern part of the country (51%), with 70% of the total being installed in urban context, less than 30% in points of interest (such as shopping malls or public park-sites), and less than 5% is placed on highway and extra urban roads).

Carmakers as well are moving, especially to sell packages that include the installation of wall-box chargers together with the purchase of BEVs and PHEVs.

For instance, Hyundai and EnelX signed in late October 2019 a partnership that offers an integrated solution to customers who choose the electric versions of Kona and Ioniq. Indeed, they will receive the installation of the so-called “Juice Box”, a charging station that allow to fuel the car directly from domestic electric grid. Depending on power available, the JuiceBox can provide up to 7.4 kW, enough to fully charge a 64 kWh Hyundai Kona in few hours.

Hyundai and EnelX partnership represents a shining example of an electric mobility smart future, where with an all-inclusive monthly fee the user will get the car and all ancillary services such as fuel charging and dedicated assistance.

Another example of electric mobility-oriented initiative by carmakers is represented by Peugeot’s Free2Move range of services adopted during the launch of the new e-2008, the full electric version of standard 2008 SUV. This 100 kW (136 CV) brand new car can be purchased in bundle with a wide range of complementary services dedicated to smoothing the transition from ICE vehicles to EVs.

Namely, the Easy Charge package includes both at-home and public charge solutions. Customers can choose whether to install a Wallbox, Smart Wallbox or a heavy-duty socket, all included in the monthly fee.

The Easy Mobility package includes a range of instruments to help users planning their trips, such as considering the charging stations on the route and teach them how to drive in the most efficient way.

1.3.2 Policies and regulations

This section takes into account two different scenarios: the New Policies Scenario and the EV30@30 one.

The *New Policies Scenario (NPS)* is the benchmark scenario of the analysis. It considers the policies and measures that governments around the world have already put in place, as well as the likely effects of announced policies that are expressed in official targets or plans. It includes key policies in place as well as recent EV-related updates. It focuses on illustrating the consequences of existing and announced policy measures and ambitions to advance the adoption of EVs and the spreading of charging infrastructure. A summary of the policies and targets for electric light-duty vehicles (LDVs) is included in Table 1.1. The New Policies Scenario in this outlook also accounts for announcements from original equipment manufacturers (OEMs) regarding plans to scale up electric cars and automotive batteries production.

Key government policy measures and targets to advance deployment of electric light-duty vehicles

Country/ region	Key policy measures and targets*	Announced (year)	Source
Asia			
China (EV30@30 signatory)[a]	Target of 5 million EVs by 2020 (including 4.6 million PLDVs).	2012	Government of China (2012)
	New electric vehicle (NEV)[b] mandate: 12% NEV credit sales in passenger cars by 2020.[c]	2016	Government of China (2018)
	Roadmap for NEV sales share: 7-10% by 2020, 15-20% by 2025 and 40-50% by 2030.	2017	Marklines_(2017)
	***Proposal for tightened fuel economy standard (4 L/100 km** [NEDC] **by 2025)**.* (Current fuel economy standard until 2020).	2019	Government of China (2019)
India	Target of 30% EV sales by 2030 across all modes.	2018	Government of India (2018)
	Public procurement from EESL (target 500 000 vehicles, implementation delayed).	2018	
	CO_2 emissions standard of 113 g CO_2/km in 2022.	2015	Ministry of Power of India (2015)
Indonesia	***2 200 EVs in PLDVs by 2025.***	2019	Market Research Indonesia (2019)
Japan (EV30@30 signatory)	Target of 20-30% BEV and PHEV sales in PLDVs by 2030 (in addition to 40% HEVs and 3% FCEVs).	2014	Government of Japan (2014) and Government of Japan (2018)
	Long-term goal ("by the end of 2050") of a reduction of 80% of GHG emissions per vehicle produced by Japanese automakers.	2018	Government of Japan (2018)
	Fuel economy target of 19.7% reduction in specific fuel consumption by 2020 compared to 2009 and an additonal 23.8% between 2020 and 2030.	2011 and 2019	ECCJ (2011) and Government of Japan (2019a)
Korea	***Targets of 430 000 BEVs and 67 000 FCEVs on the road by 2022.***	2019	Government of Korea (2019)
	Subsides and rebates on national and local vehicle acquisition taxes, reduced highway toll fees and public parking fees.	2018	Korean Environment Corporation (2019)

Table 1.1 – part 1

Country/ region	Key policy measures and targets*	Announced (year)	Source
Thailand	***Target of 1.2 million EVs by 2036.***	2016	Harman (2018)
Malaysia	***Target of 100 000 passenger LDV stock in 2030.***	2017	Government of Malaysia (2017)
Europe[d]			
European Union	***Emission standards for g CO_2/km of LDVs, requiring 15% reduction between 2021 and 2025 and 37.5% (30% for vans) by 2030, including incentives attached to 15% and 35% zero- and low-emissions vehicle shares.***	2019	European Council (2019a)
	Revision of the Clean Vehicles Directive on public procurement, including minimum requirements of 17.6% in 2025 and 38.5% in 2030.	2018	European Parliament (2019a)
Denmark	***Target of 1 million electrified vehicles stock in PLDVs by 2030.***	2018	Government of Denmark (2018)
Finland (EV30@30 signatory)	Target of 250 000 EV stock in PLDVs by 2030.	2016	Government of Finland (2017)
France (EV30@30 signatory)	Ban on the sales of new cars emitting GHG in 2040.	2017	Government of France (2017)
	Multiply by five the sales of BEVs in 2022 compared to 2017.	2018	Government of France (2018)
	Reach a fleet of 1 million BEVs and PHEVs in 2022.	2018	
Ireland	Target of 500 000 EVs in passenger LDVs by 2030.	2018	Government of Ireland (2018)
Netherlands (EV30@30 signatory)	Target of 100% ZEV sales in PLDVs by 2030.	2017	Kabinetsformatie (2017)
Norway	100% EV sales in PLDVs and LCVs by 2025.	2016	Government of Norway (2016)
Poland	***1 million EVs in PLDVs by 2025.***	2016	Government of Poland (2016)
Slovenia	Targets of: - 100% EV sales in PLDVs by 2030 - 17% EV stock in PLDV by 2030.	2017	Novak (2017)
Spain	***Targets of:*** ***-5 million EVs in LDVs, buses and two/ three-wheelers.*** ***-100% ZEVs sales in PLDVs by 2040.***	2019	Government of Spain (2019)
Sweden (EV30@30 signatory)	Targets of: -Reduction of CO_2 emissions from transport by 70% in 2030 compared to 2010. -Net zero GHG emissions by 2045.	2017	Government of Sweden (2017)
United Kingdom	Target of 50-70% EV sales in PLDVs by 2030.	2018	Government of the UK (2018)

Table 1.1 – part 2

Country/ region	Key policy measures and targets*	Announced (year)	Source
(EV30@30 signatory)	Ban sales of new ICE cars from 2040.	2018	Government of the UK (2017)
Other European Union[e]	Targets of: - 370 000 to 680 000 electric cars by 2020. - 4.4 million to 5.24 million electric cars by 2030.	2017	EC (2017a)
North America			
Canada (EV30@30 signatory)	***Targets of:*** ***- 10% ZEV sales in PLDVs from 2025.*** ***- 30% ZEV sales in PLDVs from 2030.*** ***- 100% ZEV sales in PLDVs from 2040.***	2019	Government of Canada (2019)
	Annual reduction of CO_2 emissions per kilometre of 5% from 2017 to 2025 for PLDVs and 3.5% from 2017 to 2021 and 5% from 2022 to 2025 for light trucks.	2012	Government of Canada (2012)
United States (selected states)	Targets of: - 3.3 million EVs in eight states combined by 2025.[f]	2014	ZEV Program Implementation Task Force (PITF) (2014)
	- ZEV[g] mandate in ten states[h]: 22% ZEV credit sales in passenger cars and light-duty trucks by 2025.[i]	2016	ZEV PITF (2014)
	- California: 1.5 million ZEVs and 15% of effective sales by 2025, and 5 million ZEVs by 2030.	2016	State of California (2018; 2016) CARB (2016)
Other countries			
Costa Rica	***Target of 37 000 EVs stock in PLDVs by 2023.***	2017	Government of Costa Rica (2017)
Chile	***40% EVs in PLDVs by 2050.***	2018	Government of Chile (2018)
Israel[3]	***Targets of:*** ***- 177 000 EV stock in PLDVs by 2025.*** ***- 1.5 million EV stock in PLDVs by 2030.***	2018	Government of Israel (2018)
New Zealand	Target of 64 000 EVs stock in PLDV by 2021.	2016	Government of New Zealand (2016)

Table 1.1 – part 3

The *EV30@30 Scenario* is in line with the ambitions of the Electric Vehicle Initiative (EVI: launched in 2010, the Electric Vehicles Initiative is a multi-government policy forum dedicated to accelerating the introduction and adoption of electric vehicles worldwide) signatories of the EV30@30 Campaign Declaration, that is to achieve by 2030 a 30% market share for EVs in all modes. According to the EV30@30 Scenario, the target of 30% sales share in 2030 for LDVs (light-duty vehicles), buses and trucks

collectively is met at the global level. To be able to assess the benefits of electric mobility on climate change mitigation, the scenario also accounts for relevant measures such as the progressive reduction of the carbon intensity of electricity generation, ways to reduce average trip distances and fewer trips by car, and to enable a larger share of movements on public transportation and non-motorised modes of transport.

1.3.2.1 New Policies Scenario

The main regulations and incentive policies recently developed by several governments worldwide are summarized in the Table 1.1.

In the New Policies Scenario, the global EV stock (excluding two/three-wheelers) exceeds 55 million vehicles in 2025 and reaches about 135 million vehicles in 2030 (Figure 1.11), with an average year-on-year compound annual growth rate of 30% over the projection period. Global EV sales (excluding two/three-wheelers) reach 12 million in 2025 and nearly 23 million in 2030, increasing on average by 21% per year. The projected EV sales correspond to 9% and 15% of all vehicle sales (excluding two/three-wheelers) in 2025 and 2030.

The fleet of electric LDVs (including passenger light-duty vehicles [PLDVs] and light-commercial vehicles [LCVs]) is the second-largest after two/three-wheelers, accounting for more than 95% of the EV stock across all other modes (excluding two/three-wheelers) throughout the projection period in both scenarios. This is not due only to the rate of electrification projected for LDVs, but also on the predominance of LDVs in the total vehicle fleet.

In the New Policies Scenario, the electric LDV fleet reaches nearly 52 million vehicles in 2025, 129 million vehicles in 2030, up from 5.4 million in 2018. Globally, the stock shares of electric LDVs increase from below 1% in 2018 to 7% in 2030. Sales of electric LDVs rise from 2.1 million in 2018 to almost 12 million in 2025 (a market share of 9%) and 22 million in 2030 (15% market share). Over the period to 2030, EV sales in LDVs rise at an average year-on-year rate of 32%. Sales initially lean towards BEVs

(about 70% in 2018), mostly because China – the largest EV market worldwide – has remarkably high adoption of BEVs. In the longer term, the balance between BEVs and PHEVs shifts towards a slightly higher share of PHEVs, about 36% of all EVs sales in 2030. This is due to the bigger popularity of PHEVs in the large vehicle segments, especially for consumers that have long driving range requirements.

The evolution of BEV and PHEV shares is a challenging point. The policy environment certainly has strong capacity to influence consumer choices, as do marketing strategies. For example, BEVs are more popular in countries that use differentiated taxation measures related to zero tailpipe emissions (rather than both low- and zero-emissions vehicles), and the consumer appeal of a BEV can be maximized by optimizing the balance between price and driving range, depending on travel habits. Regional differences are related to driving behavior (for example, higher average mileage for LDVs in North America relative to Asia and Europe) and the availability of electric vehicle supply equipment (EVSE), especially for long-distance trips.

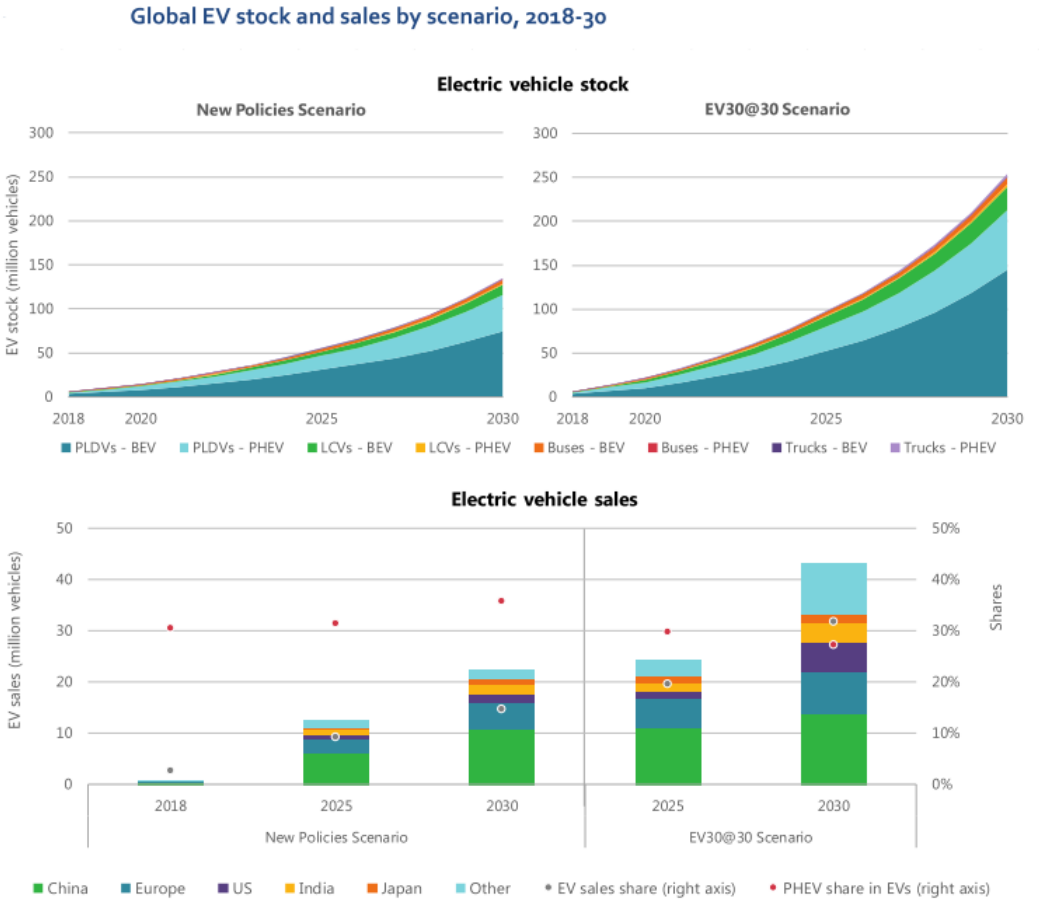
1.3.2.2EV30@30 Scenario

The EV30@30 Scenario projects global EV stock and sales that in 2030 are nearly double the projections in the New Policies Scenario. In the EV30@30 Scenario, the global EV stock exceeds 250 million vehicles in 2030 (Figure 1.11), when sales reach 43 million. In this scenario, it is assumed that all countries rapidly implement policy measures that promote the adoption of EVs such that by 2030 EVs slightly exceed a 30% EV share in the global vehicle market (excluding two/three-wheelers).

In the EV30@30 Scenario, around 110 million more electric LDVs are projected to be on the road in 2030 relative to the New Policies Scenario. This corresponds to a stock share of 15% in 2030. This is the result of faster EV deployment that achieves and slightly exceeds the EV30@30 Campaign ambition to reach a 30% market share by 2030, combined with policies that help manage travel demand, reduce trip distance and shift part of the

passenger mobility to more efficient modes of transport, with the consequence of reducing the growth of LDV stocks.

In the EV30@30 Scenario, electric LDV sales exceed 41 million in 2030 (a 33% market share, needed to compensate for a lower than 30% EV market share in buses and trucks). BEVs have a larger presence in the electric LDV fleet reflecting the emphasis on energy efficiency, energy diversification, and pollutant and GHG emissions reductions in this scenario. For the same reasons, PHEVs rely more on their electric powertrain than in the New Policies Scenario.



Note: PLDVs = passenger light-duty vehicles; LCVs = light-commercial vehicles; BEV = battery electric vehicle; PHEV = plug-in hybrid vehicle.

Source: IEA analysis developed with the IEA Mobility Model (IEA, 2019a).

Figure 1.11 – Deployment of EVs adoption by scenario

By a geographical sales and stock shares comparison, *China* emerges in both scenarios as the region where EVs adoption is highest.

