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Mobility 4.0 as a cornerstone for sustainable economic recovery

Applied evidence from companies of the new mobility sector

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*To my family, for always
being there for me*

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INTRODUCTION

The new mobility sector, also known as Mobility 4.0, has become increasingly important in the present-day daily life. Its importance in both the current and future scenario of the global economy and in the field of sustainability is undeniable. An academic debate arose on the findings stemming from recent scientific studies that have been conducted on these topics. The new mobility sector responds to the need of making cities more sustainable places, while ensuring social inclusion and economic growth. A key element of the sector is sharing mobility, as opposed to private vehicles, which derives from the concept of sharing economy. It includes services such as ride hailing, carpooling, micro-mobility, car, scooter, and bike sharing. This leads to the emergence of a new concept: smart mobility. Smart mobility is strictly related with the idea of smart city, a sustainable ecosystem in which all the actors involved interact with each other. Inside the new mobility paradigm, a new model emerged, which took the name of Mobility-as-a-Service or MaaS. The MaaS system represents a turning point in mobility, as it implies the integration of the various services in a digital platform, so as to provide a unique and personalized experience to users according to their needs. The idea at the base of this system is to provide mobility no longer as an asset, but as a public service, in a vision that puts people at the center. However, the already difficult (in terms of costs and technology) transition described above had to deal with one of the most disrupting events of the last few decades: the outbreak of Covid-19, or coronavirus. The diffusion of Covid-19, together with a new technological paradigm, affected the mobility sector in many ways, starting from the consequences on the automotive industry to the measures taken at a social level to limit the virus. This phenomenon highlighted the need to review the dynamics of the sectors in relation to the new requirements in terms of safety and accessibility. The purpose of the thesis is to show how the new sector can represent the cornerstone for a sustainable economic recovery in Italy and all around the world, thanks to the influence it has on other sectors (such as the insurance and energy one), as well as the technologies it requires and the strong impact it has on the reorganization of the structure of cities. To do so, the thesis will analyze the current mobility scenario, starting from the effects suffered from the pandemic to the opportunities emerged in this period of disruption. A further contribution will be given by the testimony of four companies of the sector (Cooltra,

2Hire, Playcar and Share Now), which will help to define the key aspects of the new mobility, by providing interesting insights about their direct experiences.

The analysis will start with a framework of the global economic scenario and the automotive industry, which will investigate the trends of the last two of years as well as the implications of the pandemic on global trade and global value chains (chapter 1). As a matter of fact, the automotive sector found itself in the middle of a key technological transition when the pandemic started, and it saw in the healthcare emergency caused by Covid-19 the realization of a crisis already started in the previous years. This will give the basis for the analysis of the central topic of the thesis, which is of course the new mobility (chapter 2). In this section we will retrace the evolution of mobility throughout history, until the modern times and the current trends represented by smart mobility and MaaS. The focus will then shift to four main aspects related to the pandemic, namely the impacts of the latter on the actors of new mobility, the effects of the emerging macroeconomic scenario on the new models of mobility, the immediate responses of the sector to the pandemic, and the opportunities arisen from the period of disruption. The notions presented in the second chapter will then be put into practice through the direct experiences of some companies of the sector (chapter 3). Cooltra, 2Hire, Playcar and Share Now will give their version of the four aspects previously analyzed, as well as their opinion on what is needed by the mobility sector to make a difference in the future. Moreover, a special focus will be dedicated to the Italian situation. Indeed, the country finds itself in delay with respect to other international realities. Delay that could be due to the small size of Italian cities, which therefore do not attract foreign investments by multinationals. However, the main problem seems to be the absence of national players throughout the territory, which is instead characterized by local solutions (not always well developed) and public services often supplied by foreign companies. Given the high number of small and medium size enterprises (SMEs) that populate the Italian industry, it will be interesting to see what these firms could do to face the competition of big multinationals. The aim of this chapter is to collect the experiences of the various companies, and use the results of the interviews, comparing them to the literature of reference, to come up with a common picture that summarizes the current scenario.

The final part of the thesis will be devoted to the conclusions, in which we will retrace the main steps of the research to extract the takeaways that better sum up the concept at the core of thesis: the key role that the new mobility sector can play in the process of

sustainable economic recovery, both at a local and global level. This section will also leave space to personal opinions about the future developments of the sector, as well as the factors that could influence it the most, particularly specific to the Italian situation.

CHAPTER I

Automotive industry: the global scenario

This first chapter is aimed at giving a general framework of the automotive industry at a global level. It is indeed important for the purpose of the thesis to analyze the various dynamics of the market in order to delineate a clearer picture of what has been the situation of the sector in the last few years, as well as its current situation.

This process would provide the basis necessary to introduce the main topic of this research, which is the rise and the future developments of the new forms of mobility that are characterizing not only the way we are living, but also our impact on the environment, in the run towards a more sustainable world.

The analysis will start from a focus on the global economic scenario, in order to present the trends of the major markets worldwide in the last couple of years. This also entails an overview of the current market structure and the resulting debate about globalization, more in particular about supply and global value chains.

The second paragraph will focus specifically on the automotive sector and will provide some interesting figures that will help to better frame the situation of the industry as a whole and of its main international players. New trends in mobility will be presented in comparison to the traditional way of doing business, so as to highlight the weak points of the current system and offer solutions for the future renewal of the industry through the technologies at our disposal. From an initial global perspective, the analysis will then shift more in detail to a European point of view, to finally conclude with the Italian economic situation and the introduction of the Italian automotive sector in the third paragraph. All these aspects taken into consideration will be analyzed according to the greatest event, in terms of impact and dimension, of the last year: Covid-19 pandemic. As a matter of fact, Covid-19 crisis further changed the dynamics of the worldwide economy, so that every issue concerning production, global trades and future trends will inevitably be influenced by this event. Impacts of the pandemic will be presented in the fourth and last paragraph, together with the related responses of countries and companies, to complete the picture depicted until now and pave the way to the central topic in the second chapter.

1.1 Economic scenario

In the last couple of years many industries, among which the automotive one, started reliving the relapse toward a new period of crisis, after the big recession of 2007 and 2008. However, despite the many difficulties encountered, the 2018 onward period of crisis was still far from the one ten years before. At least until 2020. Indeed, Covid-19 appearance and the following spread all around the world drastically changed the market dynamics, without forgetting of course its main impact on human lives.

The healthcare emergency derived from the pandemic has shown the limits of forecasting and preventing capacities all around the world, reopening a twenty-year long debate on the benefits of globalization and the current supply chain model.

As a matter of fact, the many measures put into action to limit the diffusion of the virus, such as the lockdown of production plants and nonessential services, the limitation of movement and physical distancing, have led to a drastic fall of industrial production, orders, turnover, and foreign trade, with huge impacts on logistic, transport, employment, and consumption. Many, if not all, of these problems were precisely due to the high level of dependence of most Western countries on a few Asian ones.

The most emblematic example concerned medical supplies¹. In fact, with the virus expanding to Europe, many countries found themselves poorly stocked in terms of masks and other basic PPEs, which were mainly produced in China, and therefore blocked by Chinese lockdown. This is not something new, rather a quite recurrent phenomenon already experienced in the past, for example with the Fukushima catastrophe and the Thailand flood in 2011², just to quote a couple of them.

What has emerged from these events is the weakness of the current supply chain “just-in-time” approach, which reduces the inventories at the very essential quantities. Covid-19 has highlighted once again the need to reshape this model, for instance towards one more focused on stock piling, combined with shorter supply chains obtained through reshoring or nearshoring processes. This is at the base of a shared global sentiment toward regionalization, which requires the development of a new organizational model of supply chains, without giving up the benefits of the current

¹ Gereffi, G., “*What does the COVID-19 pandemic teach us about global value chains? The case of medical supplies*”, 2020

² OECD, “*Covid-19 and Global Value Chains: Policy Options to Build More Resilient Production Networks*”, 2020

one. All these measures are aimed at one specific objective: building resilience for future disruptions by making countries and businesses less dependent on each other. In order to do this, an overall review of the risks and vulnerabilities is needed.

The economic and social situation resulting from this scenario is characterized by a strong uncertainty which does not seem to have a near end, requiring a tremendous common effort to be overcome. In 2020, global trades have shown a substantive slowdown due to a shock both in demand and supply of goods and services.

The Euro area, China and USA are the main players in the market, and together they are worth almost half of the whole trades. In this sense, global value chains (GVCs) have played a key role in the last twenty years, as they have strengthened the interdependence between these countries and because most trades take place precisely along them. However, the shutdown of factories due to the pandemic caused a worldwide domino effect with the interruption of supply chains, which was in part favored by this interdependence. All these aspects are at the center of the debate about what is going to be the “next new normal”: a period of interventions to rethink the daily life of people and companies, characterized by new fiscal policies, supply chain revolutions, remote working, e-commerce, and new mobility trends. As a matter of fact, if on the one hand the pandemic has put into serious trouble trades on a global level, on the other side this crisis can be seen as a big opportunity to rethink the current supply chain model and accelerate the development of digitalization processes – exploiting automation and digital intelligence – as well as more efficient and sustainable lifestyles.

1.2 Global automotive industry

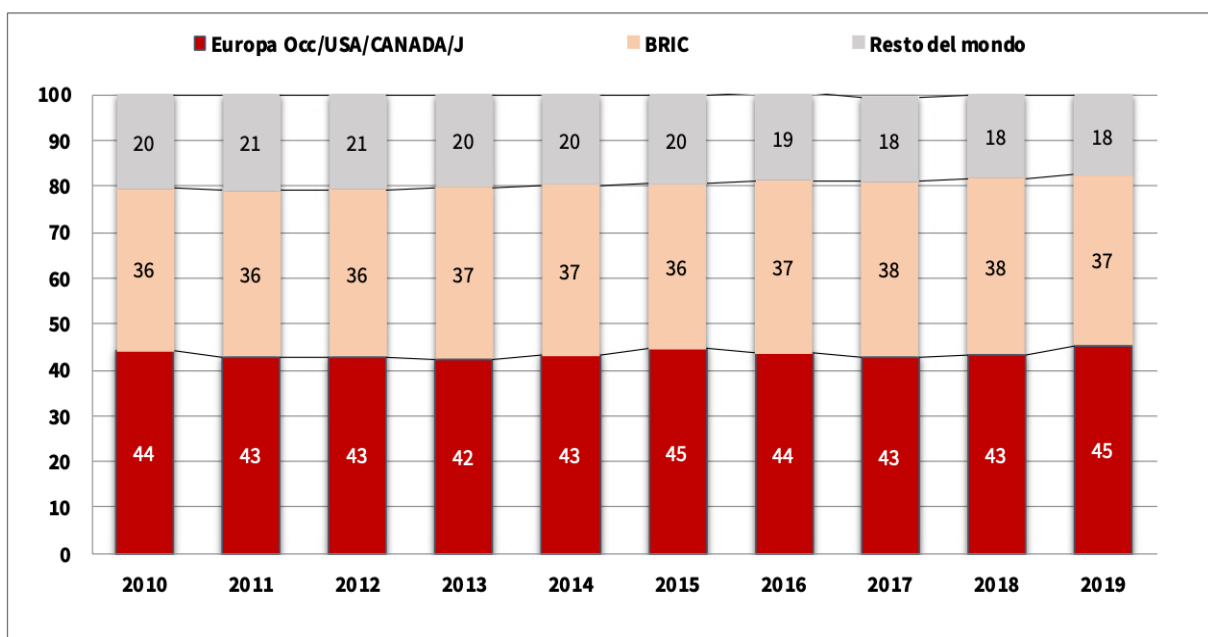
In a complicated economic scenario such as the one that has been taking shape in the last two years and especially in the last months, among all industries, the one that has suffered the most in terms of production has been the automotive one.

In 2019, the number of motorcars sold has been 91,5 million units, registering a -4,5% with respect to 2018 – estimated at 95,8 million units³. Overall, the last decade has experienced a boost in demand for motorcars – from 75 million units in 2010 to 96

³ ANFIA, *“L’industria automotive mondiale nel 2019 e trend 2020”*, 2020

million in 2017 – with a major contribution coming from BRIC countries (Brazil, Russia, India, China), Western Europe, USA, Canada, and Japan. In particular, in 2019 BRIC or emerging countries represented 37% of the overall demand, especially thanks to the growth of the world’s biggest market: China. Western Europe, USA, Canada, and Japan instead were worth 45% of the demand, therefore leaving the remaining 18% to the rest of the world⁴.

Table 1. Global motorcars’ demand for macroeconomic area (in % of total demand)



Source: ANFIA, *Area Studi e Statistiche (2020)*

What has deeply changed in 2019 is the product mix, characterized by a fall of diesel cars and a rise of fuel and especially alternative powertrains. This phenomenon is directly attributable to the 2015 “Dieselgate” scandal, which vastly damaged the reputation of European automotive industry, and fostered a demonization of diesel cars. Unfortunately, the fall of diesel cars and the consequent rise of fuel cars has caused in the last five years an increase of air pollution – estimated at 2,8 g/km of CO₂⁵. As a consequence, companies decided to change strategic plans, as well as product mix,

⁴ ANFIA, 2020

⁵ European Environment Agency (EEA)

and prepared investments for the electrification process. However, without a massive introduction of electric vehicles in the next few years, environmental goals for 2025-2030 – such as the UN 2030 Agenda – will be basically out of league. In this sense, there are three main issues to face on the way towards electrification. The first is related to recharge stations, which are still not evenly distributed across countries and inside each country. In a context where the physical use of electric vehicles is put in serious difficulty by the absence of adequate basic facilities, the run toward electrification will take more time than expected. Secondly, there is a problem of batteries, due to the fact that nowadays production is entirely in the hands of China. This aspect represented a problem especially during the pandemic, as Chinese lockdown completely blocked the supply of batteries, causing a further delay in the development of electric vehicles.

The manufacturing of batteries might be considered as one of the segments needing shorter supply chains, so that every country can develop its own know-how on the technology and accelerate the electrification process. The third and last issue concerns the production of energy from renewable sources, in order to balance and bring to zero the level of pollution coming from vehicles. Many companies are following this path, and where they are not able to fully avoid emissions, they try at least to compensate for the pollution generated through greener production processes or collateral activities. Overall, electric vehicles (ECVs) have registered sales for 2,39 million units in 2019, and despite the general slowdown of sales, the ECV market has significantly grown and is now worth 2,7% of the whole market of light motorcars. The biggest and fastest growing geographic area in the field of electric vehicles is once again the Asian-Pacific region. Sales forecasts for the future are difficult to make, both because of the global economic slowdown of the last couple of years and the current Covid-19 crisis. However, in 2020 demand could stop around 76 million motorcars, representing a decline of the market of 17%. As far as the global production is concerned, the 2019 ranking for countries producers of motorcars shows China on top with almost 28% of global production, followed by USA with 11,8%, Japan with 10,5%, Germany with 5,5% and India with 4,9%. Deserving attention are also Mexico, South Korea, Brazil, Spain, France, Thailand, and Canada. Together, these Top12 countries represent more than

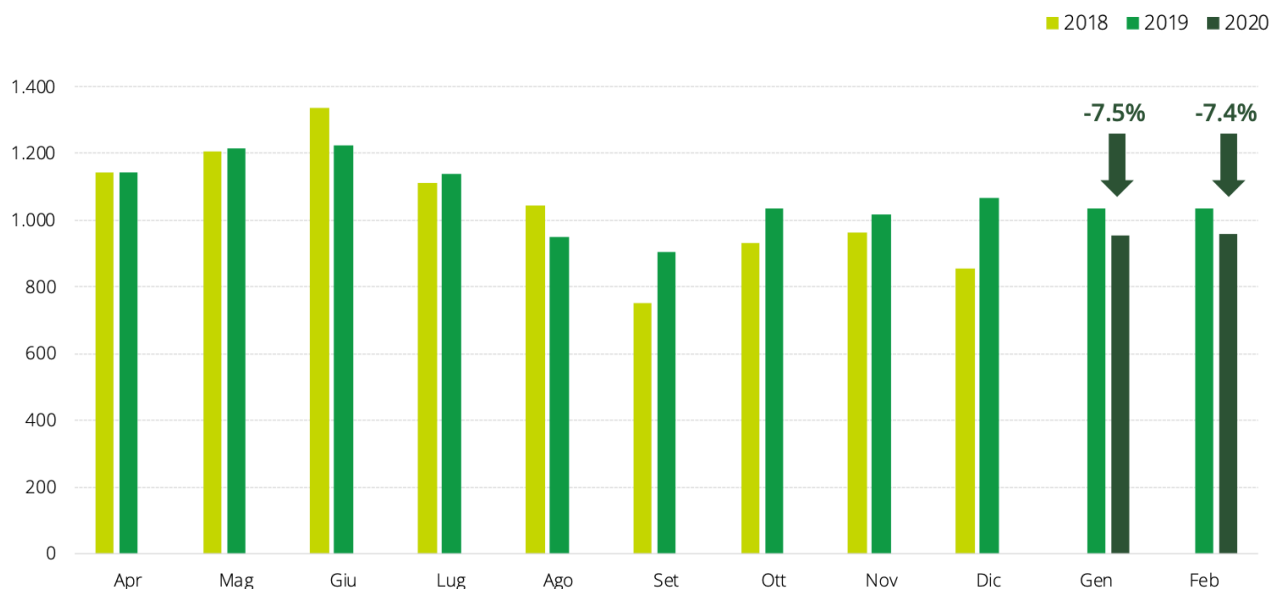
82% of motorcars' global production, while BRIC countries on their own are worth 37,9%, equal to 34,9 million units⁶.

In 2019, 67 million cars were produced, representing a decrease of 6,5% with respect to the previous year. Asia owns more than half of the total production, with China as the major player, followed by Japan, and in minor share by India and South Korea.

After Asia, most of the production is attributable to Europe (23,7%), despite the 5,4% decline in 2019. The main cause of this decline is to be found on the lower levels of cars produced by the major European markets: Germany, UK, Spain, France, and Italy.

A negative trend which is only expected to get worse with the 2020 pandemic and the consequent lockdown of production facilities.

Table 2. New cars' registrations in Europe



Source: ACEA (2020)

With the progressive expansion of Covid-19 pandemic, what emerges is the global dimension with which the automotive sector has been impacted. To understand the real consequences of the crisis on the automotive market, it is first necessary to distinguish the different spheres of the value chain that have been progressively interested by the spread of the virus across various regions of the world.

⁶ ANFIA, 2020

The first and main effect – in terms of impact on global trade – was the lockdown of production plants in China, which gave rise to heavy repercussions on the logistic, financial, and operative side for most international players. European car makers were particularly affected by this phenomenon, given their dependence on the Chinese market in terms of both productive capacity and components imports.

The result was a true shock of the automotive supply chain at an international level, fostered by a progressive depletion of materials, semi-finished products, and other essential components for the productive continuity of the Original Equipment Manufacturers (OEMs)⁷. At the beginning of the pandemic, effects on commercial distribution were predominantly limited to the Chinese market. As a matter of fact, western economies did not immediately suffer repercussions on the commercial side. At that time, the United States registered a slight increase of +0.2% of new cars sales, reaching 1.3 million units⁸. Unfortunately, Europe experienced a physiological drop of 7.4%, mainly driven by the slowdown of Germany and France, respectively of -9% and -7.8%⁹. In Italy too, the contraction was 7.3% with respect to the same period in 2019. Nonetheless, sales in February represented the highest in the last months, with 163.000 units¹⁰. Only from the end of February, an inversion of tendency occurred, with facilities reopening in China and the emergency moving drastically to western countries. As a result, European and American institutions started taking measures to contain the spread, among which restrictions on movements and general lockdowns of economic activities – for the automotive sector also dealers and showrooms were closed. The presence of cases of infection, as well as the difficulty in the provision of components, made it necessary a scaling of production volumes and a rethinking of investments. At a global level, estimates forecast a fall in the production of light vehicles equal to 11 million units in 2020. Europe seems to be the one destined to suffer the biggest loss, -2,96 million units, followed by China (-2,79) and North America (-2,22)¹¹.

⁷ The Wall Street Journal, *“Coronavirus Creates Domino Effect in Global Automotive Supply Chain”*, 2020

⁸ Globe Newswire, 2020

⁹ ACEA, *“Passenger car registrations: -7.4% first two months of 2020”*, 2020

¹⁰ ACEA, 2020

¹¹ IHS Markit, *“Automotive Industry Outlook”*, 2020

In the European area, Italy is undoubtedly the country facing the worst scenario. Situation worsened by the diffusion of the virus in northern regions – which represent the industrial driving force and account for approximately two thirds of automotive sales – but also by the early adoption of restraint measures compared to other countries. March was the hardest month for Italy, with an unprecedented 85.4% drop of registrations, equal to 28.326 vehicles¹². The healthcare crisis at European level also affected other countries, in particular France (-72%), Spain (-69%) and more moderately Germany (-38%). However, variables are still much more than empirical evidence when it comes to understanding the real economic impact of Covid-19 crisis, so that a precise formulation of forecasts is almost impossible in the long-term.

The evolution of demand will be largely determined by consumer behavior.

The purchase of the first car could be encouraged by the unwillingness to use public means of transport and by the necessity to move for essential tasks. Indeed, public transportation will be, with all probability, one of the most affected segments, as people will prefer to move individually in the next months. On the other hand, this could pave the way to new forms of mobility and micro mobility, such as carsharing and kick scooters, which have already been taking pace during the last year. New trends in mobility are also at the base of a general rethinking of urban areas, which could lead to cities composed of many little “islands” (neighborhoods) independent and self-sufficient from the point of view of public means of transport and facilities for people (supermarkets, gyms, and other shops). Unfortunately, economic repercussions are affecting especially small and medium size enterprises (SMEs) of the automotive industry, for instance due to the impossibility to visit dealers to buy cars. However, the real problem of SMEs is constituted by the impossibility to rely on a large liquidity with respect to bigger players, a factor that is forcing and will force many businesses to the shutdown. On the other side, restrictions on movements and closure of retail stores favored the growth of e-commerce and online purchase of vehicles, which can offer interesting solutions in the short and long term. In this sense, it is interesting to notice how in a period of disruption, new technological tools and opportunities emerge and transform the usual way in which people, in this case buyers and sellers, interact.

¹² Ministero delle Infrastrutture e dei Trasporti, 2020

In such a volatile and complex scenario, in order to manage the formulation of a proper strategy and to exploit new opportunities in the innovation and development of distribution channels, OEMs and dealers will need to cooperate to find a common solution for the industry upswing. New strategic approaches will imply deep changes on business models. The rate at which the pandemic is affecting the market will reward those players who prove themselves to be able to respond more quickly and effectively, intensifying and aligning the relationship with their own network of dealers. Fortunately, companies can count on a variety of solutions aimed at increasing the flexibility and performance of distribution channels in the future. For instance, a mixed system of dealers and agents would relax financial pressure on sales and distribution channels of vehicles. Alternatively, exploiting economies of scale to enhance supply chain efficiency could demonstrate particularly effective. Or again, a reduction of stocks in retail stores through a more on-demand approach, intended to strengthen partnerships with suppliers, increasing in this way flexibility and responsiveness of supply chain and drastically reducing delivery times. To this purpose, a shift from a “push” model – characterized by production based on demand forecasts – toward a “pull” one – focused on actual demand – would be the turning point toward the desired chain revolution. A rethinking of the role of customers is also needed, with a strategy that puts people at the center and focus on the customization of the product as well as the enhancement of in-store and post-purchase customer experience.

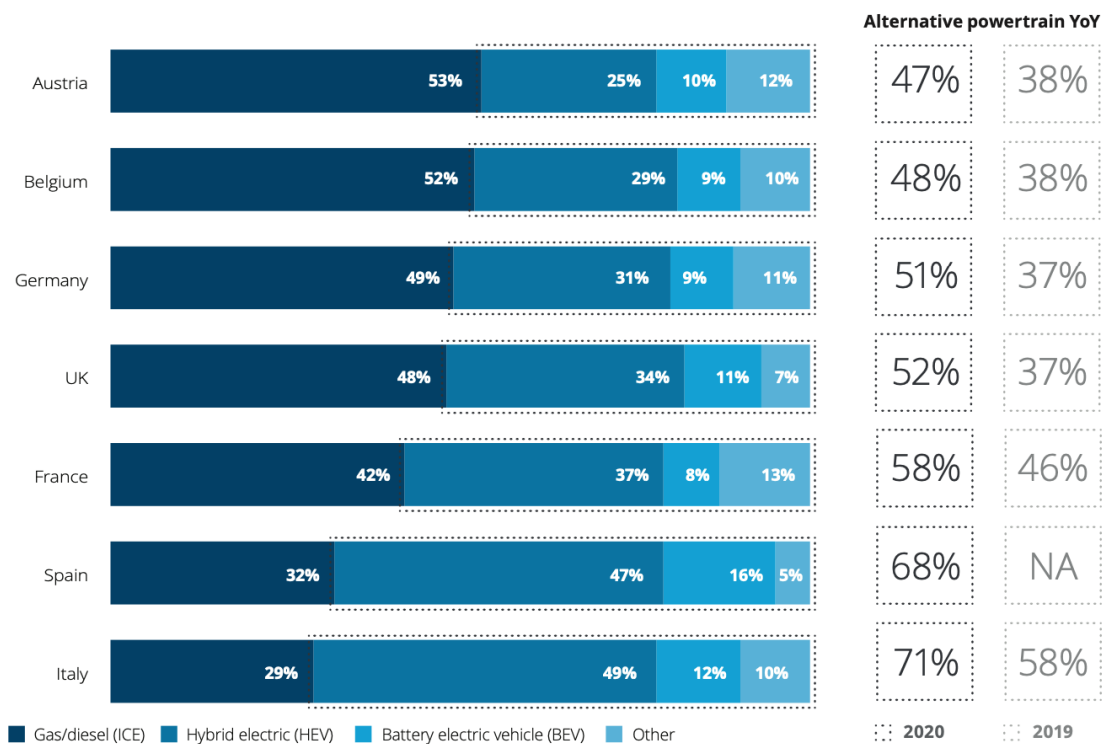
Customization of vehicles is especially pertaining to luxury brands. It is for example the case of the well-known Italian Motor Valley, where Ferrari and in particular Lamborghini are changing the paradigm of sport cars, making them more and more exclusive thanks to personalized designs and made-to-measure accessories.

Finally, the building up of managerial capabilities and professional competences would be helpful in a period of technological transition. Indeed, what the sector will need the most is the right use of new digital technologies available to simplify, for example, purchase processes and rely on online channels to sell cars, among many other uses. Adapting professional competences to new technologies also means providing workers the right tools to manage processes, therefore requiring investments in the reskilling of employees. Unfortunately, Covid-19 crisis not only affected more traditional segments, but repercussions also involved emerging trends such as electric mobility. As a matter of fact, the stop in China implied a stop also in the production of

electric vehicles (ECVs), since China is the major global producer of batteries, with a share greater than 50% – United States account for 7% while Europe for 2%¹³.

This phenomenon clearly had consequences on the international supply chain, contributing to the slowdown of a market that in Europe reached a rate of 80,5% in the last trimester of 2019¹⁴. Despite the significant growth of electric and hybrid vehicles, this segment still represents a small share of the market, at least as far as Western countries are concerned. In Europe for example, registrations in 2019 only accounted for 1 million and 356 thousand units¹⁵. However, interest in ECVs is growing rapidly, as many people look for alternative engines in their next car.

Table 3. Consumer powertrain preferences for their next vehicle



Source: Deloitte, “2020 Global Automotive Consumer Study” (2020)

European consumers’ willingness to pay for this type of technology has increased too. The main reasons in favor of electric vehicles seem to be the lower emissions and

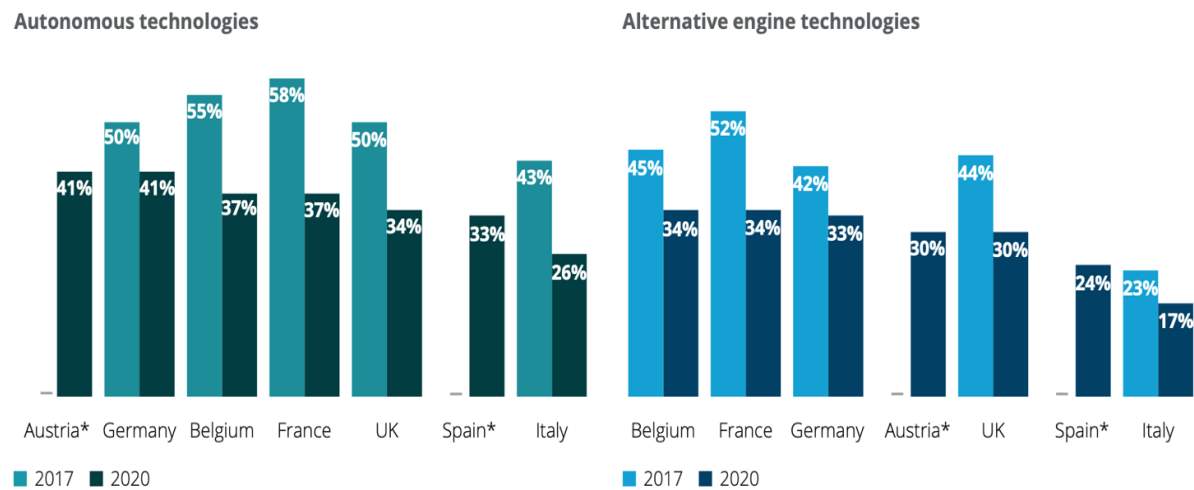
¹³ The Economist Intelligent Unit, 2020

¹⁴ ACEA

¹⁵ ACEA

operating costs, as well as the possibility to count on tax incentives related to their purchase.

Table 4. Percentage of consumers unwilling to pay any more for:



Source: *Deloitte, "2020 Global Automotive Consumer Study" (2020)*

The uncertain development of the mobility sector towards more ecological and sustainable models is mainly attributable to the still high list price of ECVs.

Doubts also regard connectivity and the so-called multimodal mobility. As far as the former is concerned, people are showing mixed feelings on the matter. This is mainly due to the different perception of connectivity across countries. In Europe for instance, Italy, Spain, and Belgium seem to be embracing a beneficial idea of the technology, with respect to neighboring countries. Inside the connectivity debate, there are also worries about the security of biometric data coming from connected vehicles. Moreover, who should have the right to manage these data is still subject of debates. As a result, OEMs will probably struggle in the search to introduce advanced connectivity devices, even though it means protecting people by increasing road safety. Speaking of multimodal mobility instead, consumers' habits might be difficult to change. In fact, people still look quite resistant to combining different means of transportation in daily trips.

The only segment that seems to better respond to this trend is of course the one of commuters. Nevertheless, younger generations seem to be more engaged in alternative forms of mobility, to the point that in the future they might also renounce the idea of

having their own car. On the opposite side, traditional powering methods are regaining momentum thanks to the fall of oil price and the suspension of prohibitions for the circulation of fuel and diesel cars in this situation of emergency. In particular, fuel cars are prevailing over diesel ones, especially because of the “Dieselgate” scandal of 2015. For this reason, many automotive companies are asking governments to introduce incentives not strictly tied only to eco-friendly models. As a matter of fact, a market like the automotive one, cannot exclude more popular cars from its range of products if it wants to recover from such a massive volume contraction. For this reason, the distinction between more or less sustainable models will probably shift to the background during this period of unprecedented crisis, at least in the short term. Delays accumulated in the launch of new electric models will lead to a progressive general delay in the technological transition that will also concern future investments. The latter will be highly influenced also by profits contraction and liquidity shortages due to the drop of sales experienced. Public institutions, on their side, should adjust policies to this ever-changing market. For instance, in the case of European Union, current CO₂ emission targets would be impossible for manufacturers to bear, leading therefore to further sanctions that would complicate an already difficult financial situation. Suffice it to say that already before the pandemic, sanctions were expected to reach 400 million euros for half of European car makers in 2020, and 3,3 billion in 2021¹⁶. Therefore, to facilitate the recovery of the industry, environmental restrictions need to be subjected to a general and shared review which does not further punish companies. The future of the electric segment will strongly depend on the evolution of a variety of contextual conditions, among which the persistence of the healthcare emergency on western markets, the impact on consumers’ income, the affordability of new investments in R&D and the capacity to restart production of batteries and other components of Asian manufacturers. In the last years, OEMs started a process of strong investments in innovation and development of electric cars, so it would be unlikely to suppose a change of direction in terms of medium and long-term strategy.

With the upswing of demand, companies will need to exploit new growth opportunities. Given the complexity of finding a coherent strategy among all stakeholders in the industry, the main obstacle will probably be identifying a balance

¹⁶ Deloitte, *“Cutting CO₂ emissions from passenger cars”*, 2020

between economic and financial interests of firms and the positive resolution of the healthcare crisis. The gap of production activities and of supply chains at an international level will imply a close cooperation between all the players of the industry in the months to come. Suppliers and consumers will be asked to adopt a more collaborative and flexible approach in the utilization of resources. B2B strategies and contractual models will need to be modified toward a greater integration both at the top and at the bottom of the value chain, to increase responsiveness to sudden changes, promptness in putting measures into action and adaptability to new contexts. In other words, OEMs will be required to operate in direct contact with suppliers and dealers. Therefore, the challenge will be to create a strategic approach aimed at balancing production and sales dynamics, with the objective of increasing resilience in case of future supply chain shocks. As always, some firms are better prepared than others in mitigating risks related to chain disruptions. For example, they can count on strategic risk management plans which guarantee business continuity in multiple market scenarios. Alternatively, they opted for the development of a diversified portfolio of suppliers based on geographic areas. Or again, they have adopted multiple-sourcing strategies for the provision of resources, together with better models of inventory management. Covid-19 impact on the automotive industry extends also to the human capital sphere of companies. Indeed, it is of utmost importance to continue investing in the reskilling of employees with the support of digital technologies. Overall, the automotive market is clearly destined to a period of great transformations – internal and external – which will require the intervention and collaboration of all players and stakeholders to seize future opportunities in a more proactive way. Not only to stop the current emergency, but also to anticipate the evolution of new business models and contribute to the innovation of the automotive sector itself.

1.3 Italian automotive industry

Among the different markets at European and global level, the automotive industry plays a particularly crucial role for Italy. As a matter of fact, the performance of the automotive sector heavily contributes to the whole manufacturing results.

For this reason, a decline of the sector would have a negative influence on the entire economy of the country. Unfortunately, this is exactly what happened in the last two

years, when the financial crisis coincided with a fall of the automotive production of 3,3% in 2018 and 9,5% in 2019. Estimates for 2020 show a further decline of new registrations in the first two months of the year, respectively of 5.9% and 8.8%, as shown in Table 5.

Table 5. New cars’ registrations in Italy



Source: ACEA (2020)

Beside automotive results, the economic situation is mainly determined by two other important factors: GDP and deficit. Indeed, the contraction of GDP and the rise of deficit due to Covid-19 caused an explosion of national debt, which could reach 155,5% of GDP in 2020, exactly twenty points more than last year¹⁷. In the first trimester of 2020, according to ISTAT data, GDP registered a substantive decrease of 5,6% due to the healthcare emergency and restraint measures to control the pandemic. Nevertheless, the biggest contraction happened in the second trimester (-12,8%), caused by a simultaneous fall of consumption and investments, together with a negative trend of foreign demand. Only with the end of the lockdown in May and the consequent restart of economic activities, a small upswing started, with an increase in consumption and exports. Consumers’ trust augmented again during the months of July, August, and September in all sectors – with different intensities – even if in lower

¹⁷ International Monetary Fund, 2020

levels with respect to pre-crisis standards. Now more than ever, the Italian automotive industry is at the center of a period of increasingly rapid and complex transformations, with the aim of ensuring itself a position in the global competitive arena for a greener and more digitized future. Moreover, during the lockdown the automotive sector proved itself very useful from a social point of view thanks to its services which secured essential goods to all citizens. It is in fact under the eyes of everyone how the pandemic expanded the possibilities of e-commerce, the only channel that showed a growth in the last months. The good part of e-commerce services is that they not only work for the big distribution, but also for small businesses, creating a commerce of proximity that did not exist before. This is a crucial aspect, given the high percentage of SMEs that compose the Italian industry. Phenomenon that is the result of the cultural heritage of the country, historically characterized by industrial districts scattered around the territory, which were specialized in specific products. In addition to e-commerce, other new trends are gaining momentum, such as electrification and technologies for the reduction of environmental impact, digitalization of production processes with consequent changes on organizational models, and new risk management approaches. The industrial transition which Italy is undergoing is clearly very expensive, and the pandemic just worsened a complicated scenario. In order to come up as a winner, Italian industry must be sustained by a favorable environment, characterized at the moment by new players in the market – as the newborn Stellantis, whose implications are still to be weighted – and by the necessity to intervene on structural and strategic matters in the landscape of the European Recovery Plan. The latter represents an unprecedented opportunity not only to put an end to the emergency, but also to help firms sustain the investments needed to face the challenges of what is going to be the “next new normal”. On their side, companies must have clear objectives in terms of Research and Development, formation of human capital, dimensional growth, and positioning. All these practices are aimed at one specific goal: building resilient supply chains. If we look at the Italian automotive industry with a broader perspective, the picture that emerges is a sector whose turnover, production and export were already declining in 2019, getting even worse with the 2020 pandemic. The crisis of the Italian production chain comes from many subsequent difficulties throughout the years, difficulties which have been exacerbated by the lockdown and could lead to dramatic and irreversible consequences. Moreover, as briefly anticipated before, Italy

experienced a stronger impact with respect to other European countries, due to the geographic distribution of industrial activities. As a matter of fact, the greatest share of industrial production is attributable to northern regions, which were the first to be hit by the virus, and consequently the first to close factories. This was particularly determinant for the automotive sector, which is rooted almost entirely in the north, between the Motor Valley and Piedmont (home of FCA Group).

In the next months, there will be three main uncertain issues to be addressed.

The first concerns the rise of the demand and production of vehicles in Europe and in the main markets of the Italian industry, given the still unknown dynamics of the sector. The second issue is strictly related to the Stellantis case, namely to what will be the next moves of the newborn company and the implications for Italian suppliers. Indeed, Italian automotive industry is still largely dependent on the activities of FCA, considering the high number of SMEs producing components and other parts for the Group. To stress its importance in the Italian automotive sector and economy, among the measures adopted by the government to guarantee liquidity during Covid-19 crisis, there was the approval of a loan for FCA of 6,3 billion euros to be divided in three years. These funds were only addressed to Italian activities of the Group and to the Italian automotive supply chain. The third element regards policies and regulations to react to the crisis. More specifically, the necessity to shorten global value chains to be more flexible and quickly responsive in case of disruption, as well as economic and financial aid coming from government and institutions. Covid-19 pandemic has also highlighted the importance of developing new technologies for a better mobility and sustainability. The only way to realize these goals is by creating synergies between public and private investments. Without joining forces, the industry will have many difficulties in coming up with a solution to overcome the crisis. Unfortunately, after an initial engagement of enterprises in the adoption of technologies 4.0 for the enhancement and innovation of organizational processes, due to both a boost of Industry 4.0 and Calenda's incentives, in the last years the number of firms undertaking development projects has basically stopped. Among these projects, an important role is played by the electrification of the entire chain, trend which is quite in delay in Italy. However, in 2020 the number of firms investing in the development of new powertrains seems to be doubled, representing an important shift with respect to the past. In order to have an idea of some figures, Italian automotive industry has registered negative results, generally

speaking, since July 2018. In more detail, the sector experienced a -13,8% decline in motorcars manufacturing, together with a +6,7% increase in the manufacturing of car bodies and trailers, and a -7,9% drop of production of parts and accessories for motorcars and their engines¹⁸. The components' supply chain suffered a decline of national as well as foreign demand. This represents a very important factor since many European major players count on Italian companies for raw materials and other intermediate goods. 2020 trends follow more or less the same path of the entire economy, with a significant fall in the first trimester (-11,4%), followed by the biggest drop in the second one (-56,6%). As before, also in this case the third trimester represented a slow "recovery", with an increase of production of 25,5%. To sum up, on an annual basis the industrial production for the automotive sector registered a loss of 35,8% in the first seven months of the year. As far as domestic production is concerned, in 2019 it amounted to 542.000 units (19,5% less than 2018), of which 54% was made to export¹⁹. In the same year 373.000 commercial vehicles, trucks and autobus were produced. This is an extremely important segment for employment and export.

In the market of commercial vehicles Italy represents a point of reference, thanks to the presence of successful brands such as Fiat Professional, Iveco and Piaggio.

Last year was also remembered for the announcement of the merger between FCA and PSA, which gave rise to Stellantis, the fourth group in the world as well as the second in Europe (behind VolksWagen Group), with 10 million motorcars produced yearly. Precisely for the key role played by FCA, the activities of the newborn Group will heavily influence the Italian sector, starting from second and third tier suppliers to bigger players. Concerning 2020 trends, domestic production suffered a reduction of 24% in the first trimester, followed by a more intense drop of 67% in the second one. The first six months saw 272.000 motorcars out to the market, almost half with respect to the previous year – according to ANFIA data. The main cause of the negative results on motorcars' trade is attributable to the heavy introduction of foreign manufacturers into the Italian market, in particular of French and German car makers.

In 2019, motorcars' imports amounted to 1.872.139, for a total value of 30,3 billion euros. Conversely, exports reached 736.372 units, for a value of 16,5 billion euros.

The result of these figures is a negative balance of approximately 13,8 billion euros.

¹⁸ ANFIA, *"Osservatorio sulla componentistica automotive italiana 2020"*, 2020

¹⁹ ANFIA, 2020

In the first half of 2020, imports have been 579.219 (9,8 billion euros) compared to 229.189 exports (5,6 billion euros), generating again a negative balance, this time of 4,2 billion euros – at least an encouraging result if compared with the same period in 2019, when it amounted to 7,6 billion²⁰. Focusing on the new forms of powertrain, in 2019 were sold 301.000 cars with alternative energy, representing an increase of 19%. In 2020, the whole market of eco-friendly cars reached a share of 16%, thanks to the growth of hybrid cars, pure electric, GPL and methane. Gas engines represented 9% of the market. Battery and plug-in cars were worth 0,9% of the market and were mainly owned by companies. Only 31% of new electric cars and 18% of new hybrid plug-in cars sold were owned by private²¹. An important factor that pushed sales of alternative powertrain cars was the “ecobonus”, introduced in March 2019. The ecobonus was a governmental intervention aimed at reducing emissions, in addition to the already existent European Regulation on the quality of the air and the environment.

Italian consumers’ interest in electric and hybrid cars has been growing steadily, reaching the 71% in 2020, with respect to the 58% of 2019²². However, at the moment automotive enterprises seem to be mainly focused at limiting the consequences of the crisis rather than identifying possible opportunities emerging from it.

Covid-19 pandemic is highlighting the need to adapt to a new technological paradigm, pushing towards the development of new competences and excellences in the fields of alternative powertrains and new services for mobility. Overall, this technological transition has by now initiated and seems to be taking pace independently from the period of crisis and uncertainty. As a result, the future of Italian automotive industry might be decided by the ability to create collaborations, aggregations, and new nets to stimulate innovation and mutual flow of know-how as soon as possible, with the precise goal of increasing competitiveness in value chains at an international level. Although the current disruption caused by Covid-19, many markets – such as the Italian one – maintain a variety of opportunities in innovation and development.

At this moment, the sector is facing an unprecedented crisis which forces it to focus on short term solutions.

²⁰ ISTAT Foreign Trade

²¹ ANFIA, *“L’industria automotive che riparte: trend e scenari futuri”*, 2020

²² Deloitte, *“Global Automotive Consumer Study 2020”*, 2020

However, in a broader perspective, automotive players need to prepare to rethink their own strategies to guide the renewal of the sector, in order to fully exploit its benefits and potentials.

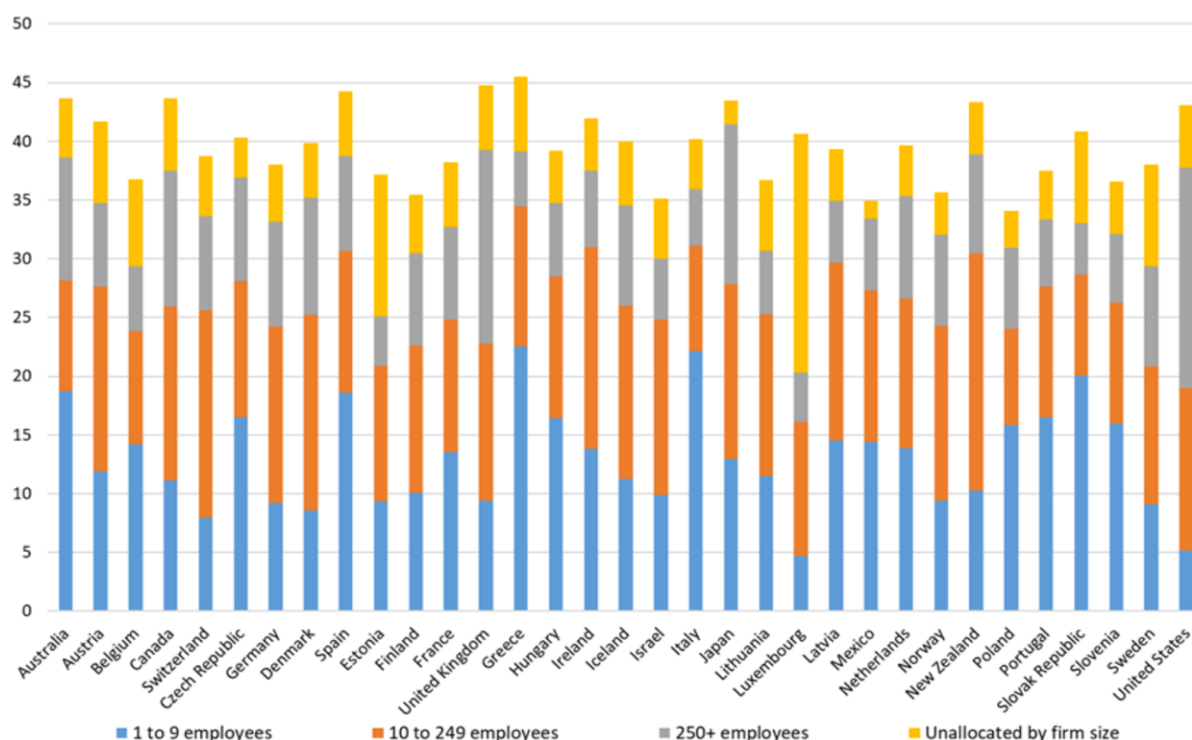
1.4 Covid-19 impacts and industry response

Covid-19 pandemic impacted the worldwide economy in many ways, both on demand and supply sides. On the former, a sudden decline of demand and consequently of revenues made it difficult for companies to properly run the business, fostering consequently liquidity shortage. Liquidity problems did not affect only businesses but also consumers, who experienced income losses that translated into less spending and consumption. On the latter, companies had to face reductions in the supply of labor and resources. Lockdowns and quarantines stopped supply chains, making the smooth flow of parts and intermediate goods impossible to sustain. Furthermore, those safety measures led to problems of capacity utilization for most firms, which were not able to exploit all the tools available or which, conversely, did not have the right equipment to turn production into goods useful for the emergency, such as PPEs or healthcare machines. From a future perspective, the pandemic will probably also change the current concept of GVCs²³. Until now, they were characterized by production sites scattered across the world, looking for the cheapest labor available in the market and just-in-time production, to reach the shared goal of cost optimization. What instead the Covid-19 crisis has shown, is the necessity to increase the resilience of these chains. To do this, the only way possible is through a supply chain diversification, as well as regionalization and nearshoring processes, to limit the excessive dependence on a few Asian suppliers and be more autonomous and self-sufficient in times of disruption²⁴. Another important feature of Covid-19 crisis is that it hit with particular strength small and medium size enterprises (SMEs).