In the New Policies Scenario, EVs sales shares across all modes reach 57% in 2030 (28% excluding two/three-wheelers). The uptake of EVs in the LDV sector reflects several concurrent factors: in the medium term, the regulation that require an average fuel consumption of 4 l/100 km by 2025 is causing an acceleration of electric cars sales (and HEV sales). Additional factors supporting increasing EV growth include: supportive industrial policies for battery producers; increasing number of restrictions in cities for registration of non-electrified vehicles; scaling up the EV production capacity of Chinese OEMs in response to policy restrictions that would otherwise limit their opportunities for growth.

Chinese BEVs sales penetration is the highest, in accordance to the reorientation of governmental subsidies to BEVs with longer ranges.

The EV30@30 Scenario entails a 42% sales share of EVs in 2030 (excluding two/three-wheelers), with increases in all modes of transport. That is mainly boosted by the capitalization of stronger policy support and the commercial opportunities generated by EVs.

Europe keeps up with China in the transition towards electric mobility. In the New Policies Scenario, the EVs sales share in Europe reach 26% in 2030 for all modes (excluding two/three-wheelers). The sales shares are very similar for LDVs. Buses attain 32% sales share in 2030, which is consistent with the Clean Vehicles Directive targets for procurement of electric urban buses (see Table 1.1). The main drivers of these projections are: stringent policies enforced across the whole European Economic Area, such as fuel economy standards for LDVs and heavy-duty vehicles, and the minimum threshold for zero- and low-emissions vehicles; recent bans of ICE vehicles made by some of the EU state members; access restrictions to city-centers and urban areas enforced by a number of major European cities; the strategic relevance that European institutions place on battery storage and the development of a European battery industry, coupled with several announcements on new manufacturing capacity; many European

OEMs, starting by German ones, put in place initiatives to accelerate the transition to electric mobility, as a reaction to policy signals.

In the EV30@30 Scenario, European leadership in the electrification of transport is strengthened by: strong policy support; capturing commercial opportunities in areas where EVs are most competitive; high fuel price regimes with fuel taxation rates that exceed those of any other major global market. In this scenario, EVs account for almost half of all vehicles sold in 2030.

In the New Policies Scenario, by 2030 EVs sales across all modes (excluding two/three-wheelers) in the *United Sates* are 8% of the market. In *Canada*, they attain a 29% market share, in line with other front running countries in the electrification of transport. This also reflects an evolution in the development of electric mobility that occurs at two speeds in Canada and the United States: low fuel taxes and high average annual distance driven reflect the poor fuel economy policy of the federal US government. However, twenty States, led by California, have implemented a zero-emission vehicle (ZEV) mandate and intend, together with Canada, to see faster deployment of electric vehicles.

The EV30@30 Scenario sees a catch-up with the global leaders in development of electric mobility, even if EVs penetration of China, Europe and Japan, due to US fossil fuel prizes regime and vehicle sizes, is not met. By 2030, 31% of all LDV sales and 17% of all bus sales are electric in the United States.

EVs share of sales across all modes in *India* reach nearly 30% in 2030 in the New Policies Scenario. Vehicle electrification is primarily in the two-wheeler segment with BEVs accounting for four-out-of-ten new units in 2030. EVs also penetrate the LDV and urban bus markets, reaching 14% of all passenger cars and LCVs, and 11% of all bus sales. In 2017, Indian government fostered a full transition to electric by 2030.

In the EV30@30 Scenario, as a global frontrunner in the transition to electric mobility, India reaches EV sales shares across all modes (except two/three-wheelers) of 29% in 2030 (54% including two/three-wheelers). In

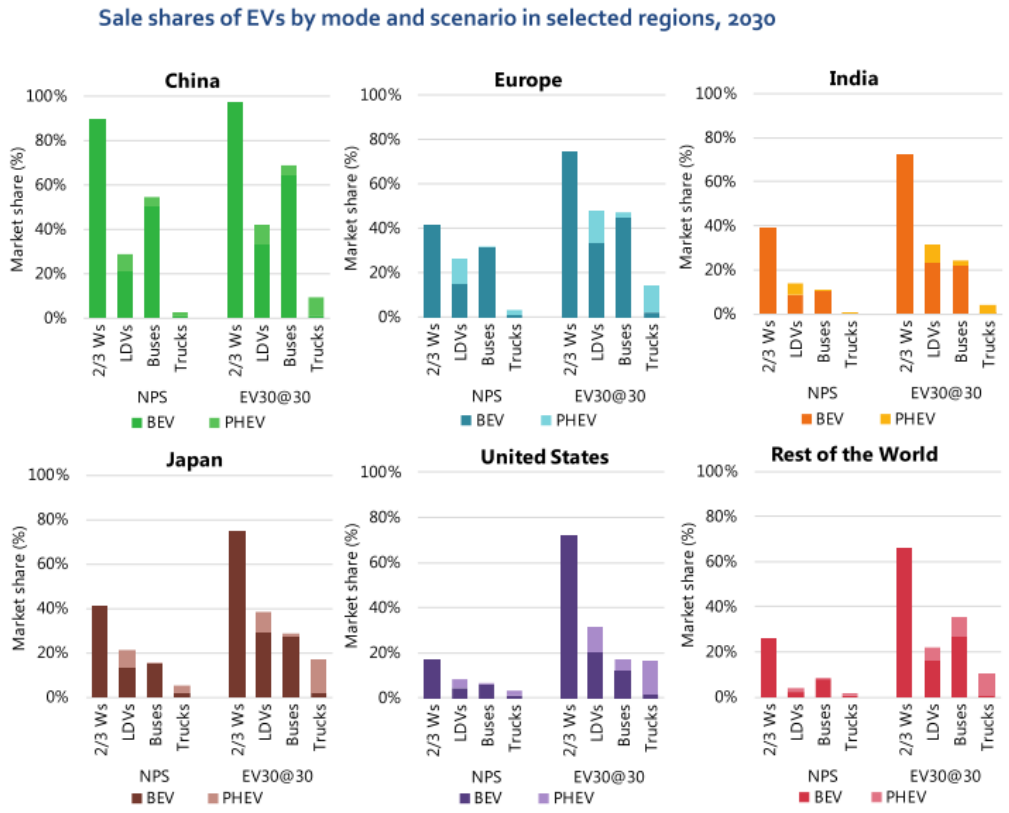
2030, in India 72% of two-wheelers, 31% of cars and 24% of buses are electric.

EVs sales shares for all modes (excluding two/three-wheelers) in *Japan* reach 21% in 2030 in the New Policies Scenario, mostly LDVs and buses, which achieve a lower market penetration than in Europe and China.

Japan is one of the global leaders in the transition to electric mobility and is in line with the targets for the sale of "Next Generation Vehicles" (including EVs) outlined in the interim report by the Ministry of Economy, Trade and Industry (METI) Strategic Commission for the New Era of Automobiles and recent updates of fuel economy standards. Japan makes concrete progress towards the long-term goal for its automakers to cut GHG emissions per vehicle by 80%. The relevant uptake of BEVs and PHEVs matches the global leadership of Japanese manufacturers on vehicle electrification technologies from HEVs to BEVs, and growing engagement in the development of solid-state batteries.

In the EV30@30 Scenario, EV market shares in Japan scale up rapidly to 37% in 2030 across all modes of transport. This is close to the market shares projected for China and Europe.

Figure 1.12 summarizes the forecasts for both NPS and EV30@30 Scenario for the leading countries.



Notes: NPS = New Policies Scenario; EV30@30 = EV30@30 Scenario; 2/3Ws = two/three-wheelers; LDVs = light-duty vehicles; BEV = battery electric vehicle; PHEV = plug-in hybrid vehicle.

Source: IEA analysis developed with the IEA Mobility Model (IEA, 2019a).

Figure 1.12 – EVs sales shares by region, scenario and mode

1.3.3 Environmental impact

EVs are generally considered as "clean" because their CO_2 emissions *from tank to wheel* are zero. However, a fairer way to compute the pollution level of an electric vehicle is the so-called *well to wheel* (WTW) emissions method. It considers all polluting emissions related to electric energy production. In particular, GHG emissions from an equivalent ICE fleet indicate the WTW CO_2-eq emissions that would have been emitted if the EVs would have been ICE vehicles of equivalent size. The carbon intensity of the national power systems account for transmission and distribution losses. Of course, it strongly depends on the energy mix of a geographical area or country. When ranking CO_2 emissions in the European Union, EVs already overcome traditional cars, except when electricity is entirely

produced by coal plants. In particular, some countries like Norway and France, that rely on renewable sources and nuclear energy, managed to reach very low levels of WTW carbon dioxide emissions (Figure 1.13). On the other side, large economies such as the US and China are still producing electricity from non-adequate sources. In the future, if energy production will not come from coal, EVs will gain a larger and larger advantage over ICE-powered vehicles, in accordance to what COP21 (United Nations framework convention on climate change) established in 2015.

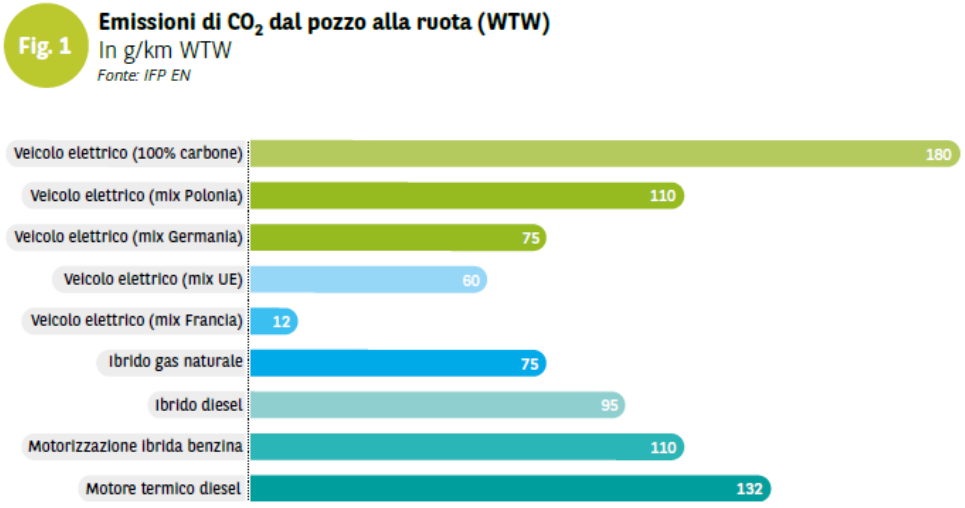


Figure 1.13 – CO_2 emissions from well to wheel (WTW) – Source Osservatorio Findomestic

On a global scale, in 2018 EV stock emitted about 38 million tonnes of carbon-dioxide equivalent (Mt CO2-eq) on a well-to wheel (WTW) perspective. This compares to 78 Mt CO2-eq that an equivalent internal combustion engine (ICE) fleet would have emitted, leading to net savings from EV deployment of 40 Mt CO2-eq (Figure 1.14). These savings were achieved through the combination of the high energy efficiency of the electric powertrain and the carbon intensity of the power grid. The EV fleet in China is the largest contributor to these savings, accounting for about 30 Mt CO2, 77% of the total. This result reflects the large magnitude of the EV stock in China, rather than a significant advantage of EVs over ICE vehicles in terms of WTW CO_2 emissions given the high carbon intensity of China's power generation mix.

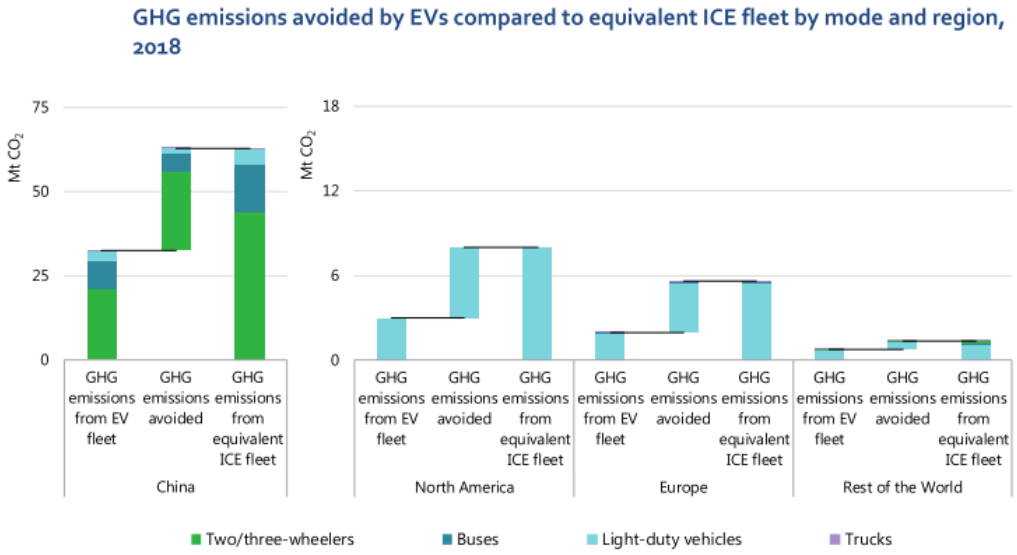


Figure 1.14 – GHG comparison, EVs vs ICE vehicles

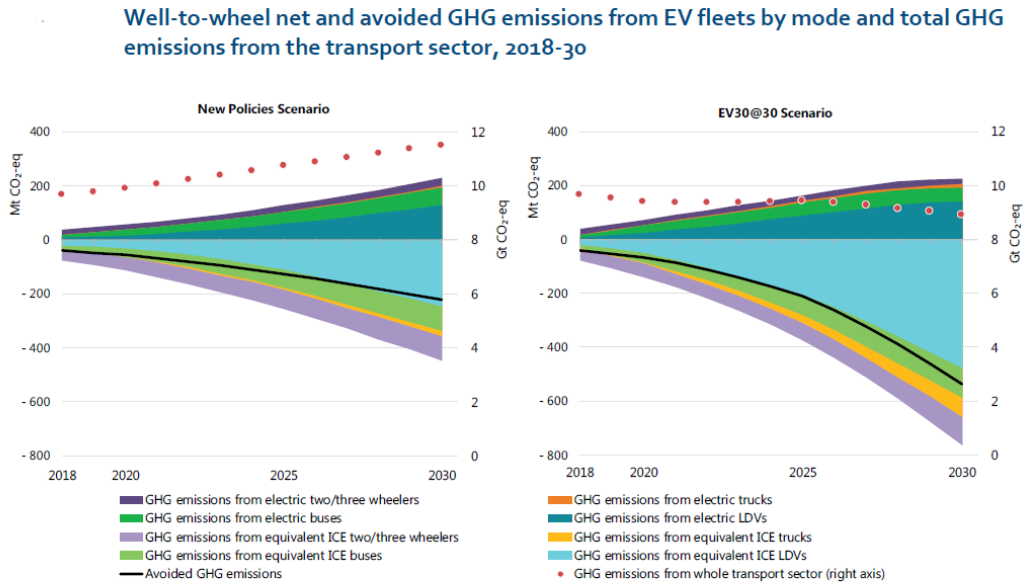
The future emissions of GHG and energy savings related to EV fleet are both related to the electricity consumption of next-gen cars and the energy mix used to fuel them.

According to both NPS and EV30@30 Scenario, in 2030 WTW emission will be lower than those resulting from the continued reliance of ICEs powered by fossil fuels. Furthermore, both NPS and EV30@30 Scenario forecast increasing reduction in WTW emission, in percentage terms, over time. That's because carbon intensity of electric energy generation is expected to decrease over time, as well.

The expected emissions of CO_2-equivalent by EVs in 2030, according to NPS, are roughly 230 million tonnes (Mt). If the projected EVs were powered by ICEs, GHG emission would almost double, reaching 450 Mt CO_2-equivalent, which means that the global electric fleet would save approximately 220 Mt of GHG emissions in 2030.

EV30@30 Scenario, besides the accelerated deployment of EVs, assumes power grid decarbonization, so that the projected EV fleet emissions are roughly the same as those expected according to NPS, but savings in GHG emissions are significantly higher, as the equivalent ICE powered fleet

would pollute for about 770 Mt CO_2-eq. The decarbonization of power systems would also enable to keep GHG emissions coming from the increasing EVs stock under control: from 2020 on, indeed, WTW emissions from the transport sector stabilize at around 9.4 Gt CO_2-eq, and decrease to 9 Gt CO_2-eq in 2030, more than 20% less than in the NPS (Figure 1.15).