²³ Gereffi, G., 2020

²⁴ UNCTAD, 2020

Table 6. Share of small firms in the most affected sectors



Source: OECD, “Coronavirus (COVID-19): SME Policy Responses” (2020)

The impact was twofold: an immediate effect characterized by the many lockdowns, followed by a long-term effect concerning global value chains and their stability. Just to quote some examples, it was estimated that at the beginning of the pandemic one third of Chinese SMEs only had money to cover fixed costs for a month, and another third for two months. Even if it was the first country to restart production, it continued to suffer a decline in demand from other markets²⁵. Moreover, factories’ lockdown in China caused a delay in delivery times for the Korean markets, which saw itself deprived of resources. Lastly, a research on 174 Japanese companies showed that 39% of firms experienced supply chain disruptions, while 26% suffered a decline in orders and sales²⁶. The impact on SMEs was particularly severe if compared with larger businesses because of the high vulnerability and low resilience due to their size and ownership structure.

²⁵ South China Morning Post, “Coronavirus: China’s small factories brace for big hit as pandemic erodes overseas demand”, 2020

²⁶ Tokyo Shoko Research, 2020

As a matter of fact, they result in less flexibility when it comes to deal with the high costs of this type of shocks. This vulnerability was noticed for the first time with the 2008 financial crisis, which caused to SMEs a serious decrease in demand together with strong financial distress. Moreover, SMEs can count on fewer human, financial and technical resources if compared to larger businesses. A last difference between SMEs and their larger counterparts concerns the reduction of hours worked. In fact, SMEs were more likely to shut down production. On the other hand, larger firms stayed generally open, but were forced to reduce workforce. In the short-term, SMEs mainly suffered from difficulties in logistics and shortages in demand, even if intensity differed from industry to industry. As a consequence, many of them registered financial and liquidity issues. It is also true that most firms were already under financial constraints before the pandemic, therefore harshening an already difficult situation. In the long-term instead, every industry and firm will have its own challenges and opportunities. What has emerged in the last year is the importance of investing in digitization, environmental sustainability and in strengthening internal efficiency and productivity. Unfortunately, financial constraints will make it difficult for SMEs to undertake this kind of investments, also because of the costs related to the reskilling of employees. In this sense, policy interventions will play a vital role and will need to be specific for every case, rather than one-size-fits-all. These interventions must be addressed to the renewal and growth of businesses through innovation, cooperation, and networking. In the first semester of 2020, the loss of production due to Covid-19 crisis in the main macro areas corresponded to 15% of the volume registered in 2019.

China suffered a moderate decline in volumes, if compared to other areas such as Europe, which lost 3,65 million units. The type of shock witnessed in 2020 can be considered even harder than the 2007-2008 financial crisis, both for the strong contraction of production and the weakening of demand that it caused. Forecasts estimated a recovery only in the fourth trimester of 2020, leading to a total annual contraction of 17%, with major losses of volume in Western Europe and North America²⁷. In order to facilitate the sector's resilience and accelerate the recovery, many countries adopted measures to stimulate demand, such as incentives to buy new cars, encouraging the purchase of electric vehicles and the scrapping of old ones.

²⁷ ANFIA, *"Osservatorio sulla componentistica automotive italiana 2020"*, 2020

Conversely, technologies such as autonomous driving and shared mobility could result in damage by the extension of the pandemic, as companies were forced to keep them on the background to face the immediate effects of the emergency.

Another factor to take into account is the oil situation. In fact, a fall of the oil price in the short term would slow down the demand for electric vehicles in favor of traditional powertrains. Fortunately, in the long run demand will continue to grow without great impediments. The lockdown of factories due to the pandemic not only concerned car manufacturers, but also the aftermarket segment and the suppliers of components. Many of these components for the automotive sector came from a single country: China. China is the leader in the sector, and almost all car companies in the course of time opened production plants there to serve the local market. Consequently, all the main international car makers were exposed to the interruption of supply chains, such as the Korean Hyundai, SsangYong Motor and Kia. To fight this difficult worldwide scenario, all the countries have introduced support measures for the safeguard of both people and businesses. Of course, the priority was public health, so the first measures were addressed exactly to that end. Immediately after, economic and financial interventions appeared to help businesses. Many, if not all, of these measures were aimed in particular at ensuring liquidity in the short-term, the main drawback of the sudden lockdowns. For example, Central Banks in many countries opted for encouraging direct lending to SMEs by reducing or even removing monetary conditions on loans. Alternatively, banks provided grants and subsidies to companies to cover revenue losses, at least in part. Other measures concerned the reduction of working hours, in the worst cases adopting temporary layoffs and sick leaves.

Overall, Asia is expected to be the leader of the sector in the attempt to get back to the pre Covid-19 situation. Nevertheless, the recession could require the automotive industry a recovery time longer than expected, and longer than all previous crises, which for many experts would vary between three and five years.

If we focus on the European area, small and medium size enterprises are considered the backbone of the economy, making up 99.8% of all enterprises and two thirds of employment²⁸. A survey made in June by SME United showed that 40% of SMEs in Europe faced liquidity issues, while 90% of them suffered turnover losses in the

²⁸ European Commission, 2019

lockdown period²⁹. Another study run instead by McKinsey found that two thirds of the jobs which were considered at risk belonged to SMEs, and of all these jobs, 30% involved microenterprises composed of nine employees at maximum³⁰.

In the last two decades, global value chains (GVCs) played a challenging role for European SMEs, since their flexibility and ability to reorganize themselves entailed labor costs too high to bear for small businesses, as well as rigid regulations. On their side, European SMEs can count on their ability to be innovative to return competitively through the right use of digitalization and Industry 4.0³¹. A good use of innovation would also allow them to reduce costs while keeping price and quality at their standard level. As mentioned before, GVCs are experiencing some changes in terms of reshoring, nearshoring, supplier diversification and stock management. This situation could represent a big opportunity for European companies, since many aspects of production would return inside the territory. Territorial proximity would also help companies to focus more on customers by putting them at the center, building in this way a closer relationship with them. As a matter of fact, current value chains are highly characterized by specialization and customization trends, which require time and money to be implemented, making it necessary for cooperation and coordination between different actors. Of course, it is not easy to replace even one single actor in such consolidated chains, but Covid-19 could represent in this sense a starting point towards a reorganization at global level. In a scenario characterized by interrupted production lines and disrupted GVCs, many firms were not able to receive orders from key suppliers, as they were blocked too, creating a never-ending domino effect. This was in particular the case of the European automotive sector. The progressive lockdown started from March 2020 in the main European countries was justified by the necessity to limit contacts between workers, as well as to respond to a decrease in demand and optimize resources. One after the other, FCA, PSA, Renault, Ford, BMW, Daimler, Jaguar Land Rover, Volkswagen, and Volvo started to close factories and simultaneously reopened production in China. However, the first negative effects appeared in the second trimester and continued in the following months. The result was a decrease of sales of approximately 3 million units, from the 12.8 million of 2019

²⁹ SME United, *"Lack of liquidity and insolvency the main concerns of SMEs"*, 2020

³⁰ McKinsey, 2020

³¹ European Commission, *"Annual report on European SMEs 2018/2019"*, 2019

to the 9.6 million of 2020³². Only in May production restarted also in Europe, following the pressure made especially by French and German car makers to assure the supply of strategic components manufactured in Italy, a key player in the European scenario – Volkswagen for example makes use of almost 800 suppliers in Italy. A curious fact concerning Germany is how German SMEs were relatively less affected by the crisis thanks to the diffused reliance on regional supply chains, which favored a growing resilience over the last decade. It is important to remember that the automotive industry is a cornerstone of Europe’s economy, and it is estimated to employ directly and indirectly 13.8 million people, almost 6% of the overall workers employed in the European Union³³. One of the main effects of the pandemic at corporate level precisely concerned employment, in many cases bringing to a reduction of the workforce. Renault announced in May cuts for 15 thousand jobs. Similarly, Nissan closed the factory in Barcelona, with 3 thousand jobs lost, and MAN reduced a quarter of the workforce. Conversely, other companies decided to rely on the few opportunities available in this complicated context, such as Volkswagen which invested 2 billion euros in China for the development of electric cars. This is a proof of how important it is to continue investing on new technologies even in a period of disruption, and how new forms of mobility can help businesses to relaunch the automotive industry and consequently economy as a whole – given the high impact of the sector on worldwide trades. With all probability, the world that will emerge from the Covid-19 crisis will be one characterized by growing digital customer interactions and automated processes³⁴. Therefore, in order to succeed in this transition companies will have to exploit technological innovations also to strengthen their internal organization and operations. In general, their ability to survive or to create new growth opportunities will largely depend on European policymakers and on the regulations and interventions that will be put in place. At the beginning of the pandemic, European institutions had the merit to understand the importance of sustaining SMEs with financial aid, often the same for everyone, to guarantee their survival. Many governments quickly intervened to protect workers, for example through wage

³² ACEA, *“The automobile industry pocket guide 2019/2020”*, 2020

³³ ACEA, 2020

³⁴ McKinsey, *“Digital strategy in a time of crisis”*, 2020

adjustments for partial unemployment, reduction of working hours and sick leave³⁵. Others opted for measures to postpone payments, or to incentivize direct lending from banks to provide short term liquidity to firms. Now policymakers will need to focus on the next phase, the renewal one, which entails more structural interventions rather than financial, with the aim of promoting resilience through innovation, cooperation, and networking. Of course, different businesses will need different actions, which can vary from entering new international markets, to strengthening relationships on the domestic side. As a result, interventions in this final stage will strictly depend on the type of industry and territory. At this point, a common solution for everyone is not possible anymore. Rather, institutions will need to focus on measures specific for each case. Concerning Italy, Covid-19 had a severe impact on the territory, both for the temporary paralysis of the market and the key role that Italian automotive supply chain plays for European and especially German industry, which saw itself blocked because of Italian lockdowns. Moreover, as mentioned before, the economic situation of Italy was worsened by the anticipated restraint measures adopted with respect to other European countries, as well as the early diffusion of the virus in northern regions, which constitute a large share of the overall industrial production. According to some estimates, with the pandemic ending in 2020, 50.000 Italian companies would need liquidity aid. If instead the pandemic will continue also in 2021, the number would probably double, reaching 100.000 firms, for a total liquidity gap between 30 and 80 billion euros³⁶. Through the years, firms of the sector have tried to diversify their activities to build a sort of resilience in case of potential disruptions. As a matter of fact, it is not unusual to find firms specialized in components for auto which produce also for the home appliances sector or the aerospace one. These companies will probably recover once production restarts, but in the meantime many of them decided to temporarily diversify their products. During the pandemic we had proof of this phenomenon, with many firms – including FCA – shifting towards the production of personal protective equipment (PPE), disinfectants and ventilators for intensive care. Therefore, beside the economic role of the industry, it is important in this case to also highlight the social impact of automotive companies and their suppliers in the fight

³⁵ OECD, “Tackling coronavirus (COVID-19): Contributing to a global effort. SME policy responses”, 2020

³⁶ Schivardi and Romano, 2020

against the virus. In terms of industry responses, the first measures were taken immediately in March, even if they came from government and institutions rather than firms themselves. For example, the Italian Banking Association, backed by other business associations, introduced a moratorium to postpone debt repayments, loans and mortgages, with the aim to guarantee liquidity to companies. On March 17th, the Italian government introduced a series of economic and financial measures through the Legislative Decree n.18 (known as “Cura Italia”), for those workers who saw their activities suspended. In May, more precisely on the 13th, a greater package of measures of 55 billion euros addressed to businesses, workers and sectors was approved by the Council of Ministers, namely the “Recovery decree-law”. All these interventions were aimed at mitigating the impact of the crisis on the demand side. For the automotive sector this meant for instance incentives and administrative simplifications destined to drivers and potential buyers of new cars. Other measures concerned the increase of funds for SMEs through the Central Guarantee Fund, the support to export activities, the safeguard of strategic sectors, incentives for the purchase of PPE and sanitization tools, and financial support to start-ups, in particular high-tech ones, to stress once again the key role of technology in the recovery of the country. What is still to be defined is the support to enterprises of the automotive supply chain, which will need made-to-measure interventions addressed to the specific needs of different actors, keeping in mind the organizational and financial aspect of each firm. Another factor to keep in mind in the impact of Covid-19 crisis and in the run towards the recovery is the size of businesses. Indeed, the average Italian company in the automotive sector is composed of 70 employees, which is greater than an average manufacturing firm, but still not big enough to keep the pace with the kind of transformations that are taking place at a global level. For this reason, many firms suffered further difficulties for example in the development of electric vehicles, connectivity, and autonomous driving – the main trends of the new mobility scenario. As a matter of fact, one of the many reasons why this pandemic was so harmful for the economy, was that it appeared in a moment of drastic transformations. In this period of great uncertainty, the effects could be controversial: the automotive industry might inevitably slow-down in its path toward innovation or, conversely, the turmoil generated by the virus will unexpectedly boost a series of changes. For the Italian supply chain, it will be fundamental not only to resist the recession, but especially to respond with a strong strategy based on

investments, strictly tied to a change of technological paradigm which is already affecting mobility trends and which firms will be forced to face. Precisely in this scenario, it is of utmost importance for the country the well-thought use of the Recovery Plan. These funds must be employed to support investments in Research and Development, in aggregations and collaborations, and in the reskilling of human capital. We are in front of an industry which, since the Dieselpgate scandal, has been living a technological transition towards electrification and decarbonization – fundamental goals imposed by the European Union – until Covid-19 turned it upside down. Now more than ever it is crucial to go back on track, to achieve those goals and create a more sustainable world, economically, socially, and environmentally speaking. Firms will have to face new technological and competitive challenges with a reduced liquidity. In particular, they will respond to several effects on the automotive sector arising from the pandemic. They will deal with a decline of demand in the market and of production, followed by a consequent boost of electric and hybrid vehicles to the detriment of internal-combustion engines. They will face a change in the supply policies, with an increase of domestic sourcing of components. They will have to adapt to a different competitive scenario, characterized by an increase of mergers and acquisitions, due to the reduced autonomy of single firms – to stay competitive, it will be necessary to strengthen aggregations and collaborations between businesses. They will need to attract investments from leader companies in the fields of autonomous driving and cybersecurity – where Italy is less specialized – in order to favor a smooth flow of know-how at a national level. Moreover, the economic situation itself will play an important role, as it will inevitably affect consumer behavior and willingness to pay. Finally, firms will have to face a new mobility scenario, characterized on the one side by the relapse toward private and fuels cars, and on the other by the emergence of new models of micro-mobility and the great variable of carsharing. In conclusion, what is waiting for the Italian and global automotive industry is a future of great uncertainty, ambiguity, complexity, and volatility. But it is also true that historically a crisis can be the launching pad for the renewal and restructuring of the economy. A big opportunity to rethink completely the way the industry works, and the way people live, starting of course from investments in the new technologies at our disposal.

Conclusion

The overall picture that emerges from this chapter shows a global economic scenario in the middle of an unprecedented crisis. The difficulties that have been affecting many industries in the last couple of years were exacerbated by the Covid-19 pandemic, which rapidly spread across the entire world, hitting some countries harder than others, sometimes with multiple relapses. The healthcare emergency reopened also a twenty-years old debate on globalization and on the current economic model based on “just in time” production, highlighting the necessity to shift from a push model to a pull one. The disruption of supply and global value chains shed light on the high level of dependence of international trades on a few suppliers, especially Asian. For this reason, many companies started to consider the idea of shortening supply chains through regionalization processes and multi-sourcing strategies. All these measures were aimed at one specific purpose: building resilience in view of future disruptions. In addition to the most important human consequences, the pandemic put in serious danger many businesses at a national and international level. The intensity of the crisis differed among countries as well as among industries. Western countries suffered the most if compared with Asian ones. European companies felt the burden of Chinese lockdowns. One of the most affected sectors was the automotive one, whose negative results of the last years were worsened by the spread of the virus and the consequent restraint measures to limit its diffusion. The slowdown of the automotive industry together with the rapid diffusion of the virus affected with particular strength the Italian economy. The consequences of Italian crisis poured onto other European countries that depended on its products, creating a never-ending domino effect.

Policymakers and institutions intervened by means of economic and financial measures to provide short term liquidity to businesses for their continuity, as well as incentivize long term investments. Now they are called to address specific needs of each market and company, rather than focusing on one-size-fits-all measures. The effect of the pandemic was particularly strong for the automotive industry because of the period of technological transition that the sector was experiencing. Electric and hybrid cars started to become popular when the crisis rekindled fuel and diesel engines. Investments in trends such as connectivity and autonomous driving suddenly stopped due to liquidity shortages. However, as often history shows, periods of

disruption could offer important opportunities for the renewal of economic activities. This is exactly the case of the automotive industry, which has the possibility to be the driving force of the next recovery phase, thanks to the rise of new trends in mobility and micro-mobility. Nevertheless, there are still many variables to be clarified, such as the future of carsharing and the behavior of a new generation of consumers, as we will see in the next chapter. These tools must be accompanied by a general rethinking of the current way of doing business, in terms of both companies' internal operations and global trades. The new technological paradigm that is characterizing the 2020 industrial scenario represents the means by which this revolution must be accomplished, to create a more sustainable world environmentally, economically, and socially speaking.

CHAPTER II

Mobility 4.0: A cornerstone for sustainable economic recovery

Now that we have witnessed what is the current situation of the automotive industry and the various repercussions that the Covid-19 pandemic had on it and, at a larger scale, on global trades, it is time to focus on one precise sector which is strictly correlated to automotive matters: the mobility sector, and more in particular the new mobility or “mobility 4.0”. As a matter of fact, the period of emergency shed light to new trends and forms of transport that were already emerging in the last couple of years, and which are now becoming reality because of changes in consumer demand and behavior. The purpose of this chapter is exactly to present the new technologies and innovations in the field of mobility, as well as the impact of the pandemic and the opportunities emerging from it, in a way that puts the new mobility sector at the center of the next recovery phase. In fact, as we will see, the concept of mobility extends to many other sectors, apparently far apart, but which managed together can give the necessary boost for an economic upswing. The chapter will be divided in two main parts, one introductory and the other more focused on the current implications of Covid-19 crisis. The first part will start with an analysis of the historical evolution of mobility, starting from the very first forms of transport to the current services available. It will successively present the new forms of mobility that have been characterizing the market in the last couple of years, finally concluding with the presentation of the new Mobility-as-a-Service paradigm, which is at the base of the current technological transition. The second part instead will analyze more in detail the dynamics between mobility and Covid-19 and will define four main issues or questions concerning the rise of new forms of mobility. The first matter will regard the impacts of the current pandemic on the actors of the new mobility trend. The second question instead will try to answer what the effects of the macroeconomic scenario generating from this crisis will be on the new models of mobility. The third issue will concern the immediate responses of the sector to the healthcare and economic emergency. To conclude, the fourth and last topic will focus on the opportunities that are emerging from this context, not exploited yet, which could boost a global diffusion of the sector.

2.1 The evolution of mobility

Before analyzing the evolution of mobility until now, it is important to define what we mean by mobility. The term refers specifically to a complex system that includes different modes of transport (by road, railway, sea, air), infrastructures and services, as well as the social, economic, and organizational fabric of a community, region, or country³⁷. The citizen is at the center of this system, being at the same time supplier and user of mobility services, but also being the one that directly faces positive (accessibility, connectivity, competitiveness) and negative (greenhouse gases, emissions, noise, safety) externalities related to them. Historically, the transport sector experienced many evolutions, most of the time caused by technological innovations in mobility. In the eighteenth century, fluvial transport was developed through the creation of internal canal systems which, together with maritime navigation, favored the circulation of goods, tearing down costs at the same time. Starting from the nineteenth century, railway stations followed the same path, contributing to the increase of traffic and facilitating the movement of people inside their own country, offering possibilities unknown at that time. The twentieth century has been characterized by the introduction of the car and the consequent development of streets and highways which, together with airplanes, had the biggest impact on movement of people and goods. In the last sixty years, the exponential growth of motor vehicles in most economically advanced countries had a strong impact on cities, exceeding the supremacy previously owned by the railway sector. In the course of the twentieth century, cities experienced a substantial increase in urban areas, as they provided many job opportunities. This fact pushed people to move inside cities from the countryside, accelerating a process of urbanization that led to the creation of the current metropolis. In this first stage of urban economic growth, a rapid increment in the use and purchase of private vehicles, in particular cars, was registered. The great consumer demand favored the extension of the automotive sector, which in turn filled cities with vehicles. The increasing diffusion of private vehicles affected the circulation inside urban areas and became responsible for some set of problems – such as traffic congestion – forcing local entities to review their own urban policies. As a matter of

³⁷ Di Rosa, D., et al., 2017

fact, cities needed to be modified to manage the changing mobility scenario. Streets and car parks appeared everywhere, investments in public transport were reduced, and the areas for cyclists and pedestrians were limited to provide greater capacity for vehicles. However, this unconditional admiration for private cars caused a lot of damage with the passing of time, leading to always more frequent traffic congestion, urban pollution, and environmental pollution. Mobility experienced many evolutions in the last decades precisely to remedy these problems. In order to reduce traffic congestion, investments in public transport were reintroduced to limit the use of private vehicles. However, pollution continued to grow steadily, highlighting the need to rethink the technology available to travel in a more sustainable manner. In the last years, this concern led to the development of the concept of smart mobility. Concept that found its final fulfillment with the outbreak of Covid-19 pandemic and its consequent impact on people's mobility habits, with future implications in terms of safety and accessibility. The term "smart mobility" refers to a typology of mobility that satisfies the needs of people to easily move, get access, create relations, and communicate without giving up the human and environmental requisites essential for present and future sustainability. The concept of smart mobility originates from the idea of creating a system based on the principles of sustainable development. Such a system should allow us to reach an equilibrium with respect to critical aspects connected to transport, among which energy consumption, traffic congestion and air pollution. Therefore, this ideal of mobility falls into the definition of sustainability intended as the possibility of satisfying current needs without compromising the needs of future generations. Hence, smart mobility is a system able to conciliate people's need to travel with the necessity of reducing the so-called negative externalities related to it, which represent a social cost that weighs on the population. This new paradigm aims at transforming these externalities into a useful element for social qualification, leading to the establishment of new processes able to stop their effects. The introduction and implementation of smart mobility is characterized by two key factors: the increasing substitution of vehicle ownership with the simple use of it and the interconnection between all mobility services. Focusing on the first element, what has emerged in the last years is a decreasing interest in private vehicles, since ownership has lost the symbolic meaning once had, and new forms of mobility more appealing for nowadays citizens have appeared. However, the reduction of private vehicles can happen only if

the city offers alternative forms of transport. Many of these forms are supplied by third-party companies specialized in alternative mobility solutions. Historically, these alternatives consisted in public transport, as it was able to carry many people in a unique vehicle. Nevertheless, in the last decades many different types of services have appeared, which fall outside the public transport domain, such as car sharing, bike sharing, carpooling and many other forms of ridesharing. This greater diversification of supply allowed the so-called multi-modal transport, a particular form of smart mobility that consists in the combination of different means of transport. In this way, transport is no longer considered as the sum of many separate and autonomous services, rather as a single service that brings passengers from point A to point B. Multi-modal transport includes both people and goods. People transport assumes sustainable features especially when it is applied in urban contexts. Indeed, inside cities it is possible to integrate many forms of mobility into a unique pattern. Solutions such as car sharing, bike sharing and public transport, can be combined through interventions directed at the promotion of multi-modal mobility. Actions that could be taken include the building of parking lots near bus or train stations, or bike sharing platforms in proximity of subway stations, in order to cover the so-called first and last mile. The phenomenon just mentioned experienced the maximum boost through the development of new technologies that allow users to choose more efficiently between the various services available. This kind of integration is part of a paradigm known as “Mobility-as-a-Service” (MaaS), which aims at establishing a new idea of mobility, no more based on the ownership of vehicles, but on the public supply of services.

In the last years, many efforts have been invested to shed light on the evolution of some specific mobility services. For instance, car sharing is no longer based only on specific and static stations but is now available in alternative forms as “free-floating” (the possibility for users to withdraw and leave the vehicle everywhere inside a given area) or private car sharing “peer-to-peer” (where private vehicles are made available for sharing services for a specific community of users). Moreover, bike sharing stations start to diffuse, which follow a free-floating system similar to the one of cars. The increase in the dynamism of these services allows to satisfy consumer needs, providing a greater number of solutions. Because of this complex development of mobility alternatives, the line between the two main forms of transport – the use of private vehicles on the one side and public transport on the other – seems to have almost

completely vanished. In general, smart mobility can be intended as a kind of collaborative mobility, where people have access to a large variety of potential transport options. The second key element of smart mobility is, as mentioned before, the interconnection of all mobility services. The concept of interconnection is not something new. In Germany, for example, it was already used the term “Umweltverbund” in the 80s and 90s, which referred to the joint utilization of sustainable forms of public transport (bus, tram, train, bike) in contrast to private ones. However, the implementation of a paradigm based on interconnected services requires a variety of infrastructures, among which physical ones, operating, communication and information technologies. Without even one of this components, smart mobility products cannot fully exploit their potential to manage the efficiency of the process and satisfy consumer demand. The coordination and integration between the different structural layers allow better performances, as well as new possibilities in demand management. The tool at the heart of this transition is the smartphone. As a matter of fact, for mobility users the smartphone (and related apps) becomes the means by which they can access to all the various services. For example, they can rely on apps that give real-time information on arrival and departure schedules, or that find available shared vehicles. In addition, these apps allow users to buy tickets or book vehicles supplied by sharing companies. Finally, smartphones show the path toward the destination and the location of free vehicles through GPS and can be used to unlock them. The current challenge of MaaS to guarantee a smart mobility system is how to gather all the real-time information in a unique app or digital platform.

2.2 The new forms of smart mobility

As previously mentioned, in the last few years a new mobility paradigm has emerged, which takes the name of sustainable or smart mobility. This type of mobility can take various forms, which taken individually or together provide the final service for consumers. This paragraph will present and analyze some of the main services that make part of the smart mobility ecosystem. The common denominator of these services is the fact that they all belong to the sharing economy field (apart from ride hailing, which is the rental of cars with a driver, that falls into the so-called “on demand” services). From the concept of sharing economy originates the sharing mobility.

According to the definition, sharing mobility is characterized by a new way of moving of people, who prefer using public or rented vehicles rather than their own ones, be it a car, a bike, or a scooter³⁸. In order to be considered as such, a sharing mobility service must ensure the sharing of the vehicle used by many people, either simultaneously (as for trains, metro or carpooling) or in sequence (as bikes, scooters or taxis). Thanks to the use of technology, the value added of these solutions has grown, as they are able to provide transport options that beside being available when people need them, are adaptable to user necessities. Moreover, technology allows users to share not only vehicles but also routes, making these services more efficient and interactive. Just to give an idea of some figures related to the growth of sharing mobility, in 2019 Italy registered 363 services, fourteen more with respect to the previous year. A growth mainly due to the increase of car sharing and scooter sharing services, as well as the greater number of cities in which it is possible to access digital platforms to plan trips. From a geographical point of view, northern regions confirmed a predominance over central and southern ones, with the 60% of the whole Italian sharing mobility offer, for a total of 271 cities with at least one service available³⁹. In addition to quantitative terms, the mobility sector grew also in qualitative ones, with a relevant increase in environmental sustainability. Furthermore, current shared vehicles use an electric powertrain and are on average lighter and less bulky than old ones, and the average volume is expected to further decrease in the future thanks to the introduction of kick scooters. A big share of the new mobility ecosystem is represented by the so-called micro-mobility paradigm. The term micro-mobility defines a set of vehicles and modalities used to perform brief routes that carry one or two people at maximum. These vehicles include kick scooters, Segway, monowheel, bikes and hoverboards, but also services such as bike sharing and car sharing, that consist in the short-term rental of bicycles and cars. The micro-mobility phenomenon experienced an exponential diffusion particularly in the last years. Success that can be attributable to many different factors, starting from the main objective of lessening the environmental impact of people movements. During the course of time, this trend continued its evolution process, to the point of embedding many different means and services. The nowadays wide adoption of these services can be explained by the advantages that they

³⁸ Osservatorio Nazionale Sharing Mobility, *“Rapporto Nazionale sulla Sharing Mobility”*, 2019

³⁹ Osservatorio Nazionale Sharing Mobility, 2019

provide. First of all, it allows to perform the so-called “first and last mile” trips in a very efficient and rapid way. Secondly, it helps people to avoid traffic congestion and public means of transport, an increasingly important matter in this period of emergency. Moreover, it provides a sustainable way of moving and commuting, reducing the environmental impact due to carbon emissions. Lastly, it offers an economic and affordable alternative with respect to cars or motorcycles, which is also one of the reasons why new generations seem to be more interested in this type of technology, to the detriment of private vehicles. However, as every innovation, micro-mobility has its drawbacks too. As a matter of fact, low speed of vehicles and public circulation rules make it difficult to move for long distances. In addition, the battery of the current means of transport does not guarantee an elevated autonomy, a factor that could discourage users in adopting these services. Finally, all these vehicles expose passengers to climate events (cold, rain, snow) and only a few of them can carry two people. At this point, it may be useful to have a deeper insight of these diffused forms of mobility.

2.2.1 Car sharing

After the 2007-2008 financial crisis and the following drop in car sales, people started to look for more flexible solutions, able to satisfy their mobility needs, and at the same time more affordable from an economic point of view. Moreover, the urban context faced a strong increment of population living in cities. In fact, urban areas are estimated to contain approximately 52% of the worldwide population, a percentage that is expected to grow until 68% in 2050⁴⁰. The consequence of this phenomenon is a change in demand for mobility, which became increasingly more irregular and volatile, thus colliding with public transport options. One of the solutions to these problems is car sharing, since once implemented it can offer an efficient way of moving, characterized by the same comfort of private cars but at much lower prices. Another positive aspect of car sharing is that by discouraging the use of private vehicles and being a service complementary to public transport, it contributes to the enhancement of the supply and of consumer satisfaction. The term car sharing refers to the utilization

⁴⁰ United Nations, 2018

in sequence of a vehicle by more users, for the time necessary to each of them to satisfy their needs. The service allows people to use a car on reservation, paying an amount proportional to the usage made. In the collective imagination, it can be considered a synonym of carpooling, which instead is the sharing of a vehicle with other people, whose owner is a passenger, to divide the costs. Although the idea of car sharing dates to the 80s and 90s, it experienced the maximum expansion in 2000 in North America and Western Europe urban areas, when car makers started founding car sharing companies. Keeping unchanged the benefits deriving from a private car in terms of flexibility and comfort, car sharing incentivizes citizens to shift from the ownership of a vehicle to the use of it, transforming cars from a good to a service. Car sharing can be divided into three main types: P2P (Peer-to-Peer), B2C (Business to Consumer) and NFP (Not for Profit). Car sharing P2P is a service between privates. In this case, the fleet of vehicles is owned by single persons or communities that provide the service to other privates. The market combines the owners of cars willing to rent them with people interested in using a car in a specific situation. Conversely, car sharing B2C is a service supplied by companies (which invest in this kind of activity to gain an economic return) for privates. Lastly, car sharing NFP happens when an organization or a local community tries to incentivize car sharing, with the aim of changing people's driving habits and creating awareness on sustainability matters, in particular on urban sustainable mobility. In addition to the categories just shown, it is possible to make a further differentiation based on the business model adopted by the operator. In this way, new forms emerge such as free floating, station-based car sharing and P2P. Some suppliers also offer both floating and fixed models, thus reaching both the B2B and B2C market. Free-floating is the most recent version of the ones mentioned before. It allows users to withdraw and leave the vehicle everywhere inside a specific area and relies on flexibility as its distinctive feature. This type of service is mainly used for short distances in urban areas, as an alternative to taxi. With respect to stationary car sharing, free-floating has higher prices that often depend on the amount of time used, making them much more expensive in case of traffic congestion. Since this service is almost entirely supplied in urban areas, most suppliers provide small or medium size cars (for example Smart and Mini) that guarantee an easier parking to users. Many free-floating providers are owned by OEMs and rental companies (as the old car2go and DriveNow, now merged into ShareNow), which consider their investment as purely

strategic and not for financial purposes. In this way, they can use this channel to promote their cars and have direct access to people's feedbacks. Suppliers of free-floating services must take into account some factors of success, such as the positioning inside densely populated areas, a pricing strategy based on the amount of time and not on the distance, the cooperation with local entities to get parking authorization and the constant availability of small cars that fit urban dynamics. The second form is static or stationary car sharing, which boasts a longer tradition with respect to the previous model. While free-floating satisfies the need of one-way trips, station-based car sharing has fixed stations and provides round-trip services with the same starting and ending points. This type of service is used for longer trips and acts as a substitute to rented or private cars. The lack of flexibility is compensated with the variety of fleets in terms of brand and model. Station-based suppliers are often located in small or medium size country cities and regions. They are organized at a local level and do not operate at large scale. Moreover, they are financed by public and private investments, rather than by OEMs or rental companies. The main factors of success of this method are the location in small size cities or rural areas, the availability of a large net of stations in the main hubs (for example railway stations), the tariffs based on distance and a highly differentiated fleet, useful for different purposes. The third form is car sharing P2P, born as a niche market. While previous forms are provided by suppliers, P2P services offer vehicles owned by privates to a specific community of users. P2P companies provide a platform to manage the transaction, offer insurance and equip the car with telematic devices to guarantee easy access. With this method, the car must be returned to the collection point, so that only round-trip routes can be made. Thanks to the decentralized fleet, consumers can count on a larger variety of brands and models. The price is based on a daily tariff, thus representing a valid alternative to stationary car sharing or car rental. The P2P market is relatively dynamic, with new actors frequently emerging, and most providers operate in only one country (such as Drivy in France, Turo in the US and iCarsclub in Singapore). Factors of success include the digital platform that must ensure user-friendly functions, a wide and differentiated net that satisfies different user categories, a good insurance policy for cars' owners and the creation of a community based on the trust between user and supplier. This variety of services contributed over the years to the strengthening of car sharing among the various forms of mobility. The relevance it has achieved is in large part attributable to

the flexibility it provides, and the distance travelled by users. In the current scenario, car sharing seems to be a good solution that satisfies mobility needs characterized by occasional or low frequency movements, in an affordable way with respect to previously mentioned alternatives. Beside economic benefits, among the main advantages of car sharing there are the comfort and practicality of the service, the contribution to environmental sustainability, the great versatility in the utilization, and social advantages as traffic reduction and parking lots availability (a single car sharing vehicle substitutes between 8 and 10 private cars). These advantages highlight the nature of car sharing to adapt the benefits of the private car to public transport. However, car sharing has its drawbacks too and it does not work well everywhere. For instance, in Italy, more specifically in Rome, it never caught on, and citizens continued using their own car. This happened for various reasons. First, there was a problem of parking lots, as people occupied the ones dedicated to sharing vehicles with their own cars, creating inconveniences to users of sharing services. Moreover, if parked in not appropriate spots, cars generate fines that companies transfer to users. Another problem was represented by the malfunctioning of opening systems of cars or, in the worst case, their damage. This implied the search for another car nearby, with a waste of time and energy. In addition, companies operating in Italy often do not produce enough revenues to cover costs and repay initial investments. This fact has been further worsened by the Covid-19 outbreak, where an almost total zeroing of new vehicles for rental or car sharing was registered. Furthermore, people developed new concerns about safety and accessibility due to the emergency period, as they are less disposed to use cars already used by someone else. For these reasons, nowadays car sharing remains a great variable in the field of mobility, with future dynamics still to be weighted.

2.2.2 Carpooling and ride hailing

Collateral to car sharing there is also carpooling. This method implies the shared use of private cars by a group of people, with the goal of reducing costs. It falls inside the field of sustainable mobility, as it allows to reduce the number of circulating cars with positive effects on pollution and traffic congestion. Carpooling service is managed by means of a digital platform that connects users and suppliers. In this way, passengers

can share costs by exploiting the full capacity of cars in terms of size. The platform thus allows to use resources that would be otherwise wasted, without producing a real profit for the driver (owner). Advantages of carpooling include the optimization of spaces and resources, economic savings, pollution reduction and a possible enhancement of social relationships between people. Optimization of resources happens because cars travel with more people inside, limiting the number of cars on the street. As far as savings are concerned, carpooling allows sharing costs, as well as saving oil, fuel, tires and so on. The key aspect in terms of sustainability is the reduction of emissions and therefore pollution, thanks to the lower volume of circulating vehicles. Conversely, ride hailing consists in the rental of a vehicle with a related driver. The traditional services provided by taxis or car rentals have been revolutionized by the introduction of companies such as Uber and Lyft, which integrated already existing services with new technologies. Indeed, these services allow people to book and pay for cars through the smartphone with the use of an app. The revolution in a sector with a long tradition as this one was made possible exactly thanks to the advent of technology and the possibilities that mobile devices give to users and passengers. The former can connect to the service through an app, verify the availability of rides and successively book a car in a quick and easy way. The latter benefits from the possibility of having an additional source of income, as they can decide in total freedom when to drive. It is sufficient to register in the app, through which they can communicate when they will be in service and successively receive the whole itinerary they will have to follow. As a result, ride hailing companies can be considered also transportation network companies, as they provide a network composed of all those users that need mobility solutions and drivers that are available to supply them. As for carpooling, benefits concern the reduction of private cars on streets, with consequent positive impacts on pollution. In addition, cars can be better exploited by using all their capacity in terms of size and seats available. However, in many cases the service is used by only one extra passenger, so that this method has not reached the hoped-for efficiency. Moreover, pay-per-use services might be convenient for occasional consumers or people that cannot have their own vehicle, but for all the others it still does not represent a substantive advantage in economic terms compared to private cars. Finally, it is important to notice that ride hailing companies have been strongly obstructed in markets where there are regulations in favor of taxis and other third-

party transport services. In these countries, typically European, many trials for unfair competition emerged, therefore limiting the diffusion of ride hailing. In Italy for example the service only exists in the cities of Turin, Milan, and Rome.

2.2.3 Scooter sharing

Following the logic of car sharing, also the world of two wheels experienced the birth of sharing services for scooters. In this case the attention is mainly placed on electric vehicles, usable also in city centers subjected to strict anti-pollution norms. Therefore, companies offer free-floating models, where scooters can be taken and left everywhere inside a defined area, provided that they are in zones designated to the parking of motorcycles. The individual transport service through scooter sharing works with the use of an app, where it is possible to track available vehicles and book them, unlock the vehicle and start the trip. To use the service, it is sufficient to register the driving license and the credit card. Tariffs are often based on the duration of the trip, analogously to what happens in the other forms of sharing mobility. Most of the scooters used are electric motorcycles with speed limitation at 45km/h. The electric powertrain ensures many advantages, such as better performance with equal power, zero emissions and therefore the possibility to circulate inside city centers, and rigid anti-pollution norms. Moreover, differently from bikes, which allow short trips, scooters can travel longer distances without any effort from the driver's side. As far as the Italian market is concerned, 2018 was a year of great success for scooter sharing, in particular for electric scooters, which reached 2.240 vehicles (four times more than the previous year), 90% of which were electric⁴¹. However, geographic diffusion is still limited to three main cities: Turin, Rome, and Milan. Although the Covid-19 pandemic forced people to stay at home, sharing companies were able to cushion better with respect to public transport. As a matter of fact, people preferred avoiding public means such as the metro, tram, or bus, since they were crowded places where it was impossible to guarantee social distance. From this point of view, bikes, scooters, and kick scooters have become the most appreciated choice.

⁴¹ Osservatorio Nazionale Sharing Mobility, 2019

2.2.4 Bike sharing

Bike sharing consists in a service that offers the possibility to rent a bike for a variable time span. The service is provided by suppliers that win tenders promoted by public administrations and place bikes inside their area of competence. These bikes can be withdrawn without the assistance of dedicated personnel. Users of bike sharing services pay a tariff based on the duration of the trip. Bike sharing constitutes an important form of sustainable mobility that allows users to cover short distances, often in urban areas, promoting the use of bicycles and other modes different from private vehicles. Bike sharing was introduced for the first time in the second half of the twentieth century in the Netherlands, when it was suggested the sharing of public bicycles to reduce car traffic in the city of Amsterdam. Successively, there were some attempts to create a bike sharing system also in France and in Cambridge, with a maximum duration of two hours. However, this system required bringing back the bike to the initial point, thus limiting its usefulness in terms of moving from a point to another inside the city. A big contribution to bike sharing systems was given by technology. Indeed, through the use of smart cards users were able to unlock the bicycle in a quick and easy way. Lastly, a further enhancement was made possible thanks to the Internet of Things (IoT), which allowed consumers to use the smartphone to rent the bike and manage the service by means of an app. Bike sharing services can be divided into two different types, depending either on the distribution net in a specific area or on the technologies used to withdraw and return the vehicle. The traditional system is the so-called “dock-based” one, where bicycles are kept in designated racks inside a station. Users can unlock and use the bike through a special code and at the end they must park it in another designated station (also different from the original one). In order to use the bike, the user must be registered to the service through an app, and once the trip is completed, he or she will have to pay the total amount based on the duration. Bike stations are generally open 24 hours a day every day, and are strategically distributed across the city, often in proximity of public transport stations (bus, tram, train, metro), offices and commercial areas. Payments occur through a registered credit card that also works as a security mechanism to protect from damages or thefts. The second type of bike sharing does not include the use of racks or stations, but it follows the principle of free-floating as in the case of car

sharing. In fact, it allows users to use and leave the bicycle wherever they want inside a delimited area. In this type of model, users can track bike location, always through an app that uses a GPS system. Once the bicycle is found, the user can unlock it by scanning a QR code and can start the trip. At the end, they can leave the bike wherever they want, provided that it does not obstruct traffic, then they block it and pay the rental depending on the effective duration of the use. It is not necessary to bring back the bike where it was found or to park it in any station. One of the companies that had a great influence in the diffusion of this model was the Chinese Mobike – whose name recall a Buddhist expression that means “pay tribute” – which decided to use the concept of sharing to create a prototype of bike with features that differentiated it from other bicycles used in the station-based model. The result was a bike that necessitated scarce maintenance, with almost four years of autonomy, equipped with robust tires and transmission system. Bike sharing meets the expectations of citizens and public administrations, as it responds to the increase in mobility demand caused by the growth of the population inside cities and the more recent Covid-19 outbreak. This increase in demand often tends to overcome supply, generating a series of mobility-related problems, among which the topic of the first and last mile. The first mile is that trait of the trip that goes from the house of a commuter to the public transport stop, while the last mile is the symmetrical part of the trip that goes from the public transport stop to the working place. The introduction of some forms of ride hailing, such as Uber, positively affected this problem, but differently from bike sharing, it has to face traffic congestions. While station-based bike sharing does not result so attractive because of the low flexibility, the free-floating alternative is the perfect solution for cities, especially big ones (it successfully developed in Shanghai and Beijing) which have a large net of long-distance transport, but a few solutions for short distances. Free-floating provides an efficient solution that perfectly integrates with already existent means of transport, as metro or buses. Therefore, people rely on this model to complete the first and last mile to enhance the speed and efficiency of their movements. Going on with the dock-based and free-floating dichotomy, it is important to notice that the development of the latter was mainly due to the incompatibility of some cities with the concept of fixed racks or stations. As a matter of fact, if the aim of such services is to facilitate short distance movements allowing people to save time, the presence of fixed stations might make the process too long, therefore discouraging

potential customers from using them. Other important advantages that boosted the adoption of bike sharing services include practicality and affordability, factors that start to attract younger users. The success of free-floating bike sharing is precisely due to the fact that it was able to combine people's requests in a fast and user-friendly service. However, neither free-floating is exempt from flaws nor problems. Indeed, once these systems were employed in cities, they experienced difficulties related to bicycles, the free-floating system itself and the urban environment in which they were introduced. One of the great problems that emerged with bike sharing was the lack of cycle lanes and pedestrian areas. This factor could be one of the reasons why there is still a lot of uncertainty about bicycles as means of transport. Moreover, the increase of bicycles inside cities caused other ethical issues, socially speaking, such as the parking in not adequate areas, occupying lots reserved for cars and scooters, or hindering the circulation on sidewalks. Often, users do not take care of these means of transport but leave them in wrong places or even on the ground. This phenomenon represents a key issue for the implementation of free-floating bike sharing services, given the fact that if it is not possible to guarantee the correct positioning of bikes inside cities, local administrations will never allow companies to expand their business. Beside the chaos generated by the large number of bicycles, a further problem concerns acts of vandalism and thefts. Free-floating bicycles, being randomly positioned and not supervised, are subjected to vandalism, such as damages to parts of the bike or the throwing of them in rivers or ditches. In addition, bike sharing companies must deal with thefts, which could affect the whole bike or some parts of it. Finally, a last issue concerning non-station-based bike sharing concerns the durability and resistance of bicycles. In this sense, each company adopts different configurations, materials, and structures. Some of them count on a low prearranged durability, at the end of which bikes are fixed and successively demolished or given back to the market. Others rely on a longer life of the vehicle, investing on technology and materials to incur in less maintenance costs. Wear and damages of bicycles are surely the weak points of bike sharing services. Companies are thus forced to allocate part of their budget in maintenance, fixing up and collection of broken bikes. A bicycle that is no more usable implies a total cost of removal, disposal, and cost of maintenance personnel almost equal to the cost of production of a new one. Of course, companies, knowing these problems, try to reduce damage cases as much as possible to minimize costs of removal

and dismissal, and especially to make available an adequate number of vehicles, in order not to lose profits.