Notes: 2/3Ws = two/three-wheelers. Positive emissions are the net emissions from the global EV fleet. Negative emissions are avoided emissions due to the global EV fleet, which are calculated as the difference between the emissions from an equivalent ICE fleet and an EV fleet. The WTW GHG emissions from the projected EV stock are determined in each scenario by multiplying the future electricity consumption from the EVs times the carbon intensity of each power system from the IEA *World Energy Outlook* for the New Policies Scenario and its Sustainable Development Scenario for the EV30@30 Scenario. The WTW GHG emissions for the equivalent ICE fleet are those that would have been emitted if the projected EV fleet was instead powered by ICE vehicles with technology shares (diesel and gasoline) and fuel economies representative of each country/region in each year. Fuel economies for ICE and EV powertrains for each mode are provided in the notes to Figure 3.8.

Sources: IEA analysis developed with the IEA Mobility Model (IEA, 2019a); carbon intensities from (IEA, 2018d).

Figure 1.15 - WTW and net GHG savings by mode and scenario, 2018-30

1.3.4 Future Challenges

The most demanding challenge for the future development and mass adoption of EVs is related to batteries, and on the range they can grant to vehicles they are installed into.

According to *Osservatorio Findomestic*[4], author of an interesting survey, range of batteries of EVs is still the main issue preventing this technology from a large-scale adoption. As of today, batteries grant an average range that goes from few dozens of km to 350 km (except for Tesla cars, very expensive though). That should be enough for the large majority of users (86% of the sample declared they travel less than 100 km per day). The barrier to mass adoption is psychological rather than technical: travel planning, recharge management and limitations in journeys are a strong deterrent. However, people seem to be aware that an "electric future" is unavoidable, and 40% of the interviewed declared that they would like to buy an EV if its range exceeded 400 km.

1.3.4.1 Batteries

It is estimated that approximately 70 gigawatt-hours (GWh) of battery cells were produced for electric LDVs in 2018. Production is concentrated in China, which accounts for over 50% of the global market share, with the rest being split between the United States, Korea and Japan. There are currently around 60 manufacturers in China with the top-two companies, BYD and CATL, accounting for more than half of the Chinese market. To grab the benefits of scale economies, battery industry is moving to increase manufacturing capacity. Even if the majority of production still is sourced from small plants (3-8 GWh/year capacity), several recent announcements of production capacity expansion point to an increase in plant size as well as new entrants in the automotive battery market, adding to increases in capacity utilization rates of existing plants. Each of the three biggest battery factories currently in operation, all recently built, has a capacity of 20 GWh/year and, together, account for roughly 21% of the total installed capacity. Most of these are located in China, Japan and Korea.

Eight plants with a capacity of more than 20 GWh/year are expected to be in production by 2023. In total, these will have a production capacity of more than 180 GWh/year, almost 2.5-times more than LDVs battery

[4] *Osservatorio auto 2019, Findomestic*

production in 2018. In the longer term, plants with capacities around 100 GWh are being discussed. Panasonic considered expanding production (to 105 GWh/year) at its Gigafactory, but the expansion plans were suspended in April 2019. CATL has spoken about the possibility of expanding its Erfurt plant to up to 100 GWh/year.

Furthermore, another main issue is charging infrastructures diffusion and speed: in 2018, more than two-third of the global charging stations stock was domestic, with very few publicly available chargers, and even less highway charging stations. To make things better, private utilities, state-owned companies and OEMs-controlled societies have recently made announcements on installing thousands of new charging points.

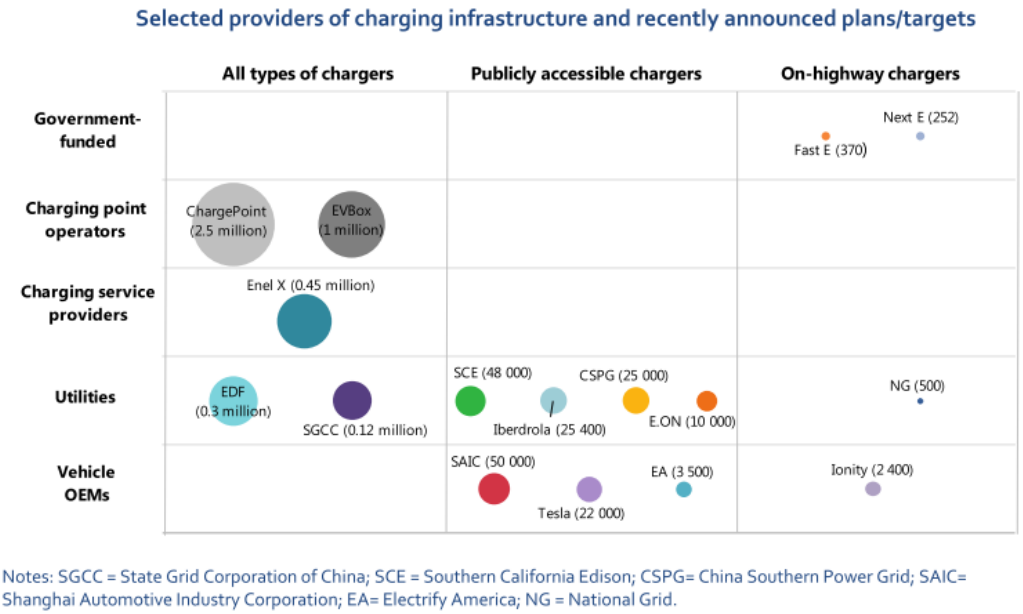


Figure 1.16 – New announced batteries plants, by mode and capacity

Figure 1.16 shows some of the main installations forecasted in the next few years: on-highway chargers are very if compared to other kinds and mainly government- and OEMs-funded.

The EV deployment described in the market outlook section of this chapter is facilitated by increases in battery capacity manufacturing. The development of described solutions depends also on the balance between

the several electric powertrains, as they are equipped with different kinds and sizes of batteries. In general, the last few years saw a diffused increase in batteries capacities: BEVs medium range went from 10-20 kWh in 2012 to 30-70kWh in 2018 (Figure 1.17), mainly due to the trend determined in the USA, with larger scale adoption of long-range electric cars (especially Teslas). As far as PHEVs are concerned, their batteries capacity is approximately 10-13 kWh, which should allow 40-60 km of driving range. That value is compatible with the daily trips made by 60% of users, according to the most conservative regional estimate used in the worldwide harmonized light vehicle test procedure)[5].

In the future, batteries capacities of BEVs are expected to grow till reaching a range of at least 350/400 km, which means roughly 70-80 kWh. On the other hand, PHEVs all-electric driving range will increase, too, with batteries that should reach around 10-15 kWh in 2030.

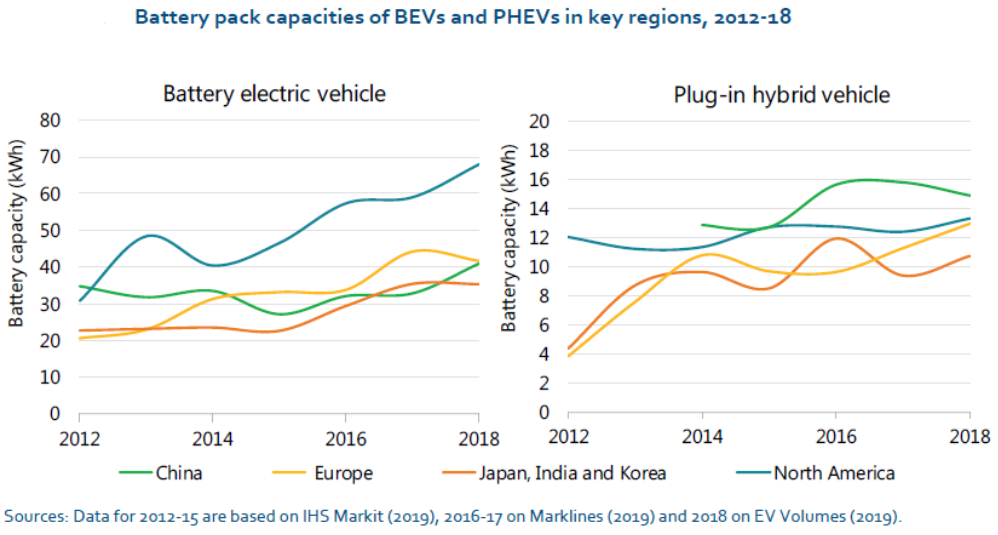
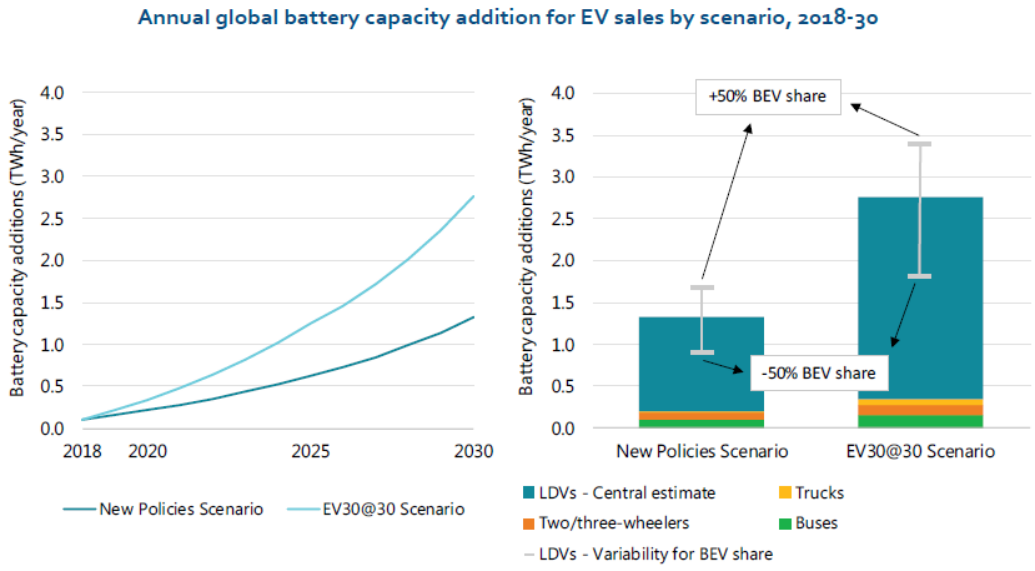


Figure 1.17 – Battery capacity of EVs in key regions, from 2012 to 2018

Private chargers - The outlook of New Policies Scenario about development of EVs batteries capacities will grow from the current 0.1 TWh/year to 1.3 TWh/year in 2030, by taking into account historical data

[5] *UNECE (United Nations Economic Commission for Europe) Annual Report, 2018*

about last years' increments in global capacity and the market share analyzed above. Given that batteries of PHEVs are much smaller than those of BEVs, estimates that led to NPS are particularly sensitive to market share of the former compared to the whole EV stock. Assuming that the share of BEVs in LDVs sales is 50% higher than the projections in the New Policies Scenario implies a global battery capacity of about 1.7 TWh/year in 2030 (+26%). On the other hand, assuming a share of BEVs in electric LDVs sales 50% lower than the central estimate implies about 0.9 TWh/year of battery capacity.



Notes: The range indicates the variability in battery capacity resulting from an increase (or a decrease) of BEV sales shares in total LDVs by 50% compared with the New Policies Scenario projections. In some regions, the 50% increase of BEV shares leads to 100% BEV sales shares (especially in the EV30@30 Scenario, where BEV shares in LDVs are higher). This explains why the variability of battery capacity to BEV shares is not the same in both directions.

Figure 1.18 – annual battery capacity increase by scenario

As figure 1.18 suggests, expansion of battery manufacturing capacity will strongly depend on the development of car market electrification, because EVs diffusion will be a crucial driver for adoption of scale economies and reduction of unit cost of battery packs.

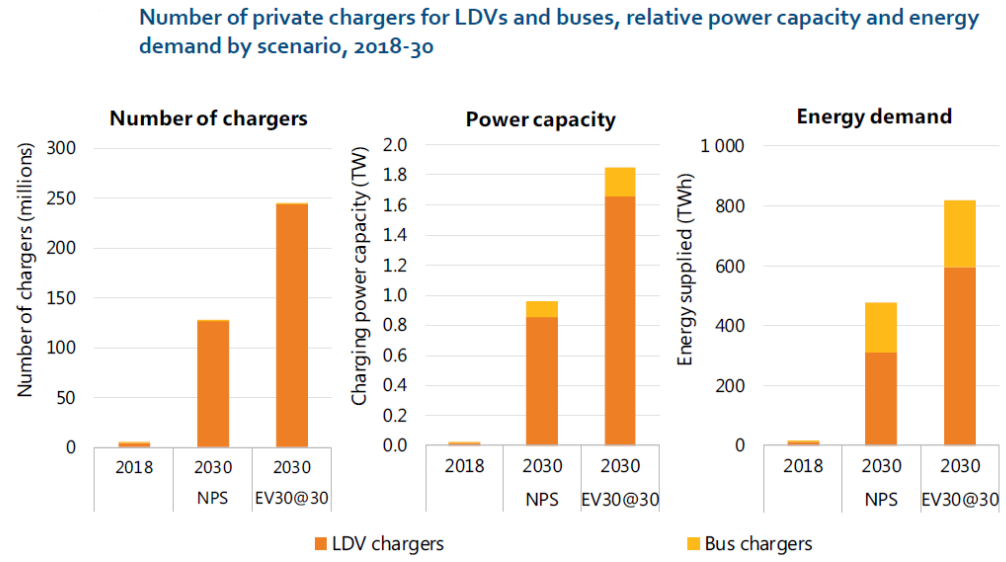
The EV30@30 Scenario estimates a faster growth of global battery capacity, that reaches 2.8 TWh/y in 2030. Both higher EV sales and higher share of BEVs contribute to this scenario. As in the NPS, light-duty

vehicles represent almost 90% of total battery capacity, with cars alone that account for more than 80% of the total.

1.3.4.2 Charging infrastructures

The NPS projects a total number of private charging points for LDVs and buses of 128 million in 2030 (currently, they are approximately 5 million). The great majority of those (almost 99%) are slow domestic chargers. By considering the hypothesis of evolution of home and workplace charging towards level 2 (6-7 kW) and the average power of bus chargers going up to 190 kW, the projected scenario in 2030 would result in nearly 1 TW of installed capacity. It looks like a tremendous result, but currently global installed capacity of air conditioners is more than 15 TW, which reflects the relatively small magnitude of EVs market current state. Total energy demand coming from LDVs and buses from private chargers in 2030 is expected to be 480 kWh in the NPS. Given that home and workplace private chargers have much lower capacity if compared to bus and public fast chargers, they account for only 65% of total delivered energy, although they represent 90% of the total number of installations.

EV30@30 Scenario expects a number of private chargers in 2030 almost double the one projected by the NPS (245M vs 130M approximately), corresponding to a total installed charging capacity of 1.8 TE, and consumption of 820 TWh of power (Figure 1.19).



Note: NPS = New Policies Scenario.

Source: IEA analysis developed with the IEA Mobility Model (IEA, 2019a).

Figure 1.19 – Deployment of charging infrastructure by scenario

Publicly accessible chargers – publicly accessible chargers for LDVs are important enablers for those who travel long-range, or for those who cannot count on home or workplace charging infrastructures. NPS and EV30@30 Scenario rely on the following considerations to project publicly accessible chargers' picture in 2030:

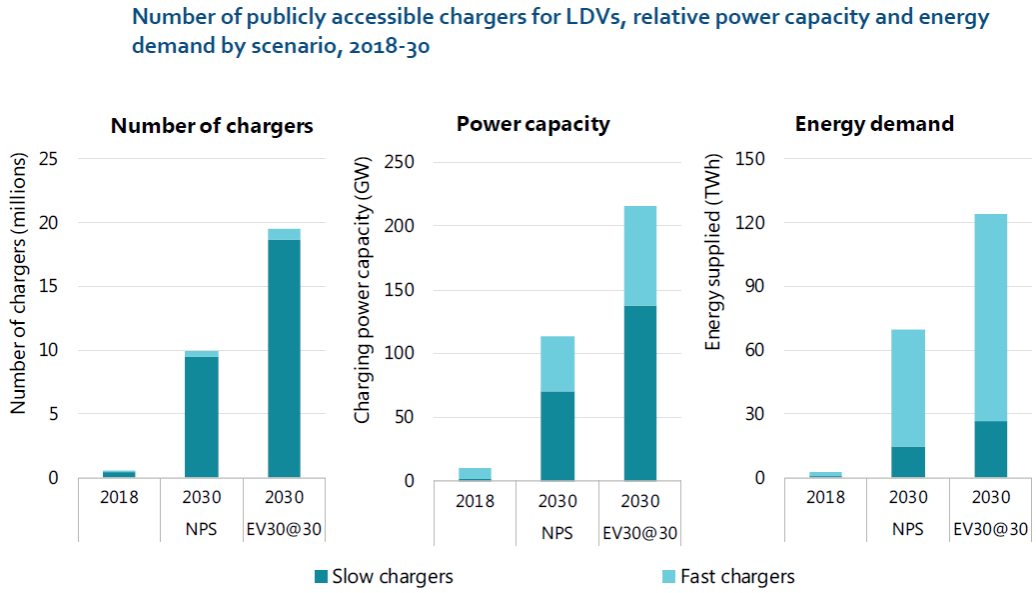
- The majority of countries are assumed to tend to a ratio of one public charger per ten electric LDVs in 2030, which is the value aimed at by both China and the European Union;
- The share of fast chargers per EV is set at 10% of the distance driven by EVs in all regions except for China and Japan, where the same share is supposed to be 20%. The 10% value reflects the much higher frequency of use of home and workplace chargers observed in the Nordics, and higher power density in case of fast charging. The 20% share of China and Japan is based on current higher reliance on fast chargers observed;
- Slow chargers are intended to be level 2, with average power of 3.7 kW today, increasing up to 7.4 kW in 2030;

- Actual fast chargers, based on DC technology, are subject to a progressive upgrade to ultra-fast and high-power chargers; their average power is expected to shift from the current 50 kW to almost 100 kW by 2030. By assuming that the capacity utilization of chargers stays constant, the consequence is a drastic reduction in the number of publicly accessible fast charging points, which lowers their share in the total of all publicly accessible chargers.