2.2.5 Kick scooter sharing

Analogously to other sharing services, the advent of electrification made possible the introduction in the market of another means of transport: the kick scooter. It is characterized by a light aluminum structure, a few plastic parts among which fender and platform and wheels without inner tubes to avoid punctures. Although kick scooters have existed since the '90s, only recently they have been introduced in an electric form, equipped with Bluetooth. Immediately after their introduction, many countries (among which Italy) started to review the norms that forbade their circulation. New norms allowed the diffusion of this vehicle, and companies began investing in this segment. Electric kick scooters have become a new frontier of moving inside cities. The functioning of the sharing system follows the same features of free-floating bike sharing, therefore allowing people to move freely inside a specific area, without resorting to racks or stations. In this way, the vehicle can be used easily with respect to the dock-based version and satisfies people's needs with flexibility. Companies in this field use more or less the same mechanism. Indeed, through a special app, users can see the vehicles available nearby, and in some cases can book a ride at a specific time. The app contains the map of the city with the relative indication of where the service is available. Once a vehicle has been selected, the user can see the remaining autonomy, the price to unlock it and the per minute tariff. To unlock the kick scooter, it is sufficient to scan the QR code and start the ride. One factor that free-floating bikes and kick scooters have in common is the electric propulsion. Therefore, once these vehicles are out of charge, the rental company makes use of personnel to collect them and provide for their recharge, since they do not have appropriate stations along the streets. This mechanism created many debates about the role of "chargers", that is the personnel responsible for the recharge. In particular, in the United States two important operators such as Bird and Lime experienced some problems. In fact, both companies paid people outside the company to track kick scooters and charge them at home during the night. This type of remuneration generated a real competition between people, who in search for easy earnings, often ended up in clashes or hid kick

scooters from other users, damaging in this way the company itself. However, these events did not limit the enthusiasm and growth of sharing services and the related job opportunities. The system used to manage fleets described until now has been influenced by the nature of the means used. The first electric kick scooters were not suitable for a shared use since they were fragile and with a low autonomy. This fact pushed companies to temporarily focus on performance rather than profits. The resulting second generation of vehicles, characterized by new substitutable batteries and slightly higher prices, will allow companies to reach a profit and increase the value of the kick scooter sharing market in the future. Beside moral and ethical issues about the recharge process of transport devices, the implementation of micro-mobility inside cities requires new rules to establish dedicated spaces, new circulation directives and so on. The supply of electric kick scooters necessitates a greater support on the side of public administrations in order to grow without creating problems or worries to customers. Infrastructural weaknesses and wrong behavior of users increase the difficulty in accessing the service. A possible solution to this problem is represented for example by the MaaS paradigm, by using a digital interface that collects real-time and accessible data. In this way, users could receive all the information necessary to create an enhanced experience in terms of safety and efficiency. To conclude, it is important to highlight the contribution that this service had during the period of lockdown. To face the healthcare emergency in fact micro-mobility operators relied on their services as the key factor to overcome the crisis. Some companies decided to offer free services to healthcare workers, others increased the volume of vehicles to support social distancing measures.

2.3 The Mobility-as-a-Service (MaaS) paradigm

The rapid growth of technology and innovation in transport favored the emergence of new modes of transport and mobility services that aim at facing problems related to traffic congestion, accessibility, pollution, energy consumption and social inclusion. Urban environmental sustainability is influenced by the level of implementation of such services and by their compatibility with the traditional means of transport. Inside this context, a new paradigm has been taking place: the concept of Mobility-as-a-Service (MaaS). MaaS consists in a service that puts together different mobility services

(for example car sharing, bike sharing and public transport) and offers access to them by means of a digital platform. The concept at the base of this new paradigm is to provide mobility no longer as an asset – so through the use of private vehicles – but as an on-demand service publicly supplied. The idea is to offer a digital platform that unifies trip search, purchase, and delivery, satisfying consumer mobility demand through an interface managed by a supplier of integrated mobility, which operates in an ecosystem composed of infrastructures, services, operators and different information and payment systems. This digital interface collects the offers of different mobility providers, thus allowing final users to plan their trips and pay for the usage in a quick and easy way. By definition, MaaS requires the integration of different forms of transport, including traditional methods (public transport, taxi, car rental) and emerging ones (autonomous vehicles, ride sharing, ride hailing), combining key components such as booking, payment and ticketing systems as well as multi-modal information services for travelers. The concept of MaaS puts together the various dimensions that have been discussed until now about the transport sector. They include the integration, interconnection and optimization of transport services, smart mobility, and sustainability. The model also includes new concepts, such as the Internet of Things (IoT), the sharing economy, the “servicification” and customization processes. Moreover, MaaS is often associated with the development of new technologies, such as autonomous vehicles, shared public transport and shared mobility (rideshare, bikeshare, carshare). Even though many of these concepts are already tackled by existing mobility services (for example car sharing and other on demand services), they are often separated between each other and are not integrated with other modalities, especially with public transport. In order to make possible the realization of a MaaS system inside cities, therefore transforming current mobility, it is essential to consider and face various aspects, among which the matching of technical and operational prerequisites with business feasibility. Unfortunately, Covid-19 pandemic heavily affected these technologies, which suffered a strong reduction in use, mainly due to the restraint measures put into practice. This effect could be exacerbated in the long term by the future development of work from home. As a matter of fact, it is still unknown what might happen to the transport sector in case of a continued and increased adoption of smart working. The success of MaaS will largely depend on the ability to understand the unique features of each area of implementation, to create

business models able to provide the feasibility necessary to the actors involved. Moreover, the latter must be able to respond in a flexible way to the requests of cities and users. These models must take into account the mission, the strategy and the objectives of MaaS operators. There are then other factors to be considered, such as the current scenario of transport sector and the future developments for each area of implementation, the actors coming from different sectors and their potential partnerships inside the MaaS ecosystem, the new sources of revenue and the new cost structure of the system, and the opportunities as well as the threats of MaaS implementation process. All these aspects show how complicated it is to develop this type of system, since it requires ad-hoc interventions for each city or region, based on the peculiarities of the context and the possible externalities of the local transport sector. In this sense, legislation was often thought to hinder the development of MaaS and the consequent renewal of the mobility sector. In response to this, local entities could intervene to increase the adoption of such services. For example, municipalities could decide to reduce space for parking to incentivize shared mobility to the detriment of private vehicles. However, even if operational changes are demanded, especially in terms of safety, they are not enough to ensure a significant economic return to mobility services, being them public transport or shared mobility. MaaS is not only a supplier of integrated services, but also a field in which companies collaborate to develop innovative technologies, as in the case of connected vehicles, which saw the cooperation of many ICT providers specialized in sensors, software, and services. As already mentioned, MaaS aims at filling the gap between public and private operators inside cities and relies on the integration of those services (now separated) needed by users, such as planning, booking, payment, ticketing, and real-time information. Through this system, consumers can get access to an easy, flexible, reliable, and affordable way of moving that allows them to travel from a point A to a point B without continuity obstacles. However, designing and implementing a business model is quite difficult when innovations are out of the exclusive control of company boundaries. The diffusion of an innovation in the field of transports is particularly slow and requires observability, trust and interactions between different players and organizational contexts. Changes necessary for MaaS and most new mobility services have a systemic nature, thus requiring an ecosystem in which the various actors collaborate, tearing down traditional company boundaries and including users in the co-creation process.

In a context characterized by logics of transparency and collaboration, what emerges is the importance and necessity to design a MaaS ecosystem and identify the actors involved with related roles. MaaS implies the introduction of a unique, cooperative, and interconnected mobility market that guarantees consumers a smooth and user-friendly service. To this purpose, inside the market a new player must emerge, that is the supplier of MaaS. The latter should be able to remove many of the issues linked to trips and should offer to users an advanced travel experience.

At the moment, people have to use many different devices to plan and undertake a trip. Most services do not provide options for multi-modal trips and only include some forms of transport available in an area. Moreover, they must use different payment methods and therefore create numerous accounts, one for each service. Some of these operators then only accept cash, while others only cards, payments through app or PayPal. Therefore, users still need different tickets with different payments for each activity, although some integration attempts were made throughout the years. These are only some of the barriers that hinder the choice of consumers of following more sustainable solutions such as inter-modality and multi-modality. In this sense, the concept of MaaS removes many barriers through the introduction of a supplier that operates as an intermediary between operators and users. The MaaS provider makes use of the data that each operator gives, purchases mobility capacity from operators and resells it to users. The latter uses a unique interface to find information and choose the transport modality he or she prefers. MaaS operators can thus offer the right combination of services, knowing the conditions of the net in real-time and the preferences of users. In other words, the operator could be able to optimize demand and supply. The idea of MaaS aims in the future not only at filling the gap between operators of the same city, but also between different cities through the use of roaming. In this way, it will be possible to go to another city or working place where the operator is active and benefit from MaaS systems. This is for example the case of car sharing and ride hailing companies such as Uber. Indeed, people can use Uber services in every city where the company operates, through the same app and personal account. Among the services available, MaaS can offer pay-as-you-go options or subscription packages that include various modality combinations and the number of feasible rides. Suppliers of this service operate both in B2C and B2B markets. Currently, on the supply side only transport operators are considered, but also other players can enter in the MaaS

ecosystem, for example including inside subscription packages services such as access to Wi-fi, movies, music and discounts in bars and restaurants. In this way, user experience will grow steadily in the next future. The MaaS ecosystem is a very complicated one, in which many actors and stakeholders intervene. Among them, it is possible to find transport operators (including suppliers of mobility services such as parking), providers of data, suppliers of technology and digital platforms, ICT infrastructures, insurance companies, regulating entities, universities, and research institutes. The ecosystem is composed of many levels, which correspond to different degrees of involvement with respect to the supplier of MaaS. The main level revolves around the supplier and the parts that form the core business, in particular those actors that interact with the company. In this case, the main elements are companies providing transport solutions, suppliers of data and customers. Successively, there are the suppliers of ICT infrastructures, software, and other technological tools. The most external level includes the regulators, universities and other research entities, investors and parts interested in the ecosystem. The real challenge for the future is to create a common sentiment towards sharing methods, in contrast to the use of private vehicles. The development of MaaS could follow two main hypothetical patterns. In the first case, it could follow pretty much the same path as before Covid-19. In the second (more challenging) case, MaaS might be used to reduce the volume of public transport by increasing the supply of first and last mile alternatives with dedicated discounts. However, potential effects of this technology are still unknown, so that willingness to invest is highly discouraged. Overall, MaaS could represent more than just an innovative technology or service, rather an advantage for society as a whole. At last, it gives the term “service” a broader multi-sectoral meaning.

2.4 Pandemic impacts on the actors of new mobility

Covid-19 emergency had an unprecedented social impact in recent global history. The sudden change in the lifestyle of millions of people turned mobility upside-down, not only in the short term with the many restrictions, but also in the long term with the repercussions that it will imply. In this context, public transport operators will face two main challenges. They will have to grant a gradual recovery of transport services optimizing costs and improving the efficiency in the management of fleets and flow of

passengers. Moreover, they will have to provide a service that ensures safety to maintain consumer trust. In addition, people's demand will evolve too. They will look after solutions that ensure safety and social distancing. In this scenario, public transport operators have the key role to rethink their services with greater flexibility with respect to continuous social changes. The global healthcare emergency has rapidly shown its effects on the economic side of this crisis. In 2020, Europe and the USA are estimated to register a drop of GDP, which could vary from a pessimistic -10% to a more optimistic -5%. Conversely, in China effects in terms of GDP could be more moderate, and generally more optimistic, with a range that varies between -3 and +3%. Of course, consequences will extend also to 2021, where a decline of global GDP between 0 and -6%⁴² is expected. The new context depicts a scenario in which all the actors involved in the new mobility, from companies to citizens and the public sector, will undergo important changes. Indeed, the most important aspect of mobility, which is also the reason why it plays a key role in the recovery phase, is the number of sectors that make part of its value chain. The main one is of course the automotive sector, which was strongly affected by the crisis, as shown by the drastic drop of registrations that only in March 2020 interested main European countries: -38% in Germany, -69% in Spain, -72% in France and -85,4% in Italy⁴³. Moreover, according to ACEA data, at a European level approximately 1,1 million workers have been affected by the stop of production, causing a reduction of 1,2 million vehicles produced in March. Another sector that felt the effect of the crisis is surely the transport one, which highly suffered from the severe restraint measures undertaken to limit the diffusion of the virus. To better understand the magnitude of the impact, in Germany financial consequences generated by the pandemic regarded 87% of businesses operating in the sector⁴⁴, while in Italy 98% of high-speed trains were cut⁴⁵. In Italy, regional railways, and local public transports (LPT) registered progressive decline from the beginning of the pandemic, which varied between -25% in the first week to -90% during the lockdown and consequent restriction on movements, apart from necessity ones⁴⁶.

⁴² Deloitte, *"Recovering from Covid-19: Economic cases for resilient leaders 18-24 months"*, 2020

⁴³ Deloitte, *"COVID-19: quali impatti sullo scenario globale del settore Automotive?"*, 2020

⁴⁴ Statista, *"Coronavirus (COVID-19) in Germany"*, 2020

⁴⁵ Il Sole 24 Ore, 2020

⁴⁶ Pwc, *"How to relaunch passenger mobility after Covid-19 emergency"*, 2020

Operators of new mobility were hit in turn by movement restraints adopted basically all over the world. For example, car sharing in Italy – one of the most developed markets in this type of mobility – experienced a contraction of utilization from 60 to 70%. Similarly, rentals saw a fall of registrations in March 2020 with respect to 2019 of -98% in short-term registrations and -80% in long-term ones⁴⁷, even though both modes of transport were available and not under restriction in most cities. Moreover, a strong reduction of non-recurring trips was registered, as a proof of the unwillingness to travel. Long distance trips – whether by train, plane, or car – drastically fell during the lockdown. Shared mobility has always been synonymous with sustainability, in terms of travel behavior and urban infrastructures, from a social, economic, and environmental point of view. It represents a key point in the provision of sustainable development, as it tries to balance ecological, economic, and social matters. Therefore, it is much more than a simple subgroup of sharing and mobility economy. However, Covid-19 raised many doubts on its sustainability. The sector showed a lack of appropriate infrastructures to ensure social distancing, as well as reduced investments in those infrastructures and the rise of environmental issues in urban areas. What was interesting to notice was that the pandemic transformed the until now centralized model of transportation into a decentralized one. The emergency transformed people’s spending attitude, and public transport is one of the first sectors to have experienced this change. A decreased consumer willingness to pay led to less revenues for companies, which in turn translated into higher costs of running services. On the other side, the pandemic favored the emergence of new ways of living and working, which can ensure economic growth without harming the environment, but rather bringing sustainability. It relaunched green mobility services, this time creating awareness on consumers of the benefits of such means. A new desire of having clean air and clean cities free from cars emerged. For this reason, it is now the moment to seriously invest in shared mobility, and digitalization could be the right tool to foster the development of environment-friendly urban areas and societies. Given the importance of the transport sector in mobility matters, it might be interesting to analyze more in detail the Italian context. Italian transport sector never stopped during the pandemic. Nonetheless, it experienced different dynamics between transport of

⁴⁷ ANIASA, 2020

people and transport of goods, with a substantial stop of the former and an increase of the latter. This trend repeated also in the post-lockdown phase, even if in the opposite situation, with a slowdown of goods and a gradual increase of people's mobility. The pandemic could profoundly change the dynamics of the transport sector in the long run. The earlier institutions will realize this, the easier it will be to discuss structural measures to avoid damages coming from these transformations, and perhaps use the upswing moment to rethink the institutional, productive, and social model of Italian transport sector. To this purpose, public and private investments represent the key starting point. As far as public transport is concerned, Italy risks for the first time after many years an inversion of tendency in terms of growth, with a reduction of the number of people moving. This phenomenon does not depend on Covid-19 impact, which sooner or later will be hopefully overcome, rather on two consequences derived from the virus that are likely to last for a long time. These include the impact on the tourism sector and the large-scale adoption of work from home. On the tourism side, the question is when local and international flows will return to pre-crisis standards, knowing however that a long period of uncertainty is still in front of us. Conversely, work from home could demonstrate a crucial issue for people's mobility. In particular, there are many different opinions on the matter, even if the data are clear. As a matter of fact, it is not only a problem of how many companies will adopt this technology impacting on urban mobility, but also of how many of them will use it in substitution of meetings previously held in presence. Considering for example all those workers that move between the cities of Turin, Milan, and Rome just for meetings, it is rather evident the implication that a reduction of trips will have on the market. If the aforementioned dynamics should be confirmed, what will happen is a radical transformation of the sector that will imply new strategies and resources to be managed. A total review of the system will be required, in favor of solutions that include integrated forms of mobility, independently from the vehicle, which put together cars, trains, public means and micro-mobility alternatives, strengthening those forms of sharing already diffused for bikes and cars. The goal must be to allow the passenger to move from a point A to a point B through a plurality of integrated solutions. In order to achieve this result, many elements are needed. For instance, regions should take actions in accordance with the various actors of mobility, taking into account territorial peculiarities and consumer demand. In addition, a review of the

industrial sector is needed. The small size and the fragmentation of Italian businesses represent an obstacle to the management of this transition, both in terms of investment capacity and supply management. This also means having players able to coordinate the reorganization at a national level. Furthermore, policies on tariffs should be integrated too. A solution could be a unique pass for all means of transport, so that multi-modal trips would be incentivized. Finally, technological investments on specific apps would allow them to channel demand in an easy and quick way. An interesting aspect of the transport sector is that it not only concerns movement of people, but also movement of goods, factors that equally impact urban dynamics and for which a sustainable solution is required. The explosion of e-commerce during the period of lockdown determined a new central role for workers of the sector. A phenomenon already growing in the last years that experienced a further boost during the pandemic and that is unlikely to slow down in the future. As for people, also in this case it will be important to intervene with long term measures. For example, it would be useful to incentivize the conversion of vehicles towards electric or hybrid forms, in this way favoring investments in the automotive sector. Moreover, the implementation of e-commerce might lead to new logistic plans inside cities (displacement of warehouses, change in distribution time and methods). This could be an important factor in the design of new urban areas. As a last point, in such a strategic field as the transport of goods, it will be essential to identify the weaknesses of the country to prepare eventual countermeasures. Indeed, one of Italy's greatest lacks is the absence of national players in the sector, which is mainly run by foreign entities such as DHL, GLS and TNT. In this sense, the new uncertain scenario could be a way for workers, companies, and the industrial ecosystem to exploit opportunities and think about actions to change this trend. Of course, before every intervention there must be the presence of the government and institutions in support of the sector. Mobility could be the key to recover from the crisis and start a new way of living, but to achieve this result interventions are needed. This also entails defining which are the sectors that most need the presence of national players, able to provide the base from which starting to rethink the industrial model, according to new necessities.

As for these sectors, given their mobility nature, a general strong impact was largely expected. What was interesting to see was the effect of the crisis on those sectors apparently separated by mobility trends. It is for example the case of the insurance

sector. As a matter of fact, if on the one side the industry is benefiting from a reduced use of vehicles and therefore a decrease of accidents, on the other it is facing a heavy reduction of insurance policies' renewals, together with a possible increase of competition on rates. In this context, many operators opted for initiatives addressed to customers intended to enhance retention and brand awareness, for instance by restoring part of the benefits deriving from a reduced vehicle utilization. Citizens have been affected too, both from an economic and a social point of view. Many people suffered financial contractions and experienced radical changes in their life. At the same time, the context accelerated the process of digitalization of the population. Indeed, people's inclination towards the use of digital services has increased, both for private and working activities. It is the case of Italy, which showed an increase in the adoption of this type of services, despite an e-commerce market penetration of only 7%⁴⁸ – in the UK it represents 30%. Overall, according to Nielsen data, e-commerce sales have registered a growth of more than 150% in 2020. Moreover, Covid-19 could change people's mobility habits in terms of reduction of the number of movements, as well as changes in the preferences of modality. To this end, mobility methods that will guarantee higher safety will be preferred with respect to other drivers of choice such as affordability or environmental impact. Last but not least, the effects of the crisis will also fall on the public sector, presumably in three main ways. First, an increment of the costs related to public transport. As a matter of fact, the necessity to ensure social distancing in the field of public transport will require a review of the management of mobility demand, which could translate into the supply of a greater number of rides. Operators are in fact responsible for the right distance between workers and between drivers and passengers in case of means of transport. This phenomenon is already diffused in many European cities, where the number of daily trains and buses has been increased. Another tool used for demand optimization was the development of on-demand booking systems to get access to the metro or other public means only through reservation. In addition, the necessity to guarantee people safety through the sanitization of vehicles and the placement of designated stations for hand sanitizers would require further expenses for public providers of mobility. Transport operators were extremely impacted by the additional costs of sanitization services as well as

⁴⁸ Statista, *“Coronavirus (COVID-19) in Italy”*, 2020

traffic revenues reduction. The second element is a review of transport's infrastructures to ensure citizens' safety in the face of a greater use of some forms of mobility considered safer by the community. Among them an important share is constituted by bicycles, whose infrastructure has been increased in many cities around the world. In New York City, for example, just in the month of March 2020 the segment of bicycles experienced a growth of 67%⁴⁹. This necessity to review the current system is also dictated by the increasing diffidence of people toward public means of transport, where it is still not possible to guarantee the appropriate social distance. An example of this mistrust is Germany, where at the beginning of the pandemic the number of passengers drastically dropped between 80 and 90%⁵⁰. Lastly, the necessity to strengthen the collaboration between public and private entities, in order to favor data sharing to monitor and coordinate movements, reducing at the same time risks of contagion. This method has already been employed in China, with a real-time individual tracking system developed in cooperation with Alibaba⁵¹. A similar phenomenon happened in Italy, where the Ministry of Innovation, the Ministry of Health and the National Institute of Health launched a "call for contributions" to private operators aimed at identifying technologies to develop a tracking and monitoring system to contain the risk of contagion⁵². On the other hand, some cost reductions also incurred, due for instance to lower energy consumption, lower energy costs and reduced infrastructure charges. However, these cost reductions will probably be offset by larger losses. If on the one hand a good management of the crisis together with government interventions will allow the continuity of the sector in the short term, on the other it is of utmost importance to design long term strategies for an effective recovery. To do so, it might be useful to analyze how the current situation could impact consumer behavior in the medium and long term. A first aspect to be considered is the persistence of remote and smart working. Indeed, in case of a continued use of the technology, both commuting activities and business trips would decrease consistently, impacting heavily on mobility. In addition, the diffusion of e-commerce services would further reduce certain habits, such as shopping-related trips. Furthermore, the digitalization of education activities could reduce the need for related trips. Lastly,

⁴⁹ New York Times, 2020

⁵⁰ Wunder Mobility, 2020

⁵¹ Technode, 2020

⁵² Ministero dell'Innovazione, 2020

people's risk perception will play a key role in consumer behavior. Individual mobility solutions, such as private cars, might prevail on shared means of transport, and both leisure and tourism trips will be seen with reluctance, with a clear preference for close destinations. Anyway, in order to have the most accurate future forecast possible, focusing only on the immediate responses of consumers might not be a reliable solution. As a matter of fact, early consumer behavior may not fully reflect what the demand for transport will be after six months or one year. Rather, it would be better to integrate the analysis with direct surveys about consumer attitudes in relation to the activities mentioned before to understand the real consequences of the pandemic on people's perception of risk and safety. Collaterally to this understanding phase, transport operators will have to plan a series of concrete actions to ensure continuity in mobility services. As far as traffic is concerned, it would probably recover in the long run. What might change is the speed of such recovery, which will depend on the ability of mobility actors to rebuild trust and willingness to travel in consumers. This aspect will be one of the most important challenges of the post Covid or "new normal" period, as people will look for solutions that reduce at the minimum the contact with other passengers, especially for drivers and other mobility workers. Therefore, the priority should be given to those actions that better ensure permanent safety inside means of transport for all the parties involved. Overall, the current emergency scenario represents a major challenge for all mobility operators, who will face several issues, such as financial pressure and consumers' mistrust, in a very short time. As a result, without appropriate interventions, demand for public transport, in particular for collective forms, will not return as quickly as it disappeared. Future oriented plans are needed for a fast recovery of the sector after the pandemic, based on an improvement of sustainability, safety, and quality standards.