The NPS forecasts an increase in the number of publicly accessible chargers from the current 560,000 to almost 10 million in 2030, of which approximately 95% of the total are slow chargers, up from 70% today. Power capacity of LDV public charging infrastructure is expected to get to 113 GW in 2030, of which 40% is provided by fast chargers. Total energy consumed is 70 TWh, of which approximately 80% is delivered by fast chargers.

Publicly accessible LDV chargers in 2030 is forecast to be 7% of the total number of LDV chargers (by considering both public and private ones). Power capacity accounts for 12% of the total, and energy provided is roughly 18% of the whole consumption by EVs.

By considering EV30@30 Scenario, rising of number of publicly accessible chargers happens faster than in the NPS, due to the larger adoption of EVs. In 2030, publicly accessible chargers almost reach 20 million units, delivering 215 GW of capacity and 124 TWh of power per year. Publicly accessible fast chargers installed will reach 0.8 million, corresponding to 78 GW of power capacity and 100 TWh of consumption (Figure 1.20).



Notes: NPS = New Policies Scenario. The assumptions used for the development of these projections are included in the main text.
Source: IEA analysis developed with the IEA Mobility Model (IEA, 2019a).

Figure 1.20 - Deployment of charging infrastructure for LDVs by scenario

1.3.4.3 Residual values and financing solutions

When a customer purchases a new car, she is already thinking to its residual value after some years. The issue about EVs is their relatively young age: technology is still evolving at a fast rate, so disruptive changes are very likely to happen. As an example, the latest generation of Renault Zoe, born in 2017, allows a range that is double the one granted by the previous generation. It is obvious that the impact on the second-hand market is tremendous. The residual value evaluation process is made particularly difficult by batteries: approximately one third of the entire car value is represented by accumulators, but their capacity slowly decreases with time passing. Besides of RV, customers mainly consider the TCO (total cost of ownership), which is made up by the purchase price, maintenance, fuel costs and devaluation. As of today, diesel, petrol and natural gas-powered vehicles are still keeping price advantage, but according to BEUC (Bureau Européen des Unions de Consommateurs) in 2030 EVs will be sold at the same price point of traditional cars (Figure 1.21).

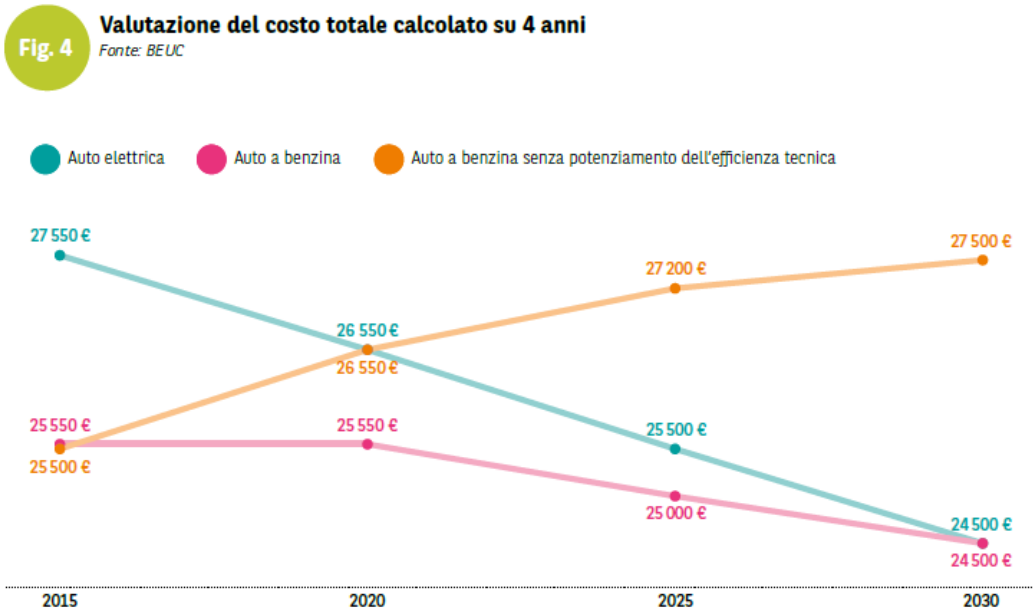


Figure 1.21 – Expected TCO, 4-years estimations – Source Osservatorio Findomestic

The solution to uncertainty generated by batteries range may well be represented by financing methods such as leasing and rental: by renting the EV (or its batteries) for a restricted period of time, the risk of travelling with technologically obsolete components is almost totally cut away. Furthermore, these two kinds of financing allow to negotiate the residual value in advance, thus eliminating uncertainty and inconvenience of resale.

1.4 Financial products are tailormade on customers

The automotive market scenario is characterized by a very high uncertainty level. Furthermore, the faster development of electric mobility is spreading more and more doubts on consumers. As explained above, these dynamics reflected on the market in 2018, so carmakers, credit institutions and consumer banks are designing and selling new financing solutions to mitigate and overcome the lower propensity of customers to purchase a new car.

The main need expressed by customers nowadays while choosing the way of purchasing their new car is flexibility. To accommodate this request, many carmakers are using digital innovation on their websites. The most common solution adopted is advertising different shades of TCM that allow users to choose the downpayment, the instalment and the duration of the contract, besides insurance contents and maintenance. The basic structure of the contract (downpayment + instalments + GFV) was not modified, but the commercial lever on customers is much higher than before.

Of course, the concept of mobility as a service is being improved through the implementation of several variations of leasing and long-term rental contracts, that grant the use of the vehicle without the burdens linked to ownership.

The two main trends in consumer finance market are the so-called bridge solutions and the subscription to all-inclusive services.

1.4.1 Bridge solutions

Bridge solutions rely on a standard loan that implies a change of the vehicle after some period (usually half the duration of the contract, for example 2 years) in order to switch from an internal combustion to an electric engine.

Credit institutions designed bridge solutions for two main reasons: overcome the lack of EVs immediately available on the short-term, and have the customers got used to electric mobility.

As explained above, almost every car manufacturer has been launching new hybrid and/or totally electric vehicle models in the last months. Market demand for EVs is constantly growing, and it is likely that some of them could not fulfill all orders in acceptable time. For this reason, they developed bridge solutions: while promising an electric car to the customer, they let her drive a traditional, combustion engine car for the first months. In this way, the client has the perception to exploit all upsides of EVs (no emissions, fiscal benefits) without feeling their downsides (higher price,

few charging stations at the moment, limited range), because they will be potentially solved when the client herself will drive an electric car.

On Italian market, one of the most popular bridge solutions is represented by Jeep initiative, named “Renegade Road to Hybrid”. The plan started in Q2 2019 and offered to buy a 1.6-liter, diesel-engine Renegade Limited with 2,000€ down payment and a monthly fee of 400€ for one year. After that, customer has the possibility to buy a plug-in hybrid Renegade with additional 2,000€ discount.

Hyundai Finance (which is a Hyundai’s trademark licensed to Santander Consumer Bank) and Hyundai launched a bridge solution loan as well. Leveraging the hype generated by the imminent arrival of Kona Electric, in second half of 2019 Hyundai allowed to buy an ICE Kona, drive it 12 months and then decide if switching to Kona Electric or keeping the standard car (Figure 1.22).

Figure 1.22 – Advertising of Hyundai’s bridge solution - Source hyundai.it

1.4.2 Subscription plans

In the last months, some carmakers have exacerbated the *mobility as a service* concept by the introduction of subscription plans. The specific structure of these mobility solutions is inspired by other markets (such as mobile phones and multimedia services): the customer pays a single monthly amount and gets access to several different models in the car range

of the brand. Of course, large-scale feasibility and adoption of subscription programs is still far from reality for many reasons. First, as users can get a vehicle for very short periods (days or even hours), vacant cars must be continuously moved by chauffeurs to be placed in pick-up points chosen by users themselves through the mobile app. Secondly, a very large number of vehicle is needed, and the platform capacity should satisfy both quantity and quality (i.e. different models) constraints. Customers may indeed opt for a model x one day and another model y the following day. Coordination costs are very high, as well: managing a large car stock whose vehicles constantly change driver is extremely complicated in terms of algorithms, logistics and customer satisfaction. The last obstacle is cost: as of today, subscription plans are extremely expensive: their price can easily exceed two thousand dollar per month. All the above reasons explain why subscription plans have been on an embryonic stage until today.

As a matter of fact, mostly premium brands have put in place these initiatives, because their customers have larger possibility to spend and are more acquainted to the concept of use. Furthermore, only pilot projects in small areas has been carried out: in this way, some of the disadvantages of subscription plans can be turned down (it is easier to coordinate the fleet, fewer cars are needed, social and economic status of customers are homogeneous).

For example, Access by BMW is a subscription plan by the brand of Munich, available only in Nashville, which offers 3 price levels (Figure 1.23). Subscribing to “icon” plan for 1,000$/months, users can access a range of iconic BMW cars, such as 330i and X3. With 1400$/month it is possible to drive cars belonging to “legend” pack, among which M2 Coupe, 540i and X5. With 2,700$/month, people get access to the “BMW M” pack, populated by most performing cars, such as X6M and M6 convertible.

All tiers include: roadside assistance, taxes, full detail washes and maintenance; $1 million liability insurance policy; $1,000 deductible for drivers; personal concierge who will clean and deliver each vehicle.

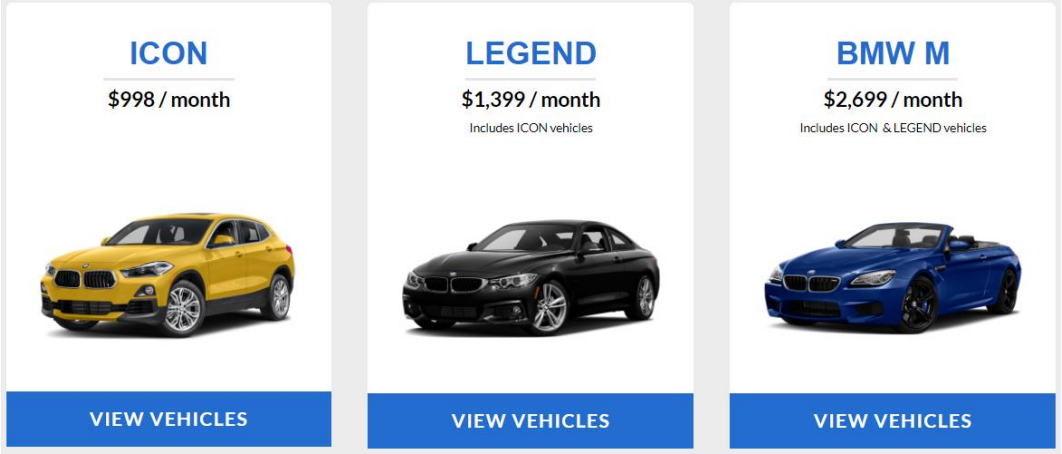


Figure 1.23 – Access by BMW tiers - Source bmw.it

Care by Volvo is a slightly different subscription plan. It offers an all-inclusive monthly fee to drive a single car (as of end 2019, only V60, V60 Cross Country, S60, XC40 and XC60 are available). The monthly payment includes anything but the fuel: car tax, insurance, maintenance, tires switch, and even internet hotspot in the cabin are included. Here, the final goal is to get customers used to pay a fixed amount periodically to drive an always new car, without worrying about all extra operations that anyone must perform to keep their car efficient and working properly.

As it was explained above, in the leasing and rental paragraph, the ownership concept is being pushed more and more towards use concept, both by customer needs and habits and by carmakers and sellers.

FCA recently (October 2019) launched their new subscription plan called Leasys CarCloud. It offers four tiers (CarCloud City, Metropolis, Renegade & Compass and Alfa Romeo, Figure 1.24) that, starting from a monthly fee of 199 €, allow customers to select the model they prefer and fetch the car in one of the 150+ Leasys Mobility Stores spread across Italian territory. During the rental period, users can change their car as many times as they wish. The monthly fee is paid via Amazon. This partnership with the ecommerce giant is a further element of innovation introduced by the Italo American carmaker. The main difference of CarCloud from Care by Volvo and BMW Access is that Leasys does not provide a pick-up service, but it is the customer herself that should go to the collection point, hand the old car in and fetch the new one.

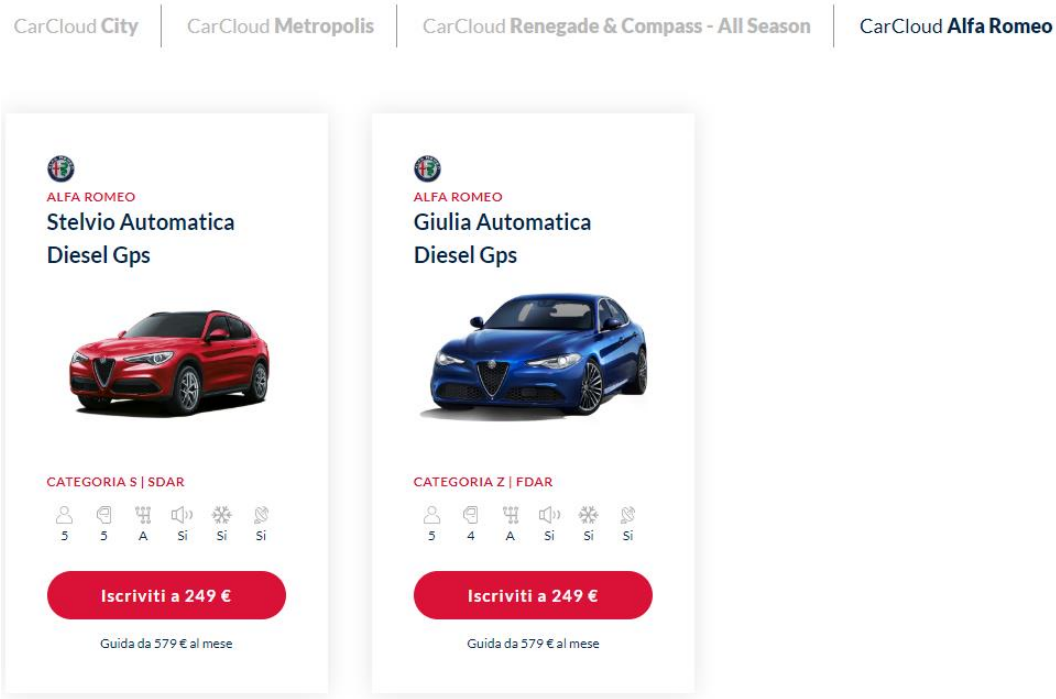


Figure 1.24 – Leasys CarCloud and its four tiers - Source carcloud.leasys.com

Chapter 2

Project definition

The previous chapter explained the overall trends and customers' needs of the automotive market during 2018 and the first half of 2019. The analysis focused mainly on Italian market, where Santander Consumer Bank, the company in which the candidate spent 6 months as an intern, imagined, designed and developed a customized financial product in order to satisfy these specific requirements.

2.1 Clear market needs

According to the analysis carried out above, nowadays customers, when buying a new car, express two main needs that are shaping the automotive industry: flexibility and personalization.

Flexibility comes from uncertainty that pervades the market: buyers want to be free either to change their car or to reject it whenever new regulations, limitations and pollution laws come out. Diesel engines represent the clearest example of this issue: will they still be allowed in European cities in the next 5 years? What decisions will be made by governments and local institutions? Will owner of diesel-powered cars be forced to abandon them? Are western countries going to dismiss millions of cars only because they are seen as polluting? Consumers cannot answer to these questions, so they prefer to be protected in advance by contracts that forecast a solution from the beginning.

The second requirement is personalization. That means clients want the possibility to choose the main features of their financial plan when buying their new car. Such characteristics include deposit, instalments, duration, but also minor features such as included services (insurance, car tax, maintenance, tires change). Of course, consumers keep in mind other parameters, too: cost is still the main selection criteria, as well as the

consciousness of having a certain residual value at the end of the financing plan.

In the next chapters, the candidate is explaining the process that took place in Santander Consumer Bank to answer the above market challenges and which gave birth to a pilot project, called DoubleYourCar.

2.2 Santander Consumer Bank's proposal

This paragraph deals with a brief introduction of the bank and its history, then explains in general the project and its activities.

2.2.1 The Bank

Banco Santander is a Spanish holding based in Madrid that controls several bank institutions that operate on an international level, mainly in Europe and Southern America. It operates in 40 countries, and manages 125 million customers, almost 4 million shareholders and 188,000 employees. Banco Santander offers several bank services, among which there are loans, mortgages, investment funds and financial advice. Banco Santander is listed on the stock exchange in New York, Madrid and Milan, and holds shares of many other banks. In Italy, it sold its stock shares of Sanpaolo IMI after the merger with Banca Intesa that gave birth to Intesa Sanpaolo. Group's chairman is Ana Botìn, who replaced her father Emilio. She represents the fourth generation of Botìn in chief since the foundation of the Bank.

Banco Santander's history dates back to 15th May 1857, when Queen Isabel II allowed the constitution of the bank. At first, the bank's activities were concentrated mainly on trade routes between the port city of Santander, situated in the northern part of Spain, and the countries of Latin America.

The first period of great expansion of Santander's business took place in the first two decades of XX century: the bank doubled its budget and increased its capital to over 10M pesetas. Furthermore, the profitability of Banco

Santander overcame the average of Spanish credit institutions. During this 20 years-long time window, Banco Santander incorporated the three main Spanish banks (Banco Ispanoamericano in 1900, Credito Espanol in 1902 and Banco Central in 1919).

The sliding door in the growth of Banco Santander was represented, in 1920, by the election of Emilio Botìn as permanent President of the bank. From that moment on, Santander pursued a strong expansion strategy by acquiring a great number of smaller banks throughout Spain. Furthermore, in 1942 the acquisition of Banco de Avila allowed Banco Santander to finally enter in Madrid, the political and financial capital of the Country. In 1947, Santander inaugurated the first branch in American territory in Avana, Cuba. After that, the bank strengthened its international position by launching other branches in Argentina, Mexico, Venezuela and United Kingdom, which guaranteed to become in 1957, after one century from the foundation, the seventh financial institute in Spain by relevance.

Thanks to the acquisitions of Banco del Hogar Argentino, National Bank of Puerto Rico and Banco Espanol-Chile, Banco Santander was one of the first commercial banks of Western world to invest in Latin American countries.

Another turning point in history of Banco Santander is the election, in 1986, of Emilio Botìn Sanz de Sautuola y Garcìa de los Rìos as president of the bank. He came after his father and drove Banco Santander through the modernization and innovation of its business. From late 80s, the bank strengthened its position in Europe by acquiring CC-Bank (an institution with more than 30 years of experience in the field of automotive financing). In 1994, Banesto (Banco Espanol de Credito) became part of Banco Santander, which allowed the bank to reach the first position in Spanish market.

A period of strong business development in Latin America starting in 1995, when new activities were carried out in Argentina, Brasil, Colombia, Mexico, Perù, Venezuela, Chile, Puerto Rico and Uruguay. Figure 2.1 shows that Santander’s earnings come from both Europe and the Americas in the same amount.

Santander Consumer Bank (SCB) was born in 2003 from the merger of Finconsumo (Italy), CC-Bank (Germany), Hispamer (Spain) and other Group's subsidiaries. Nowadays, SCB operates in many European Countries (Spain, United Kingdom, Portugal, Italy, Germany, Netherland, Poland, Czech Republic, Austria, Hungary, Norway and Sweden), besides the United States, where it operates as Drive Finance.

In Italy, SCB has national agreements with three important carmakers to finance their cars. They are Mazda, Hyundai and Kia. In this paper, when referring to the portion of SCB that actively collaborates and support one of the brands in ideating, developing and launching on the market new financial products, the candidate will use "Captive Finance"[6].

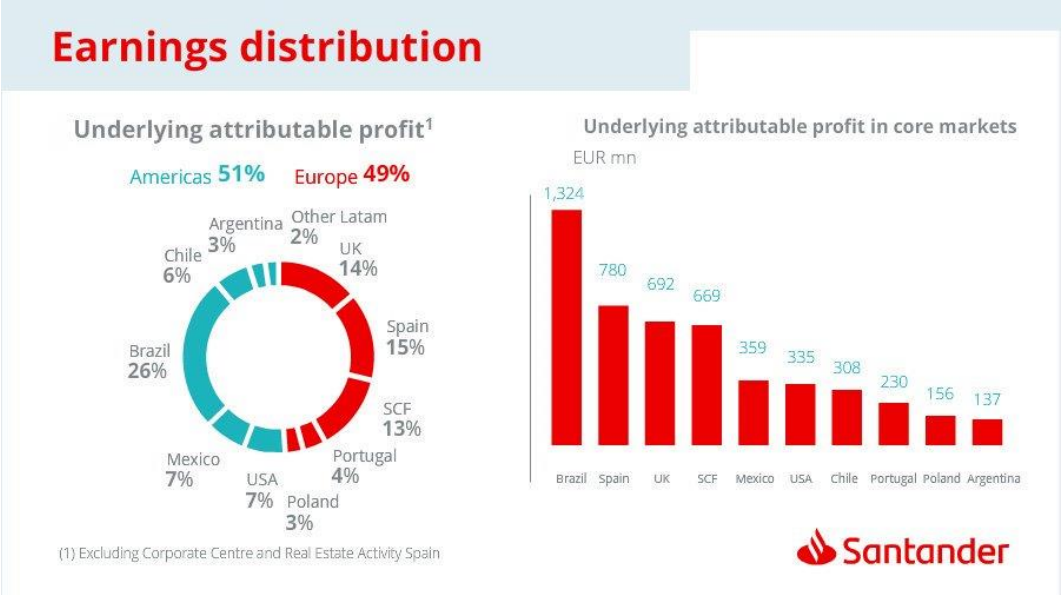


Figure 2.1 – Santander's revenues are well diversified between Europe and Americas - Source santander.com

2.2.2 The project: activities and resources

[6] *Name that includes the three brands' financial institutions*

The project consisted in the supporting of Captive Finance to CarDiamond[7] dealer (hereafter "the Dealer", an official Captive brand salespoint), who ideated a new form of TCM financing and needed aid to design, develop and launch it. The Marketing department (which included the candidate as an employee of the Product Development office) was the main actor carrying out the great majority of the activities accounted to Captive Finance. Of course, the process needed the collaboration of other Bank's departments, in particular Legal, Compliance, Insurance and Commercial Planning.

The basic idea of the Dealer was to create a car loan which grants customers the possibility to rent for free one or more additional cars for a period of total 15 days among the duration of the loan. The main drivers that lead to this concept were:

1. Gaining additional sales: the Dealer may increase its sales by potentially selling a second car to those customers who already bought one and, interested in the new model they were able to try thanks to the rental, decide to purchase it.
2. Empowering brand awareness: the target of the Dealer was to launch a product that, being unique on the market, generated a significant amount of indirect advertising thanks to word-of-mouth between existing customers and their acquaintances.
3. Improving stock rotation: the Group which owns the Dealer also includes a car rental, whose vehicles will be provided to those who subscribed DoubleYourCar. The overall effect will be for sure an increase in the stock rotation.

Santander's goal has been to support the Dealer in the development of DoubleYourCar, in its launch on the market and, moreover, in the monitoring of performances and correction, if needed, of some features that might not be appreciated by the market. Furthermore, the Bank has the opportunity to evaluate the impact of a completely new financial product on the Italian market and consider the opportunity to transfer it, net of possible adjustments needed, to other Captive Brands as well.

[7] *Invented name*

Even if it was the Dealer that ideated the new product, he asked to Santander Consumer Bank to be supported during the development of DoubleYourCar, both in terms of resources and technical skills. That meant not only the involvement of different departments and employees, but also a careful planning to deliver the product according to the deadlines requested by the Dealer.

The first activity to be scheduled was product planning, which included collection of customers' requirements through a market research; feasibility study to determine whether the project may accomplish with profitability target; activity and resource planning, to check the impact of the project in terms of time, cost and work needed.

The second phase concerned product design. This activity involved more technical resources that worked to integrate the concept with technical constraints regarding the interest rate structure, the depreciation plan, and the duration. Furthermore, the development required the authorization of Legal and Compliance departments, so they participated to the design phase and checked that the final output corresponded to legal standards.

The following phase was about advertising. Of course, the project had to be promoted before entering the market: besides choosing on which platforms to advertise it, the Dealer, in accordance with Marketing department, decided whether to outsource it or develop it in-house. Then, they selected the message to bring to customers.

The last two phases of the project entail product launch on market and performance monitoring, by constant information exchange between SCB and the dealer.

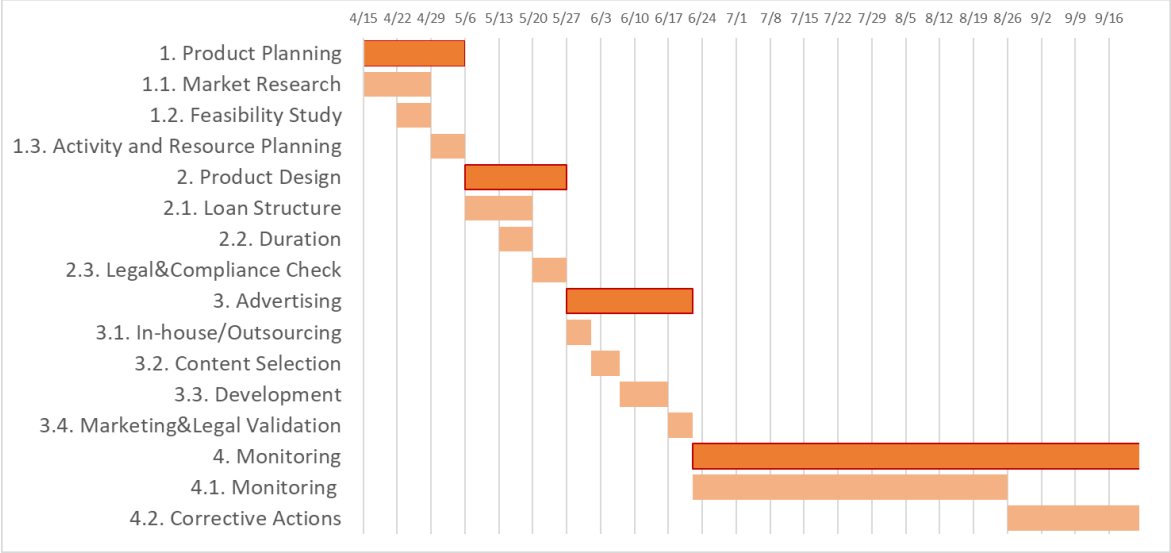


Figure 2.2 – Gantt diagram showing the expected scheduling of activities - Internal source Santander

2.2.3 The candidate's role

As an intern of the Marketing Department, and more specifically working in the Product Development Office, the candidate was personally involved in many of the activities described above. The level of responsibility of the candidate in the decisional process, as well as in the coordination activities, could vary depending on the amount of expertise needed. As a matter of fact, the candidate had to report directly to the Head of Product Development, whose responsibility was to check the results assess whether to approve them or not.

During the product planning phase, the candidate deep dived into the sales records of the Dealer to assess its performances and the main trends coming out from customers' demand in the last year. Those data were used in the next step (feasibility study), in which the candidate, together with the Head of Product Development, carried out a feasibility study in which they assessed the rough economics potentially developed by the new product. Then, during the activity and resource planning phase, the candidate supported his boss in the scheduling of all activities needed to complete the

project, and in the allocation of the suitable resources that would have performed them.

The product design phase mainly required a coordination role by the candidate, as the activities carried out mainly required highly technical and specific skills, such as a legal background to assess whether the new product could potentially infringe any regulation and/or customers' right. The candidate's goal consisted in making sure that each actor involved respected the deadlines; furthermore, he acted as a focal point and gateway to collect all information flows and, if needed, put in contact the different resources to solve arising criticalities.

The candidate was involved in the advertising phase and supported the Head of Product Development, and therefore the Dealer, as a strategic advisor. Indeed, the main decision to be made during that phase concerned the option whether to outsource or not. The candidate helped with the listing of decisional drivers which may have potentially been considered to assess advantages and disadvantages of outsourcing and in-house development. Then, he supported his boss and the Dealer in the reviewing of the drafts and in the refinement of the message to be delivered to customers. Lastly, the candidate acted as a coordinator to initiate the legal validation process, by putting in contact the Dealer, the advertising agency and the Legal and Compliance Department.

During the monitoring phase, the candidate was in charge of collecting all data from the enterprise resource planning system, of assessing sales performances and, if needed, of escalating in order to take all possible corrective actions that may improve potential weaknesses in the new product. This phase required that periodical meetings with the Dealer take place, as well as brainstorming sessions when in need of coming up with new ideas to improve the attractiveness of the product or to develop additional features, aiming at empowering the impact of DoubleYourCar on the market.

The sequential and quite articulated structure of the project made an agile approach possible. The four phases described above were tackled by adopting the main principles of agile philosophy: multiple teams were

employed, each one of them working on different features; frequent adaptations of the characteristics of the product took place before and after the launch; alignment of customer's and Dealer's needs was intended as a priority.

In the next part of this paper, each one of the activities mentioned above will be described in detail, by specifying how they were ideated, set up, carried out and, if needed, corrected. The role of each actor acting in the project will be analysed, with particular focus on the candidate's responsibilities.

Chapter 3

Product planning

Product planning phase is made up of several sub-activities that determine the guidelines to follow during the actual design phase of the new financing. Product planning is a critical activity because each error in this stage has potential repercussions on the following activities in the project.

3.1 Market research

Requirements collection is the first and primary step during the development of a new product. In the case study, Captive Finance is supporting the Dealer in the pre-launch activities of a new kind of loan for cars, on a limited sample of customers, to understand if the interest generated could justify the extension of the product on a national scale.

The main focus was in particular on customers' primary need of flexibility, and their will to precisely know the value of their car after a certain number of years. The basic financial product that mostly corresponds to these demands is TCM (Trade Cycle Management). To meet flexibility expectations, the idea of CarDiamond is to insert in the loan two weeks of free car rental of another car, to be spent among the duration of the loan (3 years), non-consecutive if needed.

There are three main reasons to explain this particular structure: on one side, customer gets a guaranteed future value of this car at the moment she turns on the loan; secondly, the free rental included assures that the flexibility need is met; last, the same free rental may be used as a commercial leverage by car salesmen to turn customers' curiosity on and catch their interest, beside the importance during negotiations.

Future potential implementations in case of positive performance of the project are consistent. As of today, additional cars included with free rental

have an internal combustion engine, the obvious development of the project entails the transformation into a bridge solution that allow to gradually replace internal combustion engines car stock with electric vehicles.

The steps performed during the market research were:

1. Analysis of the market environment and identification of possible incumbent competitors
2. Analysis of the customers' needs and their propensity to adopt the new product
3. Analysis of the impact of the new product on already existent loans of the same Brand and cannibalization threat.

3.1.1 Analysis of the market environment and identification of possible incumbent competitors

The first action to perform when assessing the potential success of a new product through a market analysis is the research of incumbent competitors acting on the same industry as the new product. In the case study, it means the candidate was responsible for looking for hybrid financial loans that, without any form of additional compensation besides the common monthly payment, allowed customer who purchased a new car to get an additional vehicle for a limited time span.

To carry out the task, the candidate operated an enquiry through the internet, the newspapers, the tv commercials and the main mass media to identify any possible competitor. In this phase, the most useful tools were the websites of the main carmakers operating in the Italian market: each one of them, indeed, contains all of the financial offers of the brand, with a detailed documentation that expose conditions, clauses and interest rates.

From the analysis results it was clear that, as of end of April 2019, none of the main carmakers selling their products on the Italian market have in their portfolio a product similar to DoubleYourCar. That was good for the Dealer and Santander Consumer Bank, because it meant that DoubleYouCar would operate in a context with a sustainable level of competition.

3.1.2 Analysis of the customers' needs and their propensity to adopt the new product

Even if the analysis on incumbent competitors determined that no similar products were on the market already, it is extremely important to understand the propensity of the customers to buy the incoming product before it is actually developed and put on the market.