2.5 New macroeconomic scenario's implications for mobility models

In the current context, the future represents a true variable, so that many possible scenarios could emerge and coexist. However, two factors seem to influence any potential future development: technology and consumers' habits. On the one hand, technology allows vehicles to be more and more connected between them and with the surrounding environment, with the possibility to arrive at a final stage of automation,

characterized by a shift from the logic of driver to the one of passenger. On the other hand, the gradual change of buying habits contributes to making the ownership of a vehicle obsolete, with a shift towards logics of exclusive (long-term rental) and non-exclusive (car sharing) utilization. The social and macroeconomic scenario generated from Covid-19 pandemic could create effects precisely on those two trajectories of new mobility development. From a technological point of view, some conflicting factors will play a key role. More in particular, the run toward digitalization, favored by the emergency context, could boost the development of new communications technologies (such as 5G), with possible positive implications also for mobility services, for example through innovative solutions for drivers' safety. Conversely, the economic crisis that many collateral sectors are facing could result in a reduction of investments in R&D for new technologies, such as autonomous driving and electrification, due to the need to use liquidity for the relaunch of the whole core business. However, this phenomenon might be mitigated by the intervention of policymakers in favor of sustainable forms of mobility – taking advantage of the period of disruption and of the growing concern about sustainability – in order to rethink those factors that have limited until now their full growth, such as the high list price of electric vehicles and the lack of recharge stations. Mobility market will be increasingly characterized by the entrance of new players, and people seem to be ready to rethink their transport habits. This is partially due to the rapid improvement of the Internet and smartphones, which have drastically changed people's lifestyle and are now shaping a new era of urban transportation. New technologies in urban mobility will respond to three main needs: increasing the efficiency of public transport through the introduction and implementation of automation; enhancing safety and accessibility in a cost-effective way; protecting the environment by means of low or zero-emission vehicles and other initiatives to redevelop urban sustainability. From a social point of view the crisis will produce its effects too, accelerating and modifying the evolution pattern. The negative impact expected on people and businesses' financial situation will favor those forms of mobility that better ensure flexibility in the purchase process. For instance, the rental of vehicles with more innovative payment systems such as the “pay-as-you-go” will be preferred with respect to buying a private car. Moreover, the growing trust on new payment methods (as payments through App) could further fasten the diffusion of new mobility services, thanks to consumers always more ready. The context is favorable,

since those services are already well known, even if still poorly used. Suffice it to say that in Europe 70% of the population knows car sharing, but only 7% make regular use of it⁵³. However, the current situation could lead to a greater use, given the fact that these forms respond to new needs deriving from the crisis, such as safety and flexibility. Therefore, Covid-19 pandemic could have a double impact on the field of mobility. It could boost the development of some forms of sharing nowadays considered embryonic, such as micro-mobility (bikes, scooters, and kick scooters), which would represent a safer and cheaper way of moving inside cities. This is particularly true for small and medium size urban areas, where this kind of technologies are less developed. Italy would be a perfect example, since about 85% of the population lives in cities with less than 250.000 inhabitants⁵⁴.

Alternatively, the pandemic could transform more consolidated forms, now in danger. It is the case of carpooling, a phenomenon that emerged to respond to a need for environmental sustainability, but which is now in contrast with distancing measures. Or car sharing itself, which before the pandemic was considered as a sector about to find a final consolidation also from an economic point of view – with the equilibrium expected to be reached in 2020/21 – but which is now delayed by the crisis. The great advantage of car sharing is the possibility to use a “private” vehicle but without all the costs associated with owning one. The term “car sharing” includes many aspects of sharing, such as B2C services and the so-called point-to-point (P2P) arrangements, information technologies for the development of network platforms, mobile internet, and real-time positioning. A curious fact about car sharing is that it appeared for the first time in Switzerland in 1948, but only in the last fifteen years it became a popular mobility solution. While it was introduced as a more flexible and cheaper alternative with respect to public transport and private cars, future modes of transport were already emerging thanks to the development of “connected, autonomous, shared and electric” (CASE) vehicles. These technologies are a reality nowadays, as people demand more sustainable, affordable, reliable, and safe mobility methods. To this end, electric and autonomous vehicles would surely represent key factors in the relaunch of car sharing services. The success or failure of this service will probably be decided by operators’ responses. They can take actions in terms of enhancing platforms and travel

⁵³ Monitor Deloitte, *“Shifting gears into New Mobility in Europe – Overtaking old habits”*, 2020

⁵⁴ La Stampa, 2020

options or by reducing costs. However, to achieve these results they cannot exclude interventions and contributions from outside actors. If the pandemic will slow down throughout the year, operators could react with interventions aimed at ensuring passengers' safety, hopefully leading to a gradual recovery. On the other side, with the pandemic going on also in 2021, operators would suffer further negative economic effects, which could postpone the equilibrium to 2023. Or again rental of vehicles, which will need to evolve its offers to guarantee safety and flexibility, through sanitization systems and "pay-as-you-go" tariffs. Nowadays, more than half of the world's population lives in cities, a percentage that is destined to grow in the future. As a result, urban areas need to develop together with changes in population, to provide healthier and more efficient lives for citizens. Cities will become denser, making it inefficient to devote large areas of surface to the circulation of private cars. Inefficiency of private vehicles is also demonstrated by the fact that approximately 95% of the time they remain parked⁵⁵. Therefore, it is clear that private cars cannot represent a suitable and competitive solution for the mobility of tomorrow, considering the future potential of urban transportation. Hence, new and advanced forms of public transport – being bus, tram, metro, or ridesharing services – are the answer for more sustainable cities, economically, environmentally, and socially speaking. In recent years, rapid urbanization and motorization favored worldwide problems in transportation infrastructures, such as traffic congestion, injuries and accidents, pollution, and excessive energy consumption. Furthermore, lifestyle changes due to the pandemic accelerated a shift in consumer mobility attitudes, which will continue to evolve in relation to the surrounding environment. Undoubtedly, urban mobility is in the middle of a dramatic change, but at the moment confusion and great uncertainty prevail in this evolutionary process. Under this emerging macroeconomic scenario, sustainable management of urban areas represents a key factor, leading to the development of the concept of "Smart City": an area able to manage the various aspects inside a city (environment, energy, living, education, and mobility) in a sustainable way. It entails a new context in which different factors (environment, society, and economics) are perfectly integrated. Inside the picture of

⁵⁵ Ceder, A., *"Urban mobility and public transport: future perspectives and review"*, Routledge, 2020

the smart city, an important role is played by smart mobility. It includes a variety of mobility solutions, some of which are already in use (for example e-ticketing, e-parking and live-tracking) while others are still works in progress, such as driverless cars. Other innovations include typical Industry 4.0 elements, such as big data, artificial intelligence (AI), robotics and virtual reality. A new emerging technology is also Vehicle-to-Vehicle (V2V) communication. It consists of a software that enables drivers to exchange information on location, speed, and direction between them. It is based on “Vehicular Ad-Hoc Network” (VANET) technology, which works by considering each vehicle as a node in a larger network to enhance communication between them. Among all, the main tool remains connectivity. As a matter of fact, through connectivity people can share real-time traffic information, while public administrators manage that information to get useful insights. Without a good connection, passengers might choose to stop using the service. Moreover, connectivity is widely considered to be a catalyst of social equity. Indeed, it allows accessibility to a larger audience (for example groups with mobility limitations), facilitating a process of inclusion in public transport initiated a long time ago. Generally speaking, all these technologies will play a key role in the development of next generation mobility. For this reason, it is important that they are integrated in the best way possible, so that people are incentivized in the use of public transport. The presence of new mobility systems and services might have a double effect. On one side, it could boost an increase in the demand for transportation. On the other hand, it will in some way influence consumer behavior. As a result, it will be important to develop appropriate tools to monitor the dynamics of mobility demand, while at the same time using the information available to detect those factors that influence mobility behavior. The picture described is part of a context in which the offers of operators remain rich and innovative, so that their success will be determined by their ability to better meet customers’ needs. Overall, the potential is high, especially for a sector that in the last years was able to transform our mobility habits.

2.6 Sector’s responses to the healthcare and economic emergency

The new mobility sector will be undoubtedly affected by the economic crisis derived from Covid-19. Demand fragmentation, as well as the presence of many small size operators and suffering business models could have consequences on two main sides.

On one hand, they could lead to the disappearance of small operators in case the regulator does not intervene by means of economic support. On the other hand, the sector could witness a series of partnerships and M&A processes to strengthen businesses' presence. However, operators seem to be reacting, taking actions to turn threats into opportunities. Many countries undertook specific interventions to recover from economic damages caused by the pandemic. Even if it is still too early to see the first results, the implementation of such measures remains crucial to overcome the crisis. These initiatives concern three main macro areas of intervention. First, an active engagement at social level, becoming complementary and supportive to public transport, in the search to meet the needs of the categories mostly involved by the pandemic. An example of this is Lyft, one of the main sharing international players, which during the pandemic offered in some cities of US free kick scooter's rides for medical personnel and workers in the transport sector. Second, a review of the operational models to enhance safety measures in new mobility services. It is the case of Wheels, a company that rents electric bikes, which created a bicycle equipped with an automatic sanitization system that cleans brakes and handlebars after every use, to provide an innovative solution that responds to people's safety needs against the potential risks related to Covid-19. Third, the identification of strategies aimed at supporting the use of vehicles also during emergency periods, among which the review of pricing logics (to incentivize long-term usage) and of service accessibility (through an extension of the service to extra-urban areas). For instance, the German car sharing company Miles, enlarged the area of service in some cities to cover suburbs. The initiative responds to the decline in the utilization of public means of transport also by those customers living in extra-urban areas. The speed of mobility innovations until now, including micro-mobility and sharing services, has been exponential. With the diffusion of the emergency, public transport has been put in serious doubt, as people no longer consider it a safe and efficient method. At the same time, the rise of e-commerce favored an increase in the density of first and last mile transport, highlighting the need for collective solutions through a thoughtful review of how people and goods circulate inside cities. In some countries, mobility options supplied by public or local entities are increasingly substituted by solutions of private providers. They have been able to respond to the emergency modifying urban mobility options. These solutions include the most popular sharing forms (car, bike, and scooter

sharing), as well as less known services such as ride hailing and pooling platforms, or apps that optimize routes and trips, and they are convincing users all around the world. In this sense, a big enabler of success is the ability of companies to identify changing consumer demands. A good way to do this is by creating partnerships or collaborations between cities and mobility players. Some actions that have been taken and could be taken in response to the current situation are described here as follows.

Data sharing

The first action concerns data sharing, with mobility actors and cities cooperating to allow an efficient flow of information, of course anonymized, aimed at monitoring demand and enhancing mobility planning and management. For a successful result and for the respect of consumers, data should be made accessible and transparent to people. Moreover, cities and operators should decide and agree on who is responsible for the collection and sharing of these data. Information coming from users would be useful also to ensure safe and smooth traffic circulation and transport services, as well as to assess infrastructure functioning and readiness. A good use of data sharing would allow cities to better manage transport networks, making sure that the right amounts of public means are deployed and facilitating the forecast of infrastructure restoration and future needs.

Safety

As largely stressed before, the main concern of people deriving from the pandemic is safety, due to the lower risk tolerance associated with health matters. For this reason, cities, and mobility operators – with the collaboration of other stakeholders – are asked to focus on innovations that guarantee not only physical safety, but also security of personal data and general wellbeing of people. The basic safety measures of previous modes of transport should remain and should be complemented by new technologies that improve the safety and the efficiency of transport services. However, not only users are involved in this process. New technologies must take into account also the safety of those citizens that do not make use of mobility services but that make part of the urban environment, such as pedestrians. Only in a context where every dynamic is

perfectly connected and controlled, it is possible to talk about smart mobility and consequently of a smart city.

Inclusion and equity

The concept of smart city also includes the disappearance of every form of inequality between citizens in terms of service accessibility, be it physical or economic. In this case, operators are called to provide services to people both in urban and suburban areas, with a particular attention to more marginalized communities (for example people with disabilities), in order to incentivize equal economic growth and inclusion. As a matter of fact, mobility is in its nature an inclusive concept, so that every person, independently from where they live, should have access to mobility services. But it is not only a matter of access, indeed everyone should be able to afford those services and physically use them. At this point in time, it has become essential for cities, operators, and stakeholders to merge to cover the so-called “mobility deserts” and the various gaps in services, adapting offerings as needed.

Shared mobility and pooling

Another big task for mobility actors is to improve the efficiency of specific services such as shared mobility and pooling, to limit the quantity of private or single occupancy vehicles. To this purpose, educating users on the advantages of these forms of transport would play a key role. Indeed, it is important to favor a change in people’s behavior, which could be driven by different communication methods and economic incentives. Mobility actors should join forces to reduce the impact of the various services on non-users and society as a whole, in terms of speed and public space matters. As mentioned before, they should guarantee appropriate coverage of shared and pooling services also in less urbanized areas with a lower density of users.

Clean transition

In the context of future mobility, a central role is played by environmental sustainability, which can be reached through the efficient development of zero-

emissions public and private vehicles. This topic is part of a greater global engagement started with the Paris Agreement and the “United Nations 2030 Agenda for Sustainable Development”. Cities and operators should insist and incentivize low or zero-emission vehicles against less efficient modes of transport, for instance through road pricing tariffs based on the level of emission or restrictions and bans. They could take advantage of metrics to measure the transition such as passenger carbon footprint and passenger density. Moreover, they should agree on precise plans to establish timelines with which to achieve those goals, keeping in mind aspects such as climate agreements, public and private resources, and consumers’ wellbeing. Finally, the technological transition also implies a change of infrastructures, in this case directed at the introduction of charging stations for new electric vehicles.

Multi-modal integration

The last action that mobility actors should consider in response to new demands deriving from the crisis concerns the integration of multiple modes of transport inside single trips, being them public or private. More precisely, they should think about Mobility-as-a-Service (MaaS) solutions to expand mobility coverage and limit the use of single-occupancy vehicles. The use of multiple means of transport would probably imply a strict collaboration between cities and operators, in order to better manage public and private resources and favor a productive integration with existing means of transport. A key strategy could be to position complementary infrastructures in proximity to other services – for example bike sharing facilities near train or bus stations. The overall goal is to expand the coverage of public transport by establishing multi-modal first and last mile services.

These guidelines represent the actions that have been taken or could be taken in the future to respond to the new scenario generated by the pandemic. They incentivize cities and mobility operators to strictly collaborate in the formulation of new strategies. As previously described, some interventions seem to be preferred, among which data sharing, user education, safety guarantees, social inclusion, environmental safeguard, and multi-mobility options. On their side, cities, operators, and stakeholders are required to cooperate to address each guideline and satisfy consumer needs.

2.7 Emerging opportunities for new mobility diffusion

The rapid diffusion of Covid-19 pandemic and its effects in economic and social terms, impose to all sectors a reflection aimed at understanding many aspects, among which: the responses through which a company can face the emergency, the recovery during which the company adapts to the new context and the best practices to guarantee a competitive position in the “next new normal” phase. It is therefore essential to come up with a solution that allows us to manage the emergency while setting up the recovery, coherently with the new social and economic context. The new mobility represents a strategic sector that affects all those industries, maybe not traditionally linked to mobility issues, that play a key role along the value chain, such as the insurance or energy sector. These operators have the chance to strengthen their own positioning through the supply of new services and the extension of their domain, for example creating partnerships or by means of mergers and acquisitions. For instance, insurance companies could exploit their knowledge on mobility habits through the use of telematics to develop innovative solutions with personalized pricing policies that better fit the different types of drivers, by monitoring its profile, its movements and its driving style. Another sector that could take advantage of the period of disruption is the energy one. In collaboration with the regulator, it could build recharge stations to favor the use of sustainable means of transport. Such as stations with technology Vehicle-to-Grid (V2G) that allows to make the net more stable and efficient while bringing important economic benefits to customers. Overall, the new mobility represents for operators an important growth opportunity. They could enhance the level of service through an upstream and downstream integration of the chain. Moreover, they could have access to new sources of revenue thanks to new services connected to mobility. In addition, they could use data sharing to improve customer relationships through the personalization of services. Finally, it would be useful to develop a program to monitor passenger load in public transport, generating the maximum value possible in terms of information available. This involves the management of real-time data about passengers using IoT, as well as the creation of sharing platforms to exchange data with citizens and companies. Therefore, it is of utmost importance that the new mobility remains at the center of the current and future global economic scenario. It represents a strategic phenomenon essential also

for firms of different industries, as it allows them to respond to the needs that emerge throughout the various stages of the crisis. Among them, it allows to manage the cash flow during the crisis, for example by using offers that ensure liquidity, as the rental of vehicles for those companies that experienced an underutilization of vehicles during the pandemic. Furthermore, new mobility may help to maintain customer loyalty, by positioning the brand as the protagonist in the response to the emergency, with potential benefits on customer retention in the long-term. Moreover, companies can develop new models to overcome the limits on production due to the crisis. For instance, fleets' underutilization showed the necessity to find innovative solutions to modify the cost structure of mobility, based on frequency of use and driving behaviors. As a matter of fact, it is estimated that 30% of the costs related to company cars depend on drivers' behavior, and 55% of them could be reduced through telematics⁵⁶. Another example concerns food service and retail sectors, which find themselves in front of a radical change of business model, requiring a conversion toward the concept of delivery. In this precise context, mobility operators can count on several opportunities to be exploited, such as the transformation of the operational model to enable delivery activities, or the use of state-of-the-art technologies as Artificial Intelligence and Robotics to create a digital supply chain – as it happened in the US, where Starship Technologies introduced autonomous robots for last mile deliveries.

Finally, companies might invest in the development of new ways for creating value not only for the company itself, but also for society. Mobility remains a strategic tool that plays a central role in all the phases of the crisis. It is therefore essential for all the actors involved to continue controlling the market to gather the opportunities available. However, to react to the current disruptive scenario, it is necessary a collaboration of public and private players that favors a full relaunch of the mobility sector, also considering its incidence on the GDP in the main European countries (20% of GDP for Italy⁵⁷) and its relevance on the income of citizens. In order to reach a full development and usage of the new forms of mobility, public and private operators must undertake initiatives in two main directions: on systems and on supply. For a successful recovery, it is fundamental that institutions understand their crucial role. They should take actions in a variety of fields: boost the creation of urban ecosystems,

⁵⁶ Monitor Deloitte, 2020

⁵⁷ Monitor Deloitte, 2020

stimulating synergies and flow of data between public and private actors to manage in a safer and more efficient way traffic and customers' demand; review the legislation providing incentives for those operators that offer innovative services complementary to traditional public transport; integrate public and private services, making them more easily accessible (through the creation of MaaS infrastructures for example), cheaper and more flexible in terms of pricing, through a gradual shift from a single ticket to a unique ticket to enjoy all the services available in the area; incentivize the dual use of public and private services, in order to lighten demand on public transport, reducing in this way the need to reinforce also public infrastructures. Among these actions, the topic of Mobility-as-a-Service deserves a greater attention. At the same time, private operators can stimulate change through strategies and interventions coherent with people's needs. The most important aspect in this moment seems to be the supply of services that guarantee safety for users. In addition, an increase in pricing flexibility while ensuring affordability would be highly valued by customers. Another aspect could be the improvement of telematics to generate and share data for the good of society, for example by tracking demand to guarantee accessibility and safety. Furthermore, in a moment of great mistrust toward traditional means of transport such as trains, metros and buses, operators should extend accessibility also to extra-urban areas. On the customer side, they could invest in strategies to increase brand awareness, for example offering specific tariffs for workers and providers of primary services for the community, to strengthen people's loyalty. Finally, they might consider a strengthening of their positioning inside the value chain through the creation of partnerships or mergers with other operators, also cross-sector.

Overall, among all the new technologies available that have been mentioned, five main domains will probably characterize the future of mobility. The first is undoubtedly electrification. Electric vehicles are in fact the most environmentally sustainable solution in the market at the moment, and their success is destined to also grow thanks to the fact that their list price will reach the level of traditional cars in a few years. Batteries are becoming increasingly more efficient, ensuring better performances. Despite the great success, supply of electric vehicles could exceed demand in the next few years since people will need time to adapt to new behaviors. However, electrification does not only concern cars, indeed most of the micro-mobility and sharing services can be used with electric vehicles (kick scooters and scooters for

example). The second trend concerns platforms and apps to manage multi-modal transport. As a matter of fact, we have seen how MaaS is becoming a reality and how means of transport will be more and more integrated to provide the most efficient mobility experience possible. Apps will allow people to coordinate all the options available to move from a point A to a point B in the fastest, cheapest, and most ecological way. Related to this issue is also the creation of a unique pass to use all the services available in the city, being publicly or privately provided. Another element, which will result particularly useful in the implementation of autonomous vehicles, is sensors. Sensors will be at the base of the new mobility, as they will be everywhere. They will work as thousands of eyes, creating a 360° real-time image of whatever moves in the streets (traffic, users, non-users), and sharing that data with all the devices connected. The development of 5G technology will play a key role in this sense. Sensors could be also installed inside vehicles, to monitor drivers and passengers to avoid distractions that could lead to accidents. These sensors are able to detect tiredness of drivers or similar feelings, by observing the direction of the gaze, the expansion of pupils, the opening of the eyes and the number of blinks made. The last two trends are probably the most known and used ones. It is the case of car sharing and micro-mobility. Car sharing is still considered as a niche service by many users, but with all probability it will become a routine in the next few years, given the number of people that would prefer using this service rather than incurring in the expenses related to the purchase of a private car. However, ridesharing is currently at its first stage. Micro-mobility is the great surprise of the new mobility paradigm, thanks to its substantial growth in the last couple of years. The diffused adoption of the technology is mainly due to the fact that it allows us to solve one of the biggest problems related to mobility, which is travelling the first and last mile of a trip. Moreover, bike-sharing and e-scooter services help avoid traffic congestions in a modern and (why not) funny way. Therefore, these services need to be perfectly integrated with greater means of transport. Only with a coordinated mobility system, people will be incentivized to adopt new behaviors. In this context of great uncertainty, the good news is that many of these evolutions are already in place, also thanks to initiatives and investments undertaken by public institutions and private operators of different industrial sectors. The current scenario leaves space for opportunities also for those new players interested in entering the market. It therefore becomes essential to count on

technologies and ready to use solutions that could support and stimulate the innovation process and the business transformation. This includes solutions able to create value for all the actors involved, from suppliers of services to customers and more in general society as a whole.