In order to do so, the Dealer commissioned a phone survey, which was carried out among a sample of consumer that was representative of the customer base of the Dealer itself.

The phone interview consisted in a preliminary anagraphic enquiry used to cluster the population, and then five specific questions:

1. "How old is your current car?"
2. "Do you plan to acquire a new car in the next 12 months?"
3. "Which kind of purchase/leasing do you think you will choose?" (in case of positive answer to question 1)
4. "Which are the main causes that made you decide to postpone the purchase of the new car?" (in case of negative answer to question 1)
5. "Would you be interested in having the possibility to try other car model besides the one you usually drive?"

Unsurprisingly, the results[8] reported a situation pretty much similar to what analyzed in chapter one of this paper. The circulating Italian car stock is very old, with an average age of 11 years, and the survey reported slightly different figures, with 9 years-old cars, on average. That is mainly due to the composition of the sample, that was made of people living in the northern part of the country, where the Dealer operates most and where cars are less old. The answers to second question underlined that a significant fraction (36%) of customers is planning to buy a new car in the next year.

Question 3 assessed that the preferred purchase method is still the pure property (cash or loan, mainly), but a consistent portion of consumers would choose a leasing or long-term rental as a primary option. Among the

[8] *The results were modified on instructions of SCB. However, they reflect reality.*

ones who decided to postpone the purchase (question 4), the main reason was uncertainty of regulations in the future (diesel powered cars will be banned? How about incentives for EVs? …), followed by the more and more expensive prices of new cars.

Finally, the majority of clients would like to test other models different from theirs, which is quite obvious and paves the way to a product like DoubleYourCar.

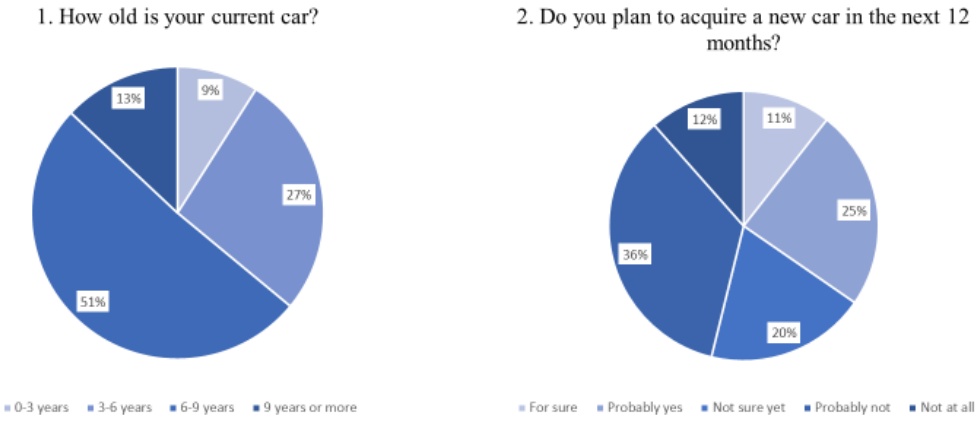


Figure 3.1 – Phone survey: questions 1 and 2 - Internal source Santander

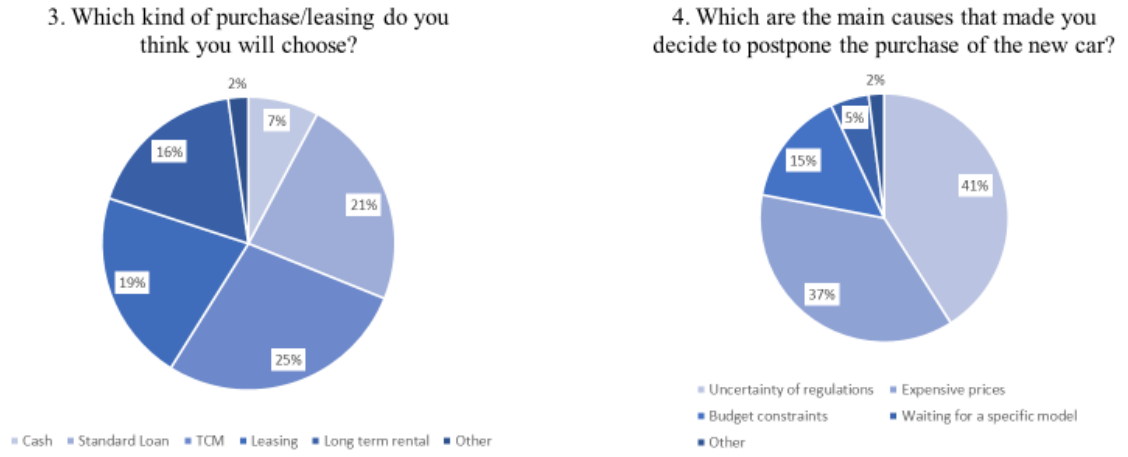


Figure 3.2 – Phone survey: questions 3 and 4 - Internal source Santander

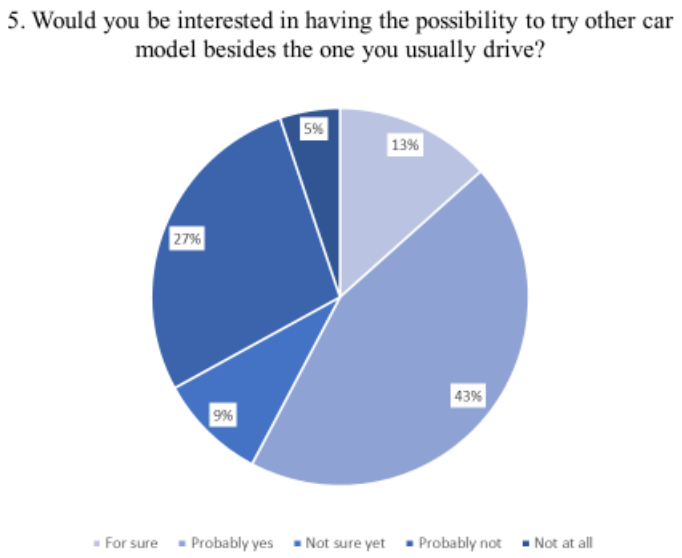


Figure 3.3 – Phone survey: question 5 - Internal source Santander

The second tool that was used to assess the propensity level of customers to potentially buy DoubleYourCar was an internal instrument developed by CRM department. It basically relies on the whole customer base of Captive Finance and, thanks to clustering, obtains the categories of customers that are most likely to purchase a certain product. That clustering operations are carried out by leveraging a machine learning algorithm that, once trained with the anagraphic data of each customer, is able to classify and combine them together according to age, sex, family situation, income and similar parameters. The usefulness of a similar model is quite obvious: from the results provided by the tool it is possible to target a specific segment of customers for either the launch of a new product, or to pump sales of selected products by doing specific actions such as advertising or recall campaigns that feature dedicate incentives for those categories of customers.

3.1.3 Analysis of the impact of the new product on already existent loans of the same Brand and cannibalization threat

One of the main threats for the products of a company may come from inside the company itself. This phenomenon is called cannibalization and consists in the erosion, by a new product of the company, of the market shares of the other products already on the market.

In the case study, the potential victims of DoubleYourCar were other loans usually sold by the Dealer when marketing cars of the same brand. The first step performed was an assessment of the present sale situation of the Dealer's sales, both in terms of absolute numbers and relative percentage. This analysis was very helpful to establish the products that might have been put at risk of cannibalization with a higher probability. Due to the structure of DoubleYourCar, which is based on a TCM financing, the product that is most likely to lose market share is the standard TCM itself, because the probability that a new customer was more interested in a product that, with the same price of a classical TCM, gives more contents, is quite significant. The second financing which might have been damaged by DoubleYourCar was leasing. The impact on leasing was forecasted to be much lower than the one on TCM, because even if the new product entails interesting features, leasing still gives advantages on fiscal and accounting terms, especially to companies: the client doesn't own the vehicle so it can borrow more for other purposes; usually, a leasing includes a complete package of additional services (liability insurance, theft and fire insurance, change winter tires…). Finally, the third incumbent product that could have been threatened by the entrance of DoubleYourCar on the market was standard loan. Of course, it targets a different kind of customers compared to a standard loan (younger, more inclined to novelty…), but a fraction of those who rely on a long-term financing with relatively low installments

may be caught by the characteristics of DYC and try to change their purchase habits.

The results of the analysis[9] are illustrated in figure 3.4.

3.2 Feasibility study

The project objective is to determine whether customers are interested in an innovative and flexible product and whether they are ready to adopt electric

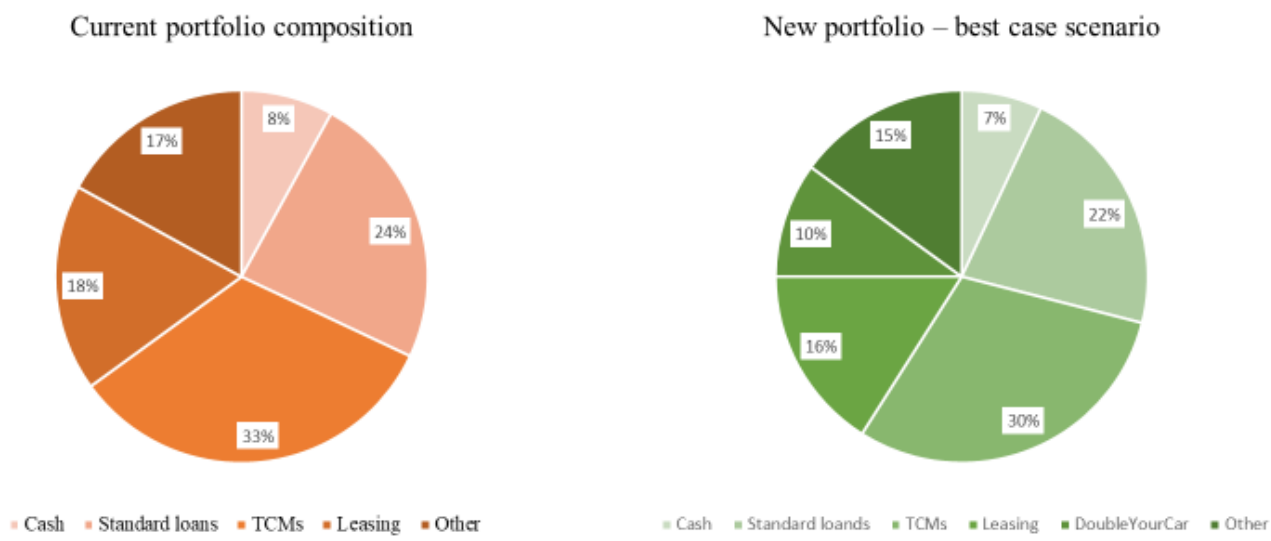


Figure 3.4 – The forecasts on the cannibalization impact of DoubleYourCar - Internal source Santander

mobility solutions.

From a profitability point of view, the bank's interest aims to create a product that is affordable and attractive for customers. The main target, as of now, is not to generate profits for the bank itself. That's why, by dealing

[9] *Data and estimations are not the same of the case study, but reflect reality.*

with a pilot project, the goal is to evaluate customers' response and their interest. During the feasibility study phase, it was considered that expected results on the income statement were null, that is they do not bring any added value in terms of net income.

The preliminary study stage required to involve external actors as well. It was already said about CarDiamond and CarAway[10], but of course the commitment of Hyundai Motor Company Italy (hereafter "The Brand") was necessary. The Brand has been working in partnership with SCB by years, and in the most recent times has gained the top-ranked positions in Europe and Italy as far as growth rate is concerned. Furthermore, Brand car range is going to expand with new electric models (several of which are already available to customers), which drives the brand's attention on financing solutions to compete in the electric mobility car market.

Captive Finance's marketing office presented the concept of product DoubleYourCar during monthly meetings with the Brand, whose top executives showed important interest in the project and approved the decision of going on with the next steps.

The last feasibility checks involved timetables: concept phase took place in April, and the target go-live date of the project was set in late June, so that salesmen can exploit the commercial lever of summer holidays. The 15 days of free rental can help the customer during the holiday trip: if she prefers to avoid long car trips, she can request the additional car directly on CarAway website, and collect it to the closest CarAway branch once she got to the resort. That procedure is particularly useful to those who choose to spend their vacations on the other side of Italy, islands included.

By considering average technical development time to develop a new loan, adding a margin to create an advertising campaign and to coordinate the different actors, Captive Finance considered that approximately 45 days to complete all activities are needed.

The main components of the feasibility study carried out by Captive Finance were:

[10] *Invented name*

- Executive summary: it is a narrative that includes details of the new product proposed by the Dealer. The executive summary was showed to Brand's top management during periodical meetings with Captive Finance personnel.
- Technological considerations: technology is not one of the main issues of the project. The only technological assets are the ones used to compute real time the parameters of the loan during the negotiation phase with the customer. The Dealer already owns those kinds of assets as a feature of its affiliation to the Brand's showroom networks.
- Existing marketplace: this section of the feasibility study focuses on the market environment, listing possible competitors, main customers' needs and potential customer base. The market research phase deeply focused on these aspects, and a summary with main findings was reported in the feasibility study.
- Marketing strategy: this section explains how the product is believed to be put on the market, including description of the ideal target client, building of value proposition, research of key messages to be communicated during advertising phase. All of the above activities will be described in detail in the next paragraphs.
- Required staffing: identification of internal and external resources to be employed. This section includes the organizational chart and is further analyzed in paragraph 3.3
- Schedule and timeline: significant milestones and deadline to be respected in order to complete the project in time.
- Project financials: in the case study, profits were not the main driver used to evaluate the project's success, but it was important anyhow that DoubleYourCar was not a black hole in terms of losses.

3.3 Activity and resource planning

Activity and resource planning phases focus on establishing project feasibility in terms of time, usage of resources and cost of labour. Detail level is still general, but it is important that all activities and resources that

are thought to be part of the project are considered, so that total cost and time estimation is as precise as possible.

3.3.1 Activity planning

Activities required by the project are: market research, product design, advertising, launch and monitoring. Each one of them is made up of sequential sub-activities, which are functional to the completion of each task.

Market research: is a research activity carried out in two directions. The first one, outwards, is made up of a market benchmark to understand what customers' needs are, potential answers from the bank and already existing solutions worked out by competitors. The candidate was in charge of this very activity, partially through an external data collection and partially thanks to Captive Finance's database, whose records were manipulated to get ad-hoc indicators. The benchmark of customer base was performed through the phone survey described in paragraph 3.1. The second activity mainly involved the CRM department, that evaluated the historical Italian automotive market database. Results obtained from the above analysis allowed not only to verify the potential interest for a product like DoubleYourCar, but also to establish whether competitor had already presented anything similar in Italy. All of that was made possible by clustering the customer base through a propensity model that focused on several parameters such as age, sex, job, family composition. From these data, the model identified which segments were more suitable to positively respond to the project.

Feasibility study: it focuses on making a quick costs/benefits analysis in order to make a go/no-go decision in short time. Feasibility study mainly concentrates on costs and revenues: as the project goal is not to generate income, the only constraint of this phase was to make sure that the income statement of the project was non-negative. Another side taken into account during feasibility study is time: project approval can be released only if

estimated duration is in line with go-live date. The feasibility study was described in detail in paragraph 3.2.

Product design (structure, duration, legal): represents the selection of financial criteria and final structure of the product. The first step involves external actors as well: the whole process was carried out while constantly keeping in touch with the Dealer. To allow the highest number of customers to access the product, they can rent segment A (city-cars) or segment B (hatchbacks) cars. Of course, rental quotations are different for each one of them.

Advertising: pre-launch advertising phase is extremely important to have good results. The goal of advertising is to stimulate curiosity both before the real availability of the product on the market, and during the sale phase of the product itself in the car showroom. After a close consultation with the Dealer, who is the real expert of customers and the socio-economic environment that characterizes the geographical area where DoubleYourCar will be available, Captive Finance suggested to promote the project by means of an advertisement campaign on local newspapers and with flyers to be distributed within the showroom itself. The claim was chosen by trying to maximize the opportunities given by DoubleYourCar to customers who go on holiday and that would rent a car anyway. As far as graphic layout, images and claim are concerned, Captive Finance, whose size and history made them more expert than the Dealer, proposed to hire an external advertising agency that already worked for the bank in the past. Agency SmartIdeas[11] proposed three different drafts, each one of them conveyed a slightly different message, with different images and layouts.

Launch: launch phase involved both Captive Finance and CarDiamond staff in the pre-launch and marketing stages. During pre-launch, Hyundai Finance's Head of Product Development went to CarDiamond showroom in order to provide a training session to salesforce. In that way salesmen, that directly work with customers and that are primarily responsible to project success, got a deep knowledge of the product, its special features and its uniqueness.