Conclusion

What emerges from this chapter is the picture of a sector in the middle of a period of profound transformations, characterized by new disruptive technologies and trends that are drastically changing the traditional concept of mobility as we know it. This is the result of centuries of evolution and technological achievements, which have been modifying throughout the years people traveling behavior and attitudes, until the creation of the tools and services available in nowadays cities. In addition to the natural evolutionary process, mobility has been largely affected also by the recent Covid-19 outbreak, with its consequent implications on people's lifestyles. The need to guarantee social distancing and the growing fear of people have led to the emergence of individual means of transport, to the detriment of traditional forms of public transport and private vehicles. As a consequence, mobility had to change too, to satisfy new consumer demand for safer and more accessible services. However, this change is not only the consequence of the emergency period but is the result of a larger scale technological transition that aims at making mobility, and therefore cities, more sustainable from an economic, environmental, and social point of view. As a matter of fact, the pandemic only accelerated a process which had already started with the various regulations at European and global level to achieve important results in terms of sustainability in the next decade. The resulting sector is characterized by a series of innovative forms of transport, some of which are already well established, while others still at their initial stage. These include the well-known car sharing service, as well as carpooling and ride hailing, which try to bring a new concept of car utilization, no more focused on the private use, rather on the principle of sharing. On the other hand, new trends emerge to further reduce the number of cars on the streets, giving rise to the electrification process. Among them we can find scooter and bike sharing, which offer a useful solution in covering short distances while avoiding problems related to traffic congestion and pollution. Lastly, the new entry in the ecosystem, that is micro-mobility,

which allows to solve the problem of the so-called first and last mile in an easy and efficient way. All these services must be perfectly integrated between them to create a new frontier of mobility, which will make cities smarter, and therefore will facilitate and enhance people's lives and the surrounding environment. These concepts are at the base of the Mobility-as-a-Service system, a new paradigm that aims at changing the logics of mobility, providing it no more as an asset but rather as a public service accessible to everyone. However, to be fully implemented, this process requires the collaboration of all the actors involved not only in the sector but in the urban dynamics in general. As a result, companies, operators, institutions, and stakeholders, being them private or public, will need to cooperate to provide a unique service that combines all the possible transport solutions. In this sense, the great advantage of the mobility sector, which is also the reason why it represents the perfect means by which starting the recovery phase, is that it includes many other sectors which are apparently different and far apart, but which, if well integrated, can make the difference in the achievement of future objectives. Overall, among the various technologies described, future opportunities in the field of mobility will with all probability develop along five main vectors, namely electrification, multi-modal transport (MaaS), autonomous driving, car sharing and micro-mobility services. To conclude, the pandemic has undoubtedly affected the mobility sector in a negative way, but it has also provided new growth opportunities, as it often happens in periods of disruption. Most negative consequences have already been experienced, and companies have reacted to them in many different ways, sometimes successfully and sometimes not. The point is that we cannot change the past. What we can do is to learn from the experiences to prevent and prepare for future crises while building a more efficient and sustainable way of living, and mobility, given all its implications, is the key to achieve this.

CHAPTER III

Case study analysis

The second chapter provided us important insights about the mobility trends emerging during the period of disruption. Four main aspects were highlighted, namely the impacts of the pandemic on mobility, the features of the new macroeconomic scenario, the immediate responses of the sector and the future opportunities emerging from the crisis. Each of these topics provided interesting concepts, from the new habits and demand of users to new technologies that have been implemented, which deserved to be further developed. The purpose of this chapter is precisely to analyze more in-depth certain aspects of the new mobility, by means of real experiences lived by some companies of the sector. It will be interesting to see the different perspectives of the various companies, and how businesses changed in relation to car sharing, scooter sharing and micro-mobility services. Moreover, a special focus will be given to the Italian context, in order to understand the current state of mobility and the future possible developments in a country that is still in delay if compared to other international realities. The chapter will be composed of three main paragraphs. The first part will present the companies interviewed and the methodology used for these interviews. The goal of this analysis is to connect the various case studies to come up with a general shared idea. The second part will deal with the real case study, analyzing the responses of the companies to depict a clearer picture of what has been the pandemic in practical terms and what are the features of the new mobility sector, as well as what it means to work in the field of mobility nowadays, with all the implications and problems to address. The third and last part, as mentioned before, will focus on the Italian situation, and will try to explain what difficulties have been experienced by Italy with respect to other countries in the implementation of new forms of transport, as well as the current habits of people and their willingness to shift toward shared and sustainable means of transport. As a matter of fact, as we will see later, Italy suffers from the absence of successful Italian companies along the territory, which is instead characterized by foreign multinationals. Therefore, it will be interesting to investigate the opportunities of Italian companies and SMEs, following the example of already existent ones, and what they can do to deal with foreign multinationals, in order to carve out an active role in the international scenario.

3.1 Research methodology

In order to prove the concepts emerged in the previous chapter, I chose to make use of real experiences coming from some companies in the sector. To this purpose, I relied on direct interviews with the subjects concerned. The methodology used belongs to the category of qualitative and interpretative analysis, which allows researchers to understand people's view of the world and the way they live daily experiences. Moreover, the researcher becomes a tool for data collection and analysis, and by means of an inductive process, it is possible to gather information with a high descriptive capacity. The methodology is composed of three main steps, subsequent to the formulation of questions, namely the collection of data, the analysis of data and the final formulation of the theory. As mentioned before, the research is based on semi-structured interviews. This type of interview has the advantage of providing retrospective and real-time reports from the subjects that experience the phenomenon at issue. In addition, the questions proposed allowed the guests to freely express their opinion on the topics discussed.

The formulation of the questionnaire that was sent to companies took into consideration the concepts emerged in the second chapter, concerning the four main phases of the mobility sector during the Covid-19 pandemic. According to these four phases, the interview was divided likewise:

- A first part concerning the impacts of the pandemic on the companies of the sector, where two main aspects were highlighted, that is the economic implications (in terms of demand contraction, cost optimization and fleet enhancement) and the social consequences (growing consumer mistrust or change consumer behavior). In this sense, a second question was prepared with the aim of understanding the precise worries of consumers in terms of safety using shared vehicles.
- A second part dealing with the characteristics of the new macroeconomic scenario, focusing mainly on two factors: micro-mobility and MaaS. The former will discuss the prospects of micro-mobility services, in particular its relationship with car sharing services. The latter will try to explain how companies interact with public entities, institutions, and other actors of the urban ecosystem to guarantee integrated services. Furthermore, there are two other questions strictly related to

the Italian situation, which will however be analyzed in the third paragraph. These questions will investigate the current level of mobility in Italy, as well as the reasons why it is so difficult to establish a company active in the entire territory.

- A third part focused on the immediate responses of the companies of the sector, which, following the examples mentioned in the second chapter of companies such as Lyft, Wheels, and Miles, will assess the actions taken to guarantee business continuity as well as a high brand awareness and customer loyalty.
- A fourth and final part which will probe the future opportunities of the sector, according to the five factors highlighted in the second chapter, namely electrification, autonomous driving, multi-modal transport, car sharing and micro-mobility. Companies will be asked which of these technologies will influence the new mobility sector, as well as their real prospects.

Once the questionnaire was prepared, the phase of research of the companies to be interviewed started. Since the thesis is mainly focused on operators of sharing services and micro-mobility, and given the particular attention to the Italian situation, the research was directed to those companies operating in Italy, possibly Italian. In order to find and contact these companies, the main tools used were the official webpages and LinkedIn. The logic behind the selection process was to find a company that provided at least one service among car sharing, scooter sharing, bike sharing and micro-mobility, or alternatively someone that worked with digital platforms able to connect the various means of transport. Initially, eight companies were selected, among which four gave the availability to undertake the interview. The interviews were held in three ways: through video conferencing platforms such as Zoom and Google Meet, through a traditional phone call and by means of written answers. In the case of the calls, each of them has been recorded, to analyze every single aspect without omitting important parts. The average duration was 36 minutes, as shown by Table 7.

Table 7. List of interviewees and related duration

Interviewee			N° of interviews	Duration
Italy	Regional	Manager	1	40 min
Cooltra				
CEO & co-founder 2Hire			1	20 min
Founder	Playcar	&	1	50 min
Playmoove				
Regional	Sales	Manager	1	---
South-West, Share Now				
Total			4	2h

Source: *Own elaboration*

The companies that accepted to answer the questions were four: Cooltra, 2Hire, Playcar and Share Now.

Cooltra

Cooltra is a Spanish company, born in 2006 in Barcelona, specialized in scooter sharing services. It was born with the aim of transforming cities into safer, more efficient and more sustainable places. Throughout the years it started to implement mobility solutions accessible to everyone, in step with the times and needs, thus becoming the leader at international level thanks to the realization of new rental models that diffused across Europe. It provides two-wheels vehicles for privates, businesses, and public administrations. Cooltra is present in big European cities such as Barcelona, Madrid, Valencia, and Lisbon. In Italy it is available in two cities, which are Rome and Milan. Nowadays Cooltra is the leader in scooter sharing services both in Europe (with 50% of the market) and in Italy (80% of the market).

2Hire

2Hire is an Italian startup, created by a very young team based in Rome, that allows users and companies to connect their vehicles into one platform, thus providing digital mobility solutions around all kinds of vehicles. In this way users can create their own mobility service, and companies can scale their existing businesses with 2Hire technology. From cars to scooters, mopeds, and bike, 2Hire can help users to launch, run and scale new digital services without any need for technical knowledge. By equipping vehicles with 2Hire plug and play device, all vehicles' actions are performed remotely by smartphone thanks to their software. Real-time data analysis enhances fleet management and the full exploitation of available resources. 2Hire customizes B2B solutions for car rentals, corporates endowed with a fleet, and privates willing to start end-to-end car sharing services. They offer different solutions to enable digital accessibility on their vehicles, with or without connectivity. They currently provide services in 35 cities scattered across 9 countries in Europe, US, and South America, for a total of more than 60 million kilometers covered.

Playcar

Playcar is the car sharing service of the city of Cagliari. It gives access to a great variety of vehicles, from commercial ones to small city cars, including e-bikes and kick scooters. It offers three trip modalities with related different tariffs: free-floating, one way and round trip. After an initial development in the city of Cagliari, the company started the software and hardware integration of different forms of transport. In fact, car sharing and bike sharing services are well integrated in its MaaS platform, called Playmoove. Playmoove platform is an innovative cloud-based SaaS (Software-as-a-Service) system developed specifically to manage car sharing mobility activities. It is well suited to scalable management of every kind of fleet regardless of its dimension or service mode and it does not oblige its users to strict and preset usage modes and routes. Playmoove was conceived and designed to enable sharing mobility service providers to work with maximum flexibility in the management of their business, granting them maximum expandability thanks to a fully API based architecture. The software has already been acquired by many

countries all around the world, thus becoming a key tool for the future development of mobility services.

Share Now

Share Now GmbH is of course one of the most known and diffused car sharing companies. It is German, and it is the result of the merger between car2go and DriveNow, which happened in 2018. It is a joint venture of Daimler AG and BMW, and provides car sharing services in Europe and formerly also in North America. The company counts more than 4 million members and a fleet of over 14.000 vehicles scattered around 8 European countries (Austria, Denmark, France, Hungary, Netherlands, Spain, Germany, and Italy), for a total of sixteen cities: Vienna, Copenhagen, Paris, Budapest, Amsterdam, Madrid, Berlin, Cologne, Dusseldorf, Frankfurt, Hamburg, Munich, Stuttgart, Milan, Rome, and Turin. Among the fleet, the company offers cars belonging to brands such as Smart, Mercedes-Benz, BMW, Mini and Fiat. The service consists of one-way point-to-point rentals, and users are charged either by the minute or by hourly and daily rates. There are also tariffs made for businesses. Of course, as for the other companies, vehicles are accessible by a specific app.

3.2 Analysis of the data

After having listened to the companies' experiences, it is time to analyze the data collected. In this phase, the four topics mentioned before will be discussed according to the answers of the companies, trying to summarize the different opinions in a unique concept. Among the eight questions, the two related to the Italian situation will not be taken into consideration in this paragraph, but will be analyzed later in the third one, as they deserve a particular attention to depict the features of the current scenario in the country. The concepts that will emerge will be as much coherent as possible with the theory presented in the second chapter, so that more theoretical aspects will be integrated with practical experiences. The result of this process should be the realization of a picture that better explains the situation of the new mobility sector and its possible future developments, in a way that creates value for all the parties involved.

3.2.1 Impacts of the pandemic

The first two questions concerned the impacts that the Covid-19 pandemic had on the various companies, in particular the economic (in terms of drop of demand, cost optimization and enhancement of the fleet) and social (growing mistrust and changed mobility habits) implications. As far as the economic sphere is concerned, all the companies agreed on the fact that the mobility sector, being characterized by people movements for reasons related to work, education or leisure, was inevitably strongly affected by the healthcare emergency, even if their businesses were hit on average less than more traditional means of transport such as metro, buses, and trains. In fact, those services implied the presence of many people, making it difficult to respect social distancing measures. Instead, car sharing, and micro-mobility solutions allowed users a more independent use and especially outside, which was essential considering the fact that some categories of people never stopped working, thus necessitating mobility alternatives also during the periods of lockdown. Nevertheless, the true impact is still uncertain, since it is not clear if it was due to the risk of transmission of the virus, or to the fact that people could not go outside except for specific reasons – as reported by 2Hire co-founder. In the case of Cooltra, the company experienced a strong economic impact in the first lockdown, with a 90% drop of revenues, even though it stayed open all the time (the only scooter sharing service to do so). After the lockdown, so in summer, demand increased again, to then decrease around the Christmas period with the second lockdown. This time the impact was lighter than the previous one, as users and companies got used to the emergency and already knew how to behave. Of course, the company adapted the service to the pandemic, therefore paying greater attention to hygiene issues, even if already before the pandemic the sanitization process was a routine (every time they changed the battery, they also cleaned the scooter). However, they intensified hygiene equipment with more hairnets and single-use napkins. Moreover, they decided to undertake an awareness raising campaign to communicate to customers all these interventions while encouraging them to the continuous use of face masks (a procedure used also by other companies). Nowadays, they are returning to optimistic levels, thanks to a gradual increase of rentals. The growing attention to hygiene was confirmed also by 2Hire, since all the operators involved in their business had to resort to sanitization processes, either for marketing purposes or for a real need from an operational point of

view. As a consequence, costs increased too. A pattern similar to the one of Cooltra was followed also by Playcar, which experienced the worst drop in the first lockdown, while now they are coming back to normality, even if with figures much lower with respect to the pre-crisis situation. However, being an innovative startup, they focused on a reactive approach and immediately started to prepare actions. They prepared a questionnaire to understand people's worries (the first to do this in Italy). Secondly, being blocked from the operational side, they focused on R&D activities. This allowed them to make important progress that they would have never made without the crisis. For example, they worked with another startup in Cagliari specialized in the production of solar panels to recharge electric vehicles and gave a car to the city hall to test the performances. After the first lockdown, the company invested in micro-mobility (bikes and kick scooters), given the serious problems of other means of transport. An important feature of Playcar is that they not only are providers of vehicles in the city of Cagliari, but they also supply a car sharing platform in other cities, among which Bologna, Padua, Buenos Aires, New York, and Dallas. This aspect helped them to work continuously and to invest in the development of new systems according to the needs of each place. Moreover, during the pandemic it allowed the company to remedy a drop of car sharing production with an increase of demand for digital services. This balance gave the optimism necessary to ensure business continuity, given the difficulties due to the small size of the company. In terms of hygiene interventions, they took a series of expedients for vehicle safety, which they have lately transferred to other colleagues. They acquired hand sanitizer and other basic equipment with Playcar customization. In addition, where they did not intervene with products, they tried to help by transmitting information and studies on social networks. One important aspect highlighted by the company that was realized during the pandemic was the importance of respect towards other users, a key factor for sharing services. As a matter of fact, the good and clean use of a vehicle by one user allowed the next one a safe ride, and so on. Overall, they were quite advanced, technologically speaking, with respect to other services, and in the summer 2020 they registered the highest turnover for car sharing service, despite the pandemic. Indeed, differently from the rent-a-car, car sharing technology allowed them a greater flexibility, thus absorbing rent-a-car users. This shows the many forms that car sharing can take, becoming a rent-a-car or a long-term rental, depending on people's needs. It can change its aspect because the true difference is made by the technology applied on the service, not the vehicle or system used. Another

important provider of car sharing that experienced more or less the same consequences was Share Now. According to the company, car sharing is undoubtedly one of the most affected services inside the mobility sector, with two figures dropping since the first phase of lockdown in March 2020 (-90%, shifting from an average of 10 rentals for cars to 2). Unexpectedly, they saw their services drastically fall. Nevertheless, they immediately reacted on two main levels to face operating and safety issues. On the operating side, they intervened on the fleet. In particular, during the first phase, even if they continued to provide the service in all the cities, they decided to reduce the number of vehicles available to limit the managing costs given the reduction of rides due to the forced lockdown. On the safety side instead, they strengthened sanitary measures and tried to create awareness on customers. From the beginning of the emergency in March 2020, Share Now activated a rigid protocol that consists of cleaning and sanitizing cars four times more frequently than the pre-covid period. The team assigned to the cleaning of vehicles uses disinfectant chemical products and pays particular attention to the surfaces of greater contact, such as steering wheel, gearshift, and handbrake. At the same time, beside the company engagement, users' behavior plays a key role too. Now more than ever it is essential that everyone respects the rules and common sense. For this reason, users are required to always wear a mask, disinfect the hands before and after driving, ventilate the cabin for half a minute both before and after the use and not leave garbage inside the car. All these measures are necessary to keep the risk of infection for all the Share Now community the lowest possible. In addition to these two main measures, there is a third one concerning the business responses, which however will be analyzed later. If the first lockdown basically blocked people's mobility, causing a drastic drop of activities, the actions introduced since the beginning allowed the company to experience positive effects in the second phase of the pandemic. As a matter of fact, from May to October they registered a significant growth of new registrations to the service, number of rentals and their duration. Even if they are data still far from the standards before the pandemic, they are all signals highlighting how users continued to perceive their means as safe ones. So, from May figures started to grow again: in Italy they registered a +184% in the number of rentals in the month of May (almost tripled) and +438% in the month of June (quintuplicate). During the summer, they were on their way to recover. Although the number of rentals was still far from the standards, in August the duration of trips had grown by 230% with respect to the same month in 2019. This growth was mainly due to

the constant development and adoption of the long-term rental option of Share Now, which consisted of rentals that can last until 30 days. In September and October, figures returned similar to the ones before covid, even if since November they experienced another drop of activities, due to the new closures, however not comparable to the one of March. Overall, they ended the 2020 with quite positive results, despite the effects of the pandemic. Italy, with its 710.000 users, was the second country in the rank for the highest number of people enrolled and cars available, immediately after Germany. Moreover, in the last year, almost 30 million kilometers were travelled at a national level on the 2.400 cars composing the fleet. Milan, with 16 million kilometers in 2020, was the second city at European level for most kilometers traveled (Berlin was the first). In Rome instead, Share Now users drove for 9,4 million kilometers, while in Turin 4 million. Rome in particular was the city where rentals lasted the most: with an average of 73 minutes in 2020, the Capital marked a 132% increase compared to the previous year. In Milan instead, a rental lasted on average 49 minutes (+61%) and in Turin 31 minutes (+66%).

In terms of people's worries, all the companies did not notice a particular change of behavior on the consumer side. The awareness comes from the information available. When the consumer does not have the necessary information, troubles begin. But with continuous communication from the company side, consumers feel safe and ready to use the service. The fact that a vehicle has some safety procedures gives trust to people. However, it is necessary to increase these procedures, as a form of respect for users, by augmenting the number of cleanings and introducing new technologies such as automatic internal sanitization. Concerning Cooltra, they made a survey at the beginning of the pandemic to understand the difficulties and the approaches of consumers, whether they felt safe or not, and what the company could do to enhance safety. The results were astonishing, showing a common optimism for sharing services. The 80% of Cooltra customers did not have worries, they were already aware of the safety of vehicles and their opinion did not change with the healthcare emergency. Moreover, they appreciated the communication process undertaken by the company about safety measures. Finally, sharing services were still safer than traditional public transport, which forced people to stay inside with no possibility of keeping social distances. Something similar was perceived by Share Now. At the beginning of the pandemic, a lot of people forewarned the end of sharing mobility. Of course, using a service where the space is shared with other people initially scared users, but successively customers understood that car sharing (as

the other forms of mobility) was not dangerous, also thanks to safety measures adopted in the fleet and the constant communication campaigns (through social and newsletter) about the sanitization of vehicles. Contrary to the expectations, users acquired awareness and continued to use the service. Therefore, we can say that the real drop of activities was due to the restriction measures that reduced mobility of people, rather than the perception of safety toward the service. Moreover, thanks to the 30 days option that allows users to book the vehicle exclusively for their personal use, car sharing confirmed itself as one of the safest means of transport in the market. Compared to the traditional public transport, by now restricted and unable to respect 100% efficient qualitative safety standards, car sharing is surely among the safest choices. What has changed during the pandemic is the use that citizens make of car sharing. For example, they noticed that rentals increased in most peripheral areas of the city. This means that car sharing is expanding towards the exterior of cities, distributing in a more uniform way. In addition, with the increase of people working from home, the peak time almost completely vanished. Analyzing the data of the last period, it is possible to notice how the use of car sharing remains relatively stable and diffused from late morning to early evening. Overall, everything is returning to normality, sharing services are growing, differently from private cars, which instead are put into serious trouble, especially in a long-term perspective with younger generations less interested in the purchase of their own vehicles, and more inclined to the logic of sharing.