[11] *Invented name*

Monitoring and corrective actions: monitoring of sales performances pointed out that the results were in line with what expected, considering the Dealer size, the automotive market and the strong seasonality peaks to which it is physiologically subjected. After summer, the Brand launched, on a national scale, a very aggressive campaign that proposed 0 downpayment and 0 APR on the whole range. In order to not be cut off by that offer, the Dealer chose to adapt DoubleYourCar by aligning the product to the market contents.

3.3.2 Resource planning

Main issue when scheduling resources and their allocation on project's activities is parallel scheduling with other projects that resources carry out while working on DoubleYourCar. Furthermore, coordinating information exchange was a tough task for product developers, as people are set in different locations (SCB HQ in Madrid, Captive Finance headquarter in Turin, dealer in Bologna, the Brand Italian HQ in Milan) and sometimes meeting in person were required, especially during product concept design phase.

Figure 3.1 shows Santander Consumer Bank organization chart and candidate role within the project. Highlighted red boxes show that only some company departments were involved in the project.

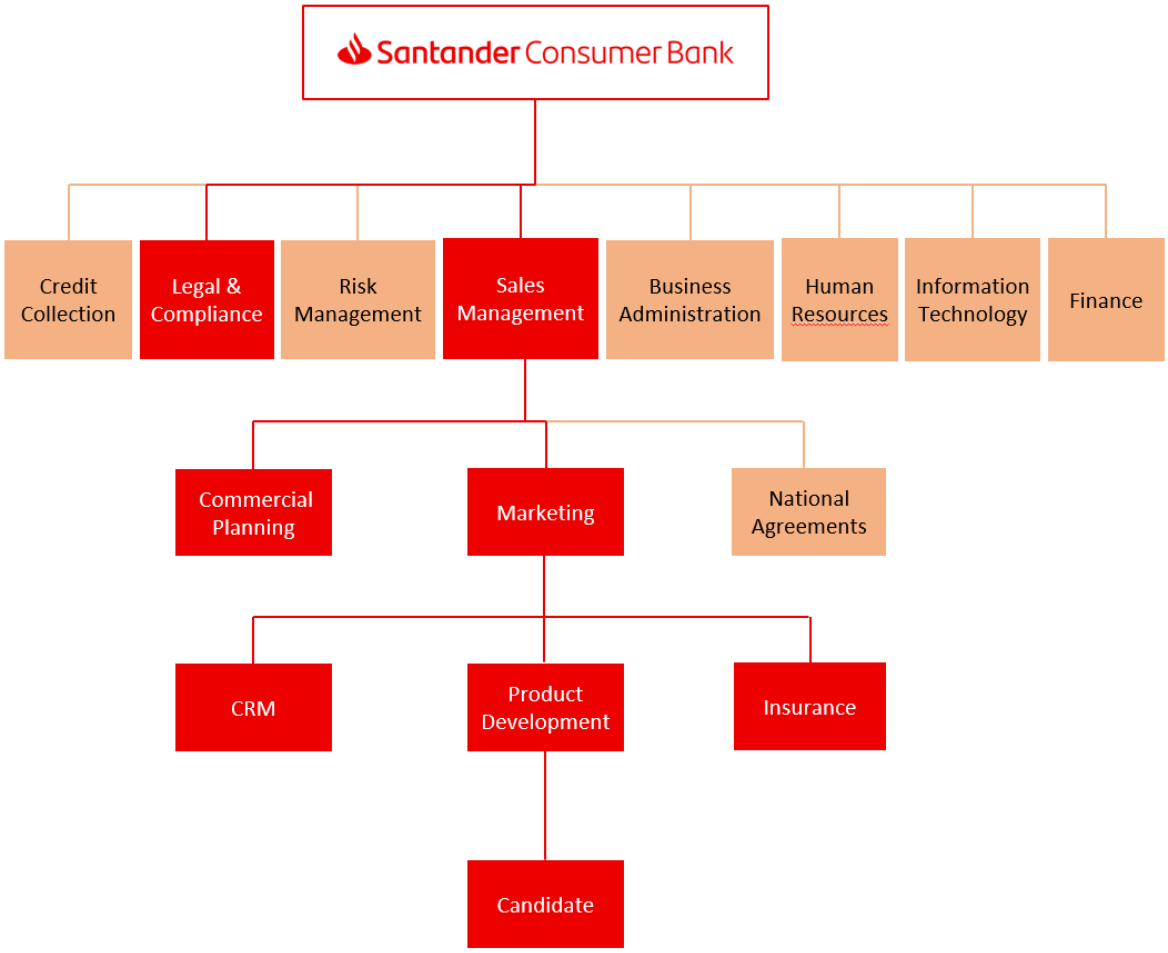


Figure 3.5 – SCB organization chart and candidate role in the project - Internal source Santander

Chapter 4

Product design

Product design phase was the most demanding in terms of resources with technical profiles, mainly to set structural characteristics of the loan. Involvement of Commercial Planning office was critical, and so was the participation of Legal department to check whether the output infringed any law or not.

When asking for Santander Consumer Bank's support, the Dealer had already identified the structure of DoubleYourCar, and only needed the technical skills to code and integrate it into its systems, besides the performance monitoring and suggestions on possible corrective actions during the after-launch phase.

4.1 Loan structure

The starting point to build DoubleYourCar was an already existing TCM-like loan. The Dealer, who can count on car rental agency CarAway, which is part of its group, added the renting conditions and created a product that, on the Italian market, is the first to come with that structure.

Rental conditions included with DoubleYourCar financing allow customers to benefit from an additional car for 15 days (also non-consecutive, if needed) during the financing period for free:

- In case of the purchase of a city-car, customer can profit from an additional group B car (hatchback)
- In case of the purchase of a car belonging to every other segment, customer can profit from an additional group C car (compact)

Of course, rented cars will be Brand where available: customers buying a group A car will rent the city car from the Brand, while customers buying any other Brand model will rent the compact car from the Brand.

As it was explained, the structure and the idea behind DoubleYourCar is very simple. What makes the difference is the uniqueness of the product on the market and the flexibility that it can give to consumers: on one hand, the included rental entails a physical additional mobility; on the other hand, the product entails an economic flexibility as well, thanks to the insurance services that may be purchased or rejected to get increased protection or lower monthly payments. As a commercial lever, insurances are very effective, because they are content-rich products whose cost is easily bearable by clients thanks to financing solutions.

The following paragraphs are dedicated to explaining more about insurance products, so that the reader can better understand this complex world and its peculiarities:

Credit Life: it's a kind of life insurance that protects the contracting party from work accidents, death, temporary incapacity, job loss. If one of the above happens, insurance company pays the installments in place of the customer. Its annual premium is rather small if compared to the total insured amount (usually, between 4% and 5%), so credit life is much appreciated by customers, and good sales performances reflect this side.

Fire and Theft: protects the contracting party from fire and theft of the car. Santander Consumer Bank's proposal articulates the product according to growing coverage levels, that go from the simplest total fire and theft, to partial and total fire and theft, value new, natural events (hailstorm included), vandalism, socio-political events, total kasko. Annual premium, besides being determined by the coverage level chosen, is influenced by the value of the property and by the province where the customer lives as well: Italian territory has some areas where fire and theft risk is much higher. Provinces are classified in 6 levels, that goes from zone 1 (highest risk) to zone 6 (lowest risk). On average, annual F&T policies premia are expensive, especially if customers choose to include additional coverages, like kasko and atmospherical events.

When purchasing a loan, customers may choose to include one or both of the above insurance coverages, whose annual premia are split into monthly installments that add up to the cost of the car.

4.2 Duration

Contract duration was chosen by following customers', Captive Finance's and dealer's needs, based on historical data. The Dealer analyzed all contracts sold in the last two years and realized that the great majority of TCMs sold had a 3-years duration. As, potentially, DoubleYourCar aims at becoming one of the most sold loans in the Dealer's line of products, it was chosen to structure it like a standard TCM.

Furthermore, customers are already used to this contract lifetime and it is easier to actually profit from 15 days of free rental on a 36-months-long contract rather than on shorter ones, because it is more likely that people split their vacations and do not use all two weeks at a time.

Another reason in support of this decision is economics-related. As DoubleYourCar is quite a service-complete loan, a longer contractual life enables a lower monthly installment, which helps both in terms of negotiation and customer perception.

4.3 Legal and compliance Department check and refinement

Product design needs legal department approval before developing phase actually starts.

Inspections operated over DoubleYourCar aimed at verifying that loans' conditions are compliant with legislation both in terms of fairness and uniformity with other financings' conditions of the same brand and towards the dealer CarDiamond itself.

Legal and Compliance department operated mostly on the advertising campaign, of which in the next chapter it will be diffusely disserted, to check on potential risks and issues for the bank.

The biggest potential issue may come from misleading commercial practices that could happen: from a legal perspective, DoubleYourCar is a

full-fledged TCM financing, so the total cost borne by a customer who buys one of the two options must be the same of buying the other one. As a matter of fact, misleading commercial practices are avoided because the whole initiative is legally worked and carried out exclusively by CarDiamond, who owns CarAway and makes use of Santander Consumer Bank as finance company. Indeed, the dealer may bring the same offer forward on other brands, on condition that it is the dealer itself to pay for the rental.

Legal and Compliance departments, after considering all of the above, granted the authorization.

Chapter 5

Advertising

Advertising activity is critical in the automotive market, and above all when a new product is to be launched. Factors that contribute to the good outcome of an advertising marketing campaign are many: launch timing, product (perceived and effective) quality, curiosity induced by the ad campaign, the emotional message perceived by the potential customer. All that said, it is often better to rely on external advertising agencies, at first explaining the characteristics and peculiarities of the product to work on, then by letting them to create adequate proposals.

Legal and Compliance department is in charge of checking and validating the final advertising campaign result, by monitoring that outcomes are compliant to current legislation and are not a cause of future claims.

5.1 In-house / outsourcing

This step deals with the analysis of potential costs and benefits that come from each of the two options of creating the campaign in-house or assign its development to an external agency.

5.1.1 In-house Development

In order to internally develop the advertising, Captive Finance need ideas, technical and communication skills to transfer the concept on a graphic support.

Benefits that come from the above approach mainly are higher agility and speed in carrying out possible needed adjustments; lower coordination costs between the product developer and the campaign developer (two entities

that may not correspond); finally, the company will save the money they would spend on hiring additional specialists.

5.1.2 Outsourcing

Outsourcing option is the opposite of in-house development, and pros and cons consequently reverse. Outsourcing is usually much more expensive, but at the same time it relies on industry specialists, so the output will probably be better from a communication and graphic point of view. Another downside of choosing an external supplier is that this very solution needs more effort by the commissioner organization, because they should keep close contacts with the supplier. Development time increases, as well, mainly due to the several additional adjustments: typically, the agency sends a first draft in multiple options, of which one is selected to be developed. This kind of correspondence can happen various times during campaign production, which physiologically brings to higher time waste than in-house solution.

CarDiamond, whose experience in advertising solutions is lower than Captive Finance's one, asked for help to the Bank itself. Hyundai Finance made a choice that considers both the workforce of Marketing and Product Development office and the quite little time available. The staffing does not include any communication expert, neither any graphic designer, so the main issue is the lack of technical skills. On the other hand, budget allocated by the Dealer to a small pilot project like DoubleYourCar is low, and lead time is low, too. Trying to balance these two constraints is the main concern of Captive Finance, and led to the choice of hiring SmartIdeas, an external, small advertising agency, so that time were reduced as much as possible and costs were below budget constraints. SmartIdeas already worked with Captive Finance, which gives the opportunity to further decrease coordination costs and time, because they already know the process and how to collaborate with the bank. The only issue remaining is coordination between the three actors, because emails and phone calls are the sole means of communication between the two, as they are located in different cities. Furthermore, SmartIdeas staff do not

know automotive loans market, as they are not experts: Captive Finance's people must carefully explain them all product characteristics in details, and they should deepen all aspects related to contents and limitations. By doing so, people in charge of creating the campaign get to deeply know the product and are capable of conveying to customers its strengths and advantages.

5.2 Content selection

Although the decision to entirely rely on SmartIdeas, guidelines and main contents for the campaign were set by mutual agreement by SmartIdeas and the Dealer, with the participation of Captive Finance. Common opinion is that DoubleYourCar offers a good chance in terms of flexibility during holidays thanks to the included rental, which should be taken advantage of when launching the campaign. By also considering that the period of arrival on the market matches with early summer, DoubleYourCar enjoys a tremendous opportunity to perform well.

SmartIdeas agreed on that pattern as well, so the base concept of the campaign is to profit from free rental to get to summer resorts without worries, and then collect the car directly into place once arrived at destination.

In the end, the final draft included, as a result of the decisions made by the Dealer and Captive Finance:

- A graphic layout that is based on holidays, with a seaside resort in the background and two cars in the foreground, to introduce the concept of "doubling" for 15 days the car purchased
- A brief and striking claim, which was thought to capture customer's attention and made her curious about the product advertised
- DoubleYourCar logo, whose importance is giving immediate reconnaissance pf the product when, in the future, it will be showed to customers again

- A legal disclaimer that specifies the main terms and conditions of DoubleYourCar. This last content is mandatory by law and must be present in every advertising campaign.

5.3 Marketing and legal validation

Besides the actual advertising claim, European legislation requires that the campaign embeds legal disclaimers aimed at specifying further financing conditions and limitations that the claim cannot contain, due to space and communication constraints. Production of the above legal notice was carried out by the responsible department, that coordinated product developers to synthesize, elaborate and review the whole notice. Global focus on this phase was mainly directed at transparency and fairness: it is critical that none of the customers, by reading what is stated in the advertising, may misunderstand the terms of use and generate complaints, dissatisfactions and adverse publicity.

The last phase of campaign development is about the selection of the means of communications by which to convey the message to customers. Captive Finance, CarDiamond and CarAway representatives met in person to exchange views about the best option to choose. As the campaign is spread on a local scale, viable possibilities are: rent a page of the local newspaper; run a 30-second ad on the local radio station; put up billboard ads across the largest cities of the province.

Every one of the three options has pros and cons. Local newspapers are read by people leaving in the same area where the Dealer operates, so it is more likely that the advertising reaches someone who actually knows the Dealer. On the downside there is the cost, which may be expensive if the campaign is spread over time.

Radio is one of the most effective mass media through which conveying advertising messages, and it can reach a huge number of listeners by repeating the message more than once per day. The main con related to purchasing radio space is its high price, which can overcome the cost of setting the campaign in newspapers.

Finally, the billboard ads have the value of being the cheapest option; furthermore, they are always visible by people passing by. On the other hand, that's the worst solution of the three taken into account when dealing with degree of penetration and customer awareness, because it's rarer that people read a billboard adverting instead of listening to radio or reading a newspaper.

The main reasons that lead Captive Finance and CarDiamond to choose local newspapers were related to diffusion: actually, most of the readers are adults between 30 and 55-years-old. This segment of Italian population, according to UNRAE[12], are the ones who statistically are most likely to buy a new car: in the Italian market this age group was responsible for more than 50% of total registrations of 2018 (Figure 5.1). As it is very important that the advertising campaign reaches maximum diffusion among the fringe of population that brings the highest number of annual car registrations, the media used to convey the message should be the one that is most used by the targets of the campaign itself.

IMMATRICOLAZIONI DI AUTOVETTURE A PRIVATI per fasce di età

QUOTE PRECENTUALI

età	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
18-29 anni	12,1	11,8	10,7	9,3	8,3	8,0	8,1	8,2	8,0	8,2
30-45 anni	34,8	34,7	34,6	33,6	32,2	31,2	29,9	29,0	28,3	27,2
46-55 anni	21,6	22,8	24,0	24,8	25,3	25,9	25,7	25,7	25,9	25,8
56-65 anni	17,3	17,4	17,9	18,4	19,1	19,2	19,6	19,8	20,3	20,8
oltre 65 anni	14,2	13,4	12,8	13,8	15,0	15,8	16,8	17,3	17,6	18,1
TOTALE	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0

Figure 5.1 – Car registrations by age group, Italian market - Source UNRAE – annual report 2018

At last, within the showroom itself some flyers were showed, displaying a single, immediate message, whose target is to catch customer's curiosity and make her ask for further information to salesmen. That technique had been adopted in the past and it showed that interest volume generated is

[12] *Unione Nazionale Rappresentanti Autoveicoli Esteri*

substantial. Please note that this last technique is usually put in place also when launching other products, and was adopted to boost DoubleYourCar initial sales performance as it had always showed effective in the past.

Chapter 6

Product launch and monitoring

DoubleYourCar launch on the market was the culmination of a design and development process that took place in the previous months.

6.1 Product launch

In this phase, the most important activity is welcoming of customers into the car showroom, thanks to specifically trained and skilled salesmen. The training was performed by the managers of the Dealer, who ideated, developed and realized the product, together with the Head of Product Development of Captive Finance. In this way, salesmen could attend special sessions during which people with deep expertise in the product explained its characteristics, strengths and commercial leverages to be acted on in the negotiation phase with customers. That kind of product knowledge, alongside with the selling experience that salesmen earned throughout years, should enable them to reach a high degree of efficiency when selling DoubleYourCar.

The correct choice of launch period is extremely important for the success of the product. The advertising campaign focused mainly on the opportunity that DoubleYourCar gives to customers of leaving for holidays without worrying about the mean of transport they will use at the resort. In order to align advertising and purchase experience, and to give a sort of continuity in the customer journey from the moment she sees the advertised claim to the one she enters the showroom and starts negotiation, the Dealer and Captive Finance agreed the best launch period was the third weekend of June. Of course, it would have been better to go on the market before, but development time constraints made it not possible.

6.2 Performance monitoring

Performance monitoring started in September. As the first chapter of this paper highlighted, car sales have quite a seasonal pattern: the peak usually happens in the first months of the year, while in summer there is a stagnation in sales. When considering launch time options, the Dealer kept into account the usual market behavior. Considering that DoubleYourCar was to be put on the market in 2019 and that its development started during springtime, the only viable option was launching at early summer. This should have the effect of revitalizing the dealer business during the time of year which is usually less animated in term of sales. The forecast about sales performance was performed by:

1. Consider the sales in the Q3 period of the past 5 years. Only sales of TCM loans were taken into account, to have a like-for-like comparison with the new product.
2. Compute the moving average of sales in the last five years considering a 3 years timespan
3. Project the value obtained for 2018 in 2019
4. Increase that number by 5%[13], which is the target impact of DoubleYourCar.

The main flaw of this forecasting model is that it doesn't consider the market performance of automotive industry on a global and national scale. For example, in 2018 car sales in Italy declined by roughly 3% compared to 2017 performances, which means that, if the actual performances of summer sales of the Dealer registered an increase of 5%, the net impact of DoubleYourCar would be 5% - (-3%) = 8%. On the contrary, if summer sales did not register any variation of the same period of the previous year, that would mean that the net impact of DoubleYourCar on sales performances is 0% - (-3%) = 3%.

As a matter of fact, monitoring activities reported that, in the summer period (i.e. the 3 months following the launch of the product, from June to September 2019), the Dealer's performance sales did not record any

[13] *Data and estimations are not the same as the case study, but reflect reality*

tangible variation if compared on a yearly basis. That means, as explained above, that DoubleYourCar had a net impact of 3% over the summer sales of the Dealer. Of course, this thesis holds only if any other external factor of influence (such as other new products put in place by the Dealer itself, new commercial agreements between the Dealer itself and other carmakers, local crisis of consumption) is excluded. All considered, DoubleYourCar was underperforming, even if its effect on sales was positive. At this phase, the Dealer, together with Captive Finance, seek the reasons that led to this result. In order to discover why performances had been lower than expected, a survey was carried out among the salesforce, because salesmen are the ones that, by working in strict contact with customers, know better the market condition. A meeting between the representatives of the Dealer, of Captive Finance and the salesforce was organized to look into the potential motivations why DoubleYourCar did not reached the target both in terms of value and volume.

The main causes of the low performances identified were:

- New, aggressive, national campaign launched by Hyundai. Starting from September, Hyundai introduced an original, very aggressive financing campaign on the Italian market. It allowed to buy a car with 0 € downpayment and 0% APR (Annual Percentage Rate). As the reader may well understand, these conditions are very convenient for customers. On the other side, DoubleYourCar gets penalized, because its monthly installment is higher, as it is not foreseen that it can sell at 0% APR. To recover from the discrepancy in the financial plan of the two options, the only option left to the Dealer was adjusting the structure of DoubleYourCar and setting its downpayment at 0€ and APR at 0% as well. The corrections put in place were promptly received by the market, and people switched back to DoubleYourCar and acknowledged the great value of the proposal.
- On 22nd June 2019, a fierce hailstorm struck the area around the Dealership, damaging thousands of cars. In the following weeks, the owners of damaged cars sold by the Dealer flooded the showroom to ask for help to activate their insurance policies and have their vehicles

mended. The unexpected number of visits to the dealership, most of which had not the goal to buy a new car, engaged the salesforce at their most, and prevented salesmen to focus on selling and advertising DoubleYourCar. This, of course, had a bad influence over the number of registrations activated through the new product.

We can assume that one of the two reasons outlined above (the hailstorm) is an exceptional event. In order to compute it in terms of number of registrations, the Dealer noticed that for the 4 weeks following the hailstorm, almost the entire salesforce was committed full time to support customers with their insurances and reparations. This means that, over the three-months period on which the first monitoring analysis applied, a third of the potential sales was turned down due to natural events. Looking at the results and considering this new element, both the Dealer and Captive Finance may well regard at the DoubleYourCar experiment as a successful initiative. For proving the efficiency of the product and the liking from the market, a deeper and more complete analysis may be carried out on projects that have longer duration, so that to include a wider statistical sample that could be more representative of the Italian market.

By considering that, as of today (end 2019), there are no other similar offers on a national scale, the results reached by DoubleYourCar are satisfactory for both the Dealer and Captive Finance. SCB has been focusing on the product because its future development may well include the creation of similar initiatives to apply cross-brand, especially with electric vehicles.

6.3 SWOT analysis

In order to assess the actual market value of DoubleYouCar it is useful to perform a SWOT analysis. This tool is based on a framework that takes into account different scopes: Strengths, Weaknesses, Opportunities and Threats (Figure 6.1). Each of the four fields listed above is examined and decomposed into its main characteristics. The final goal of the tool is to provide stakeholders with a quick, still precise, overview of the features that

will bring most of the value, and of the ones that may determine losses or underperformance of the project.

6.3.1 Strengths

The main strengths of DoubleYourCar rely on three different characteristics of the product:

- *Unique selling proposition*: at the time of creation, there were no other similar loans on the market. That acted as a magnet especially to catch customers' interest and encourage them to visit showrooms to get more information. Furthermore, being the only representative of a product category on the market means having a considerable advantage in terms both of initial diffusion among consumers and time availability to react to potential initiatives that may be put in place by competitors.
- *Aggressive price for the value*: thanks to its structure, DoubleYourCar enables the dealer to sell the product with a competitive final installment, a good amount of included services and a quite small down payment (if compared to competitors that offer the same contents). By reviewing the results of the survey carried out by the CRM department, the competitive price has been one of the top-three reasons why customers chose to buy a car through that loan. Furthermore, after the adjustments performed as a consequence of the monitoring actions carried out after summer, the price of DoubleYourCar has further lowered, which eventually brought even more people to get interested in the new product and visit the showroom to learn more.
- *Agility of sales and rentals management*: as DoubleYourCar is a pilot project, its size and scope are inevitably small. That allows the dealer and the rental company to perform flexibly with low backlog and cycle time. Furthermore, the large size of the rental company, which dispose of several tens of salespoint all over Italy, most of which in the main touristic spots, helps consumers in terms of

convenience and mindlessness. Customer satisfactions benefits from that, with positive effects on sales.

6.3.2 Weaknesses

Of course, DoubleYourCar entails drawbacks, too. The three most dangerous vulnerabilities are:

- *Mandatory insurance services*: as the loan is based on Platinum[14] financing structure, it includes one or more mandatory insurance services, such as credit life and/or theft and fire policies. That inevitably leads to a higher installment if compared to other solutions available to buy the same car, or similar vehicles from direct competitors. That is a strong drawback, because a consistent fraction of the potential customers could not consider the included services as a plus, but mainly as a deadweight on the monthly payment. In this situation, the ability of the salesman is critical: he must explain in detail to the customer all the features of the products, and make him aware of the advantages he can get by purchasing DoubleYourCar. Furthermore, the flexibility in the choice of services that the product allows is very useful to shape a financial plan that matches with the needs and expectations of the consumer.
- *Simultaneity of sale with other campaigns*: as a pilot project, DoubleYouCar sells only on a single dealer. Of course, that dealer is selling other loans from brand IZV, as well, and that may affect the performance of DoubleYourCar. This issue cannot be solved, as forcing CarDiamond to offer exclusively one loan is not fair and would distort the performances of the product. However, this paper proved that the product suffered mainly from external events rather than by competition of other loans sold as an alternative to itself by the Dealer.

[14] *Invented name*

6.3.3 Opportunities

DoubleYourCar project had several targets: each one of them may represent an opportunity to pursue in the next few years.

- *EVs bridge solutions*: one of them, possibly the most important, was to verify whether the product was attractive to switch towards electric mobility in the next years. The point here is that customers get used to change car after quite short periods of time; plus, in case of good results, DoubleYourCar may be taken as a base to accustom users to electric vehicles by letting people trying them for a very short period, and without neither any additional cost, nor the need of purchasing a battery car.
- *Increasing brand reputation (through word-of-mouth and other means)*: as in any other market, brand awareness is essential for targeting good sales also in automotive industry. In that sense, selling a unique product gives a substantial advantage over competitors, because a new and peculiar value proposition is more likely to catch potential customers' attention. Those customers, if satisfied, will talk to other ones of the good chance they got to try out a new model without any additional expense, and hopefully the total number of people interested in DoubleYourCar will increase. The main goal is reaching the minimum critical mass that could bring new potential customers in the showroom without any external advertising intervention by the Dealer.

6.3.4 Threats

There are two main drivers that lead to potential threats to DoubleYourCar:

- *Imitation*: by being launched to market, DoubleYourCar automatically became the target of potential imitation practices by competitor carmakers. It would not be the first time and paradoxically, as the product was not registered to any patent office, it would not even be illegal. The main protection against imitation is

in the structure itself of DoubleYourCar: as it is a pilot project, launched on a single Dealer, bigger competitors may not get aware of the newcomer immediately, thus providing a competitive timing advantage to DoubleYourCar. Of course, the advantage of the first entrants is still a strong leverage and allows Santander to exploit the right timing.

- *Competition*: Italian automotive market is mature, and many financial offers by several competitors are struggling to conquer market shares. As it was outlined in the first chapter of this paper, the maturity if the market is also proved by the fact that in the last period the market shares of different brands did not suffer from sudden decreases/increases, which is a typical pattern observe in growing markets. Furthermore, especially in the last decade of economic downturn, customers have become more and more price sensitive, so loans that propose a smaller monthly installment usually gets better market performances. In this context, DoubleYourCar suffers from a higher-than-average installment, due to high financial contents that it is offering.

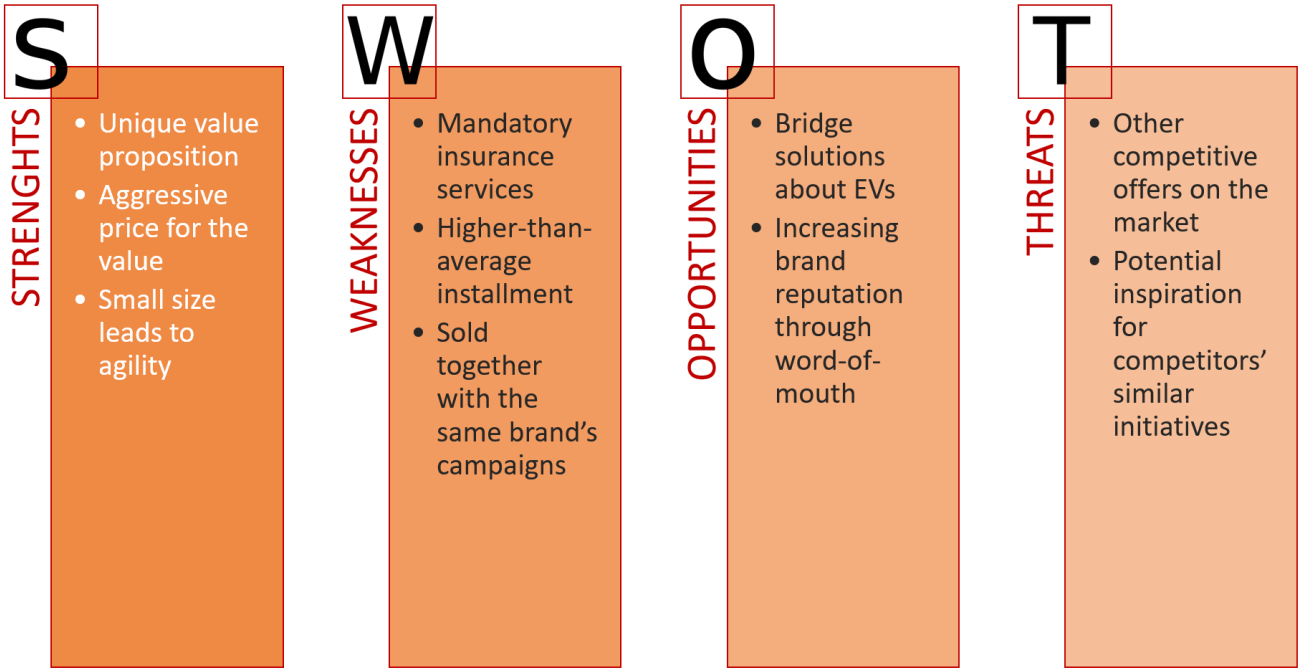


Figure 6.1 – SWOT analysis summary

Conclusions

The global automotive market is facing a period of deep uncertainty: Green New Deal and environmental issues are shaping the market towards a greater and greater adoption of electric vehicles. The transition from ICE vehicles to electric mobility, however, is still at an embryonic stage, which brings all actors involved (carmakers, financing agencies, dealers and consumers) to experiment new ways to satisfy their primary mobility needs.

With reference to Italian market, the picture looks even more complicated: besides the global uncertainty, the national market has been facing a sales crisis since 2018, and recent policies of the so called "ecobous/malus" did not help the recovery process. Furthermore, Italian political situation do prevent consumers to establish a climate of trust, which reflects adversely on their will to invest money.

In order to overcome the above issues, consumers are shifting their preferences from the ownership to the use of their car, in particular by subscribing to financing products such as TCM loans, leasing and long-term rental. Furthermore, new instruments are spreading, like car sharing platforms, subscription plans and bridge solutions.

From the point of view of carmakers and credit institutions, the global contingency represents a demanding challenge and a tremendous opportunity at the same time: the ones who will be able to profit from the disruptions of the next years may come out strengthened, but many could lose a great fraction of their assets.

As a credit institution, Santander Consumer Bank was involved in the launch of DoubleYourCar, a particular car financing ideated and launched by CarDiamond, one of the dealers of Captive Finance. Santander saw a good opportunity in this product as an answer to the market situation and as a good method to try new financing types that no one had ever brought to life in Italy before. The goal of Santander Consumer Bank was to set the effectiveness of the new proposal, in order to evaluate its applicability in possible future developments and initiatives. As it was found out, performances were good, and the potential to further develop the product,

maybe by using it as a springboard to the electric mobility transition, seems to be concrete.

Sitography

http://carsalesbase.com/china-car-sales-analysis-2018-brands/

https://www.acea.be/statistics/article/economic-and-market-report-state-of-the-eu-auto-industry-full-year-2018

https://notesmatic.com/automotive-industry-five-forces-analysis/

https://www.strategyand.pwc.com/gx/en/insights/industry-trends.html

https://www.concawe.eu/event/12th-concawe-symposium/

http://www.greenreport.it/news/energia/smart-mobility-report-2019-in-italia-superata-la-soglia-di-1-000-auto-elettriche-immatricolate-al-mese/

https://www.quattroruote.it/news/burocrazia/2019/10/09/incentivi_in_lombardia_fino_a_8_mila_euro_per_cambiare_auto.html

https://carcloud.leasys.com/

https://www.bmw.it/

https://www.hyundai.it/

https://www.santander.com/

Bibliography

ACEA, Economic and Market report full year 2018, *2019*

ACI, Auto-trend: Analisi statistica sulle tendenze del mercato auto in Italia, *2019*

ANFIA, L'industria automotive mondiale nel 2018 e trend 2019*, 2019*

ANIASA, 18° rapporto: la mobilità condivisa e sostenibile in Italia, *2019*

ASSILEA, To lease 2018/19, *2019*

FINDOMESTIC, L'osservatorio auto 2019: il mistero dell'auto elettrica, *2019*

IEA, Global EV Outlook 2019: scaling-up the transition to electric mobility, *2019*

UNECE, Annual report 2018, *2019*

UNRAE, L'Auto 2018 Sintesi Statistica. Il Mercato Italiano negli ultimi 10 anni. La transizione verso una mobilità sostenibile, *2019*