3.2.2 New macroeconomic scenario

The period of emergency inevitably transformed somehow the characteristics of the emerging macroeconomic context. The questions in this part will try to define the situation of two main elements of the new mobility, namely micro-mobility and MaaS. More specifically, we will understand the true role of micro-mobility inside the ecosystem, and whether it will affect other forms of sharing such as car sharing. Concerning MaaS instead, it will be interesting to see how a company interacts in practical terms with other actors to reach an integration of the different services available, and what could be on the opposite the reasons that hinder such integration. What emerges from the interviews is that micro-mobility remains for all intents and purposes a service complementary to car sharing, as well as ride hailing and public transport, which is simply aimed at completing

a certain type of trip. They are all services different between each other but that can be perfectly integrated. It depends on the use that customers need to make. In the same way that car sharing was complementary to public transport, micro-mobility became complementary to car sharing and public transport. However, it is also true that it “stole” a share of the car sharing market. The latter could be considered the pioneer of sharing services, as it was the first form that was introduced in Italy with car2go. Anyway, in the current context micro-mobility seems to have a position of advantage, also thanks to the incentives that it guarantees (for example the access to city centers and traffic-restricted zones) and the possibility to reduce traffic congestion. In addition, the lack of space inside city centers creates the need to use small vehicles that ensure the smooth flow of citizens. An interesting point of view on the matter is given by Playcar. According to the company, the distinction between micro-mobility, car sharing and traditional vehicles, no longer exists. What exists is the adaptability to people. The vehicle, whatever it is, remains such, available to everyone. Then there are a series of considerations to make, such as the type of tariff that one decides to choose, which could be free-floating, one-way, round-trip, or long-term rental. What is important is to establish some rules, in order not to let chaos invade cities. In this sense, operators should give a little less flexibility, which means analyzing more in depth the areas in which they provide their services, in order to better understand the culture of the place and the needs of that type of population. In fact, a single person can have various lives, and each of them requires a different way of moving. Therefore, it is no longer important how many services there are, rather the extent to which these services are accessible and customizable for each person. A single vehicle should be adaptable to the needs of users, for example if he or she looks for a long-term rental, a rent-a-car, or a single trip. This logic also includes public transport. Buses for instance have fixed routes to follow, thus requiring much more time than necessary, which translates into poor efficiency and a waste of time for users. However, if the same bus stopped only where people previously requested it, it would take half of the time. Inefficiency also concerns cars. As a matter of fact, they are no more useful investments, as most of the time they remain parked. People are no longer interested in the type of car, rather on the fact that it contains the latest technology available (for example being electric). Car sharing and micro-mobility make it possible, without incurring in unprofitable investments. This concept could be extended to MaaS, resulting in a system not characterized by different services, but services personalized according to the precise

needs of users in a specific moment. Overall, we could expect a boost toward micro-mobility, and sharing mobility in general, in the next five years. As a matter of fact, it represents a user-friendly alternative, accessible to everyone at every time, which also offers pay-per-use solutions, thus avoiding all those costs associated with maintenance, assistance, and insurance. It perfectly fits with the concept of smart city, and most importantly of a people (not car) oriented city. On the matter of micro-mobility, it is interesting to hear the opinion of another company specialized in car sharing, which is of course Share Now. The company agrees on the fact that one of the most important effects caused by the pandemic has been the boom of micro-mobility. After an initial period of difficulty, in which local administrations had to manage the regulation of such services, the diffusion of micro-mobility reached almost all the small and big Italian cities. This phenomenon is due precisely to the importance of the role these services have inside urban mobility, that is the coverage of the first and last mile as well as favoring the development of a community aware and careful about the environment. However, they are sure that car sharing, and micro-mobility services will never be in competition. On the contrary, they are perfectly complementary, because inside the mobility ecosystem the services designated to the first and last mile work as a connector and allow users to reach the vehicle they will need for the longer journey (be it car sharing, train, bus, or metro). In fact, it is important to remember that services such as car sharing works better in those cities where the network of public transport is more widespread and efficient. Only having a variety of solutions at their disposal, people will choose to adopt sustainable mobility methods in alternative to private vehicles. As far as MaaS is concerned, it was interesting to see the different approaches taken by the companies. In the case of Cooltra, the company usually finds agreements with the local mobility department of the city in which it operates to fully integrate the system with a digital platform. For example, they are currently creating a platform to integrate public transport and private mobility in the cities of Rome (with the Mobility Department) and Milan (AMAT). The company thinks that the sharing economy will be one of the most important economies in the next decade, and the pandemic accelerated this process. For this reason, they chose to invest in the full integration of API services with the digital platform of each city. Very soon there will be an app which will allow users to move from a point A to a point B with the vehicles desired. 2Hire instead works slightly differently, being a provider of technology rather than of material service. Indeed, they give the technology to those privates that want to start a

sharing service. They provide the information needed by the city or the entity responsible for mobility, interfacing always indirectly. What is curious in terms of MaaS is that the company does not believe that the future of mobility will be managed by a single app. In fact, reducing the number of choices available often implies altering price and quality. The market will decide which app will succeed. Using a single app will be efficient only if all the users decide to use that app. Nowadays, many services are provided without considering the real needs of consumers. What is needed is a change of logic. A service should not be provided only because it is not present in a city, but it is important to think about what people are asking for, and only after having understood this, one can decide how to act, if by means of an integration of services or something else. Playcar case is interesting too, as it combines the two methods described above, being at the same time provider of service and of technology. They proceeded step by step. First, they developed the software so that operators could provide the service in their territory. Otherwise, sharing services would not reach smaller territories, differently from public transport. Secondly, they integrated parking services using sensors that spot free park lots. Now they are integrating that part with a system of recharge stations for the vehicles. The next step is to transfer the same technology to buses. In their opinion MaaS must be open, that is why they on one side give the technology to integrate many systems, and on the other side provide open data so that third-party developers can act as aggregators or as local MaaS systems. Finally, according to Share Now, many Italian administrations are planning to design MaaS platforms that facilitate the integration between different sustainable mobility options available inside cities, to the detriment of private cars. The company is generally open to new partnerships and collaborations aimed at the development and implementation of urban multi-modality, both in terms of collaboration with cities and of partnerships for the inclusion of their services inside digital platforms. Their objective is coherent with that of all the other companies working in the field of sharing mobility and the local entities, and it is to reduce the mass use of private cars and to favor alternative and sustainable mobility choices that enhance the structure of cities. When asked what factors could hinder the integration between different players of the ecosystem, many interesting opinions emerged, quite different between each other. On one hand, integration could be hindered by a sort of “jealousy” of data, an aspect related to the concept of privacy. As a matter of fact, by collaborating with cities, companies agree to share the information collected, which in some cases could be considered too precious to

share. However, it is important to specify that data is used according to the limits imposed by the current law on privacy, and that often those data are anonymous, as in the case of 2Hire. Indeed, the company thinks that data do not represent a real problem, as they are something that users already give every time they use a service, be it for mobility or not. The problem of data is often an excuse for those who are forced to not understand what is going on, or who wants to wait and so data is an obstacle difficult to overcome. On the other side, the problem is not linked to data, rather to people – as reported by Playcar. This means that what might hinder the integration is the fact that all the actors involved are independent and look at their own wellbeing. Each player focuses on its customers, but this is not the right choice. Nowadays, too much attention is put on the customer. This is the result of an old mentality for which the customer represents a valuable database. There is a need to change this mentality and focus on the service as a whole, rather than on the data. Still too few systems are truly open, and as long as this closure persists, MaaS technology cannot be efficiently used. A last factor limiting the integration of services with MaaS platforms, according to Share Now, is the absence of public funds in the financing of vouchers destined to the engagement of users. Indeed, local administrations often asked operators to supply some discounted vouchers to further involve users in the utilization of MaaS platforms. Instead, such bonuses should be distributed by public funds, precisely to avoid sharing mobility operators incur additional costs, especially in a period of economic crisis such as the one we are living in.

3.2.3 Responses of the sector

The sudden outbreak of the virus surprised many, if not all, companies around the world, although at different times. As a result, many companies had to take immediate actions to respond to the emergency, often with scarce information on their side. In the second chapter of the thesis, three firms in the field of mobility were used as an example of possible interventions. They include Lyft, Wheels, and Miles. The former took actions to maintain a certain brand awareness and offered free trips for medical personnel during the most intense months. Wheels instead developed a new technology inside their bikes to ensure an automatic sanitization of the vehicle. The latter decided to invest in the expansion of the area of service, thus including less accessible suburban areas. These examples are particularly interesting as they show three different ways to approach

customers, some more focused on the inclusion and other on the safety. Similar initiatives were taken also in Italy by companies such as Helbiz and Dott. Overall, almost all the companies of the mobility sector opted for such interventions, as they were the ones that required less time to be implemented. The interviews confirmed this theory. 2Hire for example, not having a material fleet where to intervene, decided to focus on the companies for which they provided services. In fact, the lockdown and the restriction measures hindered the regular course of business of these companies. Therefore, 2Hire helped them reduce the costs of services by lowering operational costs and tariffs, so that customers could resist. In the case of Playcar instead, the company opted for measures addressed to the population. As a matter of fact, they tried to help people to recover faster in the interest of everyone, from an economic point of view. As a result, they took their fleet and offered their cars to whatever association was working during the emergency. This was a very simple initiative, justified by the fact that on one side they wanted to help people, and on the other they were disoriented by the sudden outbreak and therefore relied on immediate solutions. Moreover, a further difficulty to overcome was the fact that some of their customers were in foreign countries, thus experiencing different impacts at different times. Given the fact that so many users continued to work and travel, it was almost impossible to take actions suitable for everyone, so they could not block the service in Italy and stayed open all the time. However, this allowed them to focus on R&D activities with their partners, reaching important results. A different approach was followed by Cooltra. They highly relied on a survey to understand the needs and worries of users, but they did not make great communication campaigns in order not to ride the media wave in a period of emergency. Indeed, they noticed how some companies exploited the period of fear and uncertainty to increase brand awareness without actual interventions. These companies relied on the initiatives taken by competitors and other companies of the sector, but in their case these actions were just communicated, and their implementation was difficult to assess in real terms. Considering these unpleasant facts, they decided to take distance from any type of marketing strategy, especially if false. They wanted to avoid any type of exploitation of the period of emergency. On the contrary, they tried to stay close to their customers, listening to their requests. Among the common initiatives previously mentioned, they followed only one of them and decided to expand the range of the service to suburban areas. However, the still not so high level of mobility in the territory, favored an inefficient usage of the service. As a matter of fact, vehicles that

reached the suburbs often stayed there parked for days before someone else used them, and this increased the probability of vandalism. To conclude, Share Now undertook measures to respond to the new mobility needs of citizens. Starting from the first phase of lockdown, the company enhanced their offers to meet the new habits. In particular, they opted for four main actions. They launched in March a special package valid for 30 days that allows users to maintain their rental for an entire month. The initiative was highly appreciated, to the point that it became a fixed rental option. In addition, always during the first phase, they introduced the campaign “CARE NOW” addressed to all the workers directly involved in the fight against the virus, for which all the tariffs (from the pay per minute to the 30 days package) were discounted. Moreover, they created a Comfort package that makes it possible to book a clean car, completely sanitized and with the tank already filled, and receive it directly at the address chosen during the booking phase. The package is available only for rentals superior to one day. Lastly, they launched a special Pass both for private usage and businesses. In a period of great economic difficulties as the one we are living in it was fundamental for Share Now to provide to all the customers that regularly use their service an important advantage in terms of price. Share Now was in fact the first free-floating car sharing supplier to introduce a monthly subscription model that allows users to receive a discount of 25% or 50% on the tariff per minute of the service, both for private users and businesses. In general, we can say that firms of the mobility sector immediately tried to batten down the hatches with multiple initiatives, some more efficient than the other, and some unfortunately just as a publicity tool. However, the sudden outbreak of the pandemic and the different periods of diffusion made it almost impossible for firms to provide equal solutions to everyone, so that simple and immediate responses were probably the most successful alternative.

3.2.4 Future opportunities of the sector

The last part is dedicated to the opportunities of the new mobility sector emerged during the period of crisis. In this case the question was related to the five factors mentioned at the end of the second chapter, which could presumably influence the future development of the sector. They include electrification, autonomous driving, multi-modal transport, car sharing and micro-mobility. According to these elements, the companies were asked which of them, in their opinion, could play an important role in the mobility of tomorrow.

The opinions that emerged from this question were particularly interesting and offered curious insights for the thesis. For Cooltra, two aspects that for sure will determine the new mobility are sharing services and electrification. By electrification they mean R&D activities related to autonomous driving and electric cars. Indeed, in the next decade cities will be fully electrified and therefore accessible only with electric vehicles. This is also proved by the huge investments of car makers and big energy companies. Daimler, Toyota, BMW, Volkswagen, Audi, all of them have introduced at least one electric vehicle. Moreover, prices of EVs are decreasing with the passing of time, reducing the gap with traditional diesel and fuel cars, while autonomy and infrastructures continue to grow. According to the company, mobility will follow more or less the same process of telephony: in the past it was impossible even to think that we would have used smartphones as if they were computers, but now computers themselves have been replaced by smartphones. One day we will use electric vehicles as we use smartphones nowadays. Everything will be easier and safer, always in a perspective of sustainability and enhanced quality of life. A similar opinion is presented by 2Hire. As a matter of fact, in the last few years the mobility sector has been characterized by the so-called “CASE” (connected, autonomous, sharing, electric) paradigm, so that these principles will also guide the future of the new mobility. The first step is with no doubt connectivity, so that the true change of route will happen with the introduction of autonomous vehicles. They will completely change the paradigm. Electrification does not answer to a need of moving from a point A to a point B, but only of which type of vehicle to use, if an electric or fuel one. A doubt that is destined to vanish, as in the next few years everything will be electric, unless they find a better technology. Sharing is fundamental, but as a method of mobility. The important thing is always to understand what people need in terms of mobility. What will truly make the difference is the combination of all the different services. That is the real concept at the heart of the question. If people do not move, there is no problem to be solved for companies. With the pandemic we have witnessed that, still for a long time, people will need to move, even in periods of disruption. Therefore, the current scenario still offers great opportunities to grow and develop new technologies. Who strongly believes in electrification is Share Now. According to the company, the future of car sharing is with no doubt electric, therefore all the future developments will be made in that direction. Currently, the company manages over 2.900 electric vehicles in 8 European cities, 4 of which have fully electric fleets (Paris, Madrid, Stuttgart, and Amsterdam), and

the other 4 partially electric (Copenhagen, Hamburg, Munich and Budapest). The data collected on electric vehicles confirm that, where there are the right conditions in terms of infrastructures, the service obtains great results. Among these results, we can underline more than 10.000 trips by electric car per day, 200 million “electric” kilometers travelled until now and increasingly longer trips on electric vehicles (in 2020 they registered an increase of 62% in the duration of rentals of electric cars with respect to 2019). Concerning the future of the company, mobility has only one interpretation, that is the integration between different services. This is exactly the reason at the heart of the Joint Venture between BMW and Daimler. The three brands born from the Joint Venture must collaborate with each other, exchange experiences and know-how with the aim of being one day part of a unique ecosystem. In their urban trips, users will move inside a sustainable ecosystem, perfectly connected and on-demand, which combines car sharing, ride hailing, parking sensors, recharge stations and multi-modality. The objective of Share Now is to create a unified, complete, and digital mobility solution for a better life in a connected world. The company agrees that an important role will be played by autonomous driving. It is of course a future still far from now, but at the same time very predictable. The use of autonomous vehicles inside the car sharing fleet will require even more data collection and analysis, to allow the vehicle to reach the customer autonomously and, once the trip has ended, return to an area where demand is high, based on smart algorithms. Basically, the vehicle will always be moving. In this way, demand will be satisfied using a significantly lower number of vehicles, which will be used more efficiently. This means that mobility could be guaranteed to a larger share of people but using less cars. For example, if today all the cars composing the fleet were fully autonomous, the company would ensure the same number of rentals they now have in the world (35 million) with half of the cars. As a result, they could halve the number of cars while still having the same number of rentals. However, the real difference in the new mobility sector will not be made by vehicles or sharing services, rather on the perfect integration of all the means of transport available. That is the idea shared by Playcar. All the vehicles and systems mentioned before are surely important, but they are all separate elements, and they already exist in the market. In this moment, it is crucial to delete everything we know and create a new mobility focused on the user. People no more have to adapt to the services, but mobility itself that must adapt to people and their wants. It is no longer useful to make distinctions between micro-mobility, car sharing, multi-modal

transport, and autonomous vehicles. Vehicles are just the means through which to deliver the service. Now, the point is how to solve the problem of flexibility of all the systems. Users must have access to a system adaptable to their needs and preferences. This concept reflects a new tendency emerged in the last few years, which makes part of the so-called “servicification” process, according to which tangible goods leave space to the intangibles. The whole sector must be reviewed, including micro-mobility. Acts of vandalism or the wrong usage of vehicles represent a return to the past of the human generation. Instead, it is time to go forward. For this reason, the whole service needs to be rethought, sometimes establishing restrictions when needed. An example would be to install stations and racks in proximity of bus stops, to complete last mile trips. However, these infrastructures must be more organized. In this sense, a dock-based logic would be better than a free-floating one, as fixed stations help to maintain the order and do not require great efforts from users. As a matter of fact, it is better from a wider perspective to have specific areas designated to vehicles, even if a little bit further for people, rather than leaving them in the middle of sidewalks or other places where they can create inconvenience to citizens. Of course, it is right that the public imposes some rules or requests, but at the end the rules of the private must prevail. On the other hand, citizens must have the possibility to rapidly change their mobility methods according to their needs. Everything must be connected, and people oriented. For example, the bus can be an efficient tool also in the new ecosystem, as it can carry many more passengers than any other means, thus reducing the number of private vehicles on the streets. However, to be an efficient element in the new technological paradigm, it needs to be renewed, for instance through the implementation of a booking system that allows users to communicate the itinerary before starting the trip. In this way, the bus only goes where it is necessary, and the duration of the trip would be reduced, with the consequent reduction of waste of time for passengers, as well as a reduction of the vehicle’s size and environmental impact. Moreover, a shorter itinerary would facilitate an eventual electrification of the service, as the bus would require less autonomy. The kilometers saved could then be used for example to introduce an additional service for people with disabilities. There are plenty of innovative possibilities to modernize the sector. A similar logic can be applied to cars. The presence of new ways of transport does not imply the disappearance of cars. What is needed is again a rethinking of the system, to find solutions that better adapt to the different types of tasks people must undertake. Once people’s

needs have been understood, then it is time to talk about the service, which can be a rent-a-car, a long-term rental, car sharing, one-way or round trip. The problem is that at the moment there is not a system allowing this kind of flexibility. The truth is that we need to reason differently, and technology can help to do this, but it is also a matter of willingness to change from a political point of view, with all the various contracts behind mobility. An important catalyst of change will probably be quantum technologies. Through the use of quantum calculations, mobility will reach a level of excellence, becoming able to adapt to people in a smart way. The concept at the base of this transition is that mobility must be designed on the human being. It is not true that car sharing is always better than the bus, or that free-floating is always better than station-based solutions (especially if you do not know where to park). Everything depends on the specific need of a person in that moment. What matters is that people can rely on the largest possible solutions every time they want, to move in an efficient and sustainable way. Each operator should therefore begin to think not only with the logic of electrification because it is the current trend, but with the logic of how their service is going to impact the environment, in its widest meaning, when implemented.

3.3 The Italian mobility context

In this last paragraph, we will see more in detail the current scenario of the Italian mobility according to the testimonies of the three companies interviewed. I decided to separate this part from the other questions because I thought it was important to compare the aspects analyzed before – impacts, responses, opportunities – with the specific situation of the country, to assess the problems as well as the opportunities available in the territory. This interest comes from the fact that Italy seems quite in delay, with respect to other countries, in the run towards new forms of mobility. Therefore, it might be interesting to understand the reasons for such a delay and, on the other hand, the ways in which the country can benefit from mobility from an economic, social, and environmental point of view. Indeed, what immediately comes to mind when looking at the Italian situation, is the absence of a domestic mobility company diffused all over the territory. Every company or service is specific to a city or region. Moreover, the only companies operating in more than one city are foreign multinationals, thus acquiring the benefits of Italian ones. In this sense, the presence of multinationals is a particularly important issue.

As a matter of fact, the real “winners” of this mobility transition are once again multinationals. It is true that consumers have benefits too, as they can count on more and more alternatives with the passing of time, but multinationals completely absorbed a whole sector. In the past, the ecosystem was full of actors, starting from car makers and car dealers to mechanics and insurance companies. Nowadays, a single company manages all these aspects, favoring the disappearance of local small and medium size businesses. In fact, companies provide for the maintenance of vehicles on their own, and users do not need to pay for insurance anymore. In addition to this aspect, there are also other factors related to the pandemic to take into consideration. As a matter of fact, the rental and car-sharing sector suffered from a strong contraction in 2020. The crisis of tourism and the restrictions on urban mobility heavily impacted sharing mobility, while the uncertain scenario affected business mobility. A mix of elements that caused a significant slowdown in a sector that registered positive results in 2019. However, despite the critical economic situation, rental confirms its role as an innovation catalyst as well as driving force for the diffusion of electric vehicles in the country. The electric transition has no choice but to pass through a wider diffusion of pay-per-use mobility. In this sense, the resources of the Recovery Fund would be a key opportunity to make Italian sharing mobility more sustainable, accelerating the renewal of the current fleet towards green alternatives. As a matter of fact, rental constitutes a strategic element in the circular economy, thanks to a fleet composed of last generation vehicles and the ability to input every year on the secondhand market safe vehicles with low emissions, able to substitute more polluting ones. In the electric sharing mobility landscape, micro-mobility represents a valid solution since it is more sustainable and can be perfectly integrated with the urban transport services. This tendency was already highlighted last year, and confirms itself this year, where after the first phase of lockdown, micro-mobility services registered a brilliant return, in counter trend compared to car sharing in 2020. A proof of that is given by a data (provided by Cooltra) that comes from the city of Rome, where scooters register more than 2.500 daily rentals (with peaks of 3.000) that guarantee over 37.500 kilometers per day at zero emissions. Kick scooters are gaining momentum too, experiencing a wide diffusion in the last months. However, bike sharing wins the race as the most growing micro-mobility service in the period post lockdown. The potential for this market in Italy seems to be elevated. The “2020 Shimano Report”, realized in collaboration with YouGov, indicates Italy as the European country with the highest

inclination towards buying an e-bike (30% of the sample), but also the one with the lowest rate of penetration in the European market (3%)⁵⁸. If the pandemic changes the lifestyles and the modes of transport, cities must change too. For this reason, a series of so-called “Covid Lanes” started to appear. They consist of lanes reserved for bicycles along most popular traits. They are also known as “pop-up” cycle lanes, as they appeared one day after the lockdown, more or less across the world. In Italy, Milan is the city with the most kilometers realized (35), followed by Genova (30). 2020 was clearly the turning year for cycle lanes. They increased substantially, changed the structure of cities and incentivized citizens to pedal. As mentioned before, the fear of contagion influenced people’s mobility habits and preferences. According to the Mobility Trends Report of Apple, in January 2021 private driving showed a drop of -28%, while public transport of -46%. The “Continental Mobility and Safety Observatory” shows instead how the car is still the means preferred by Italians: over one person out of two (56,7%) travels by car because it considers it the safest method at covid times. However, it is not only a matter of safety. Cars are also perceived as synonyms of caution and responsibility. This factor pushes all those people that before the pandemic used public means of transport to choose their own car. Public transport continues to be used, but only by two Italians out of five (22,5%). According to the Continental Observatory, almost 34,3% of Italians changed their own mobility habits for reasons linked to the fear of public transport, crowding of trains, or going out, while 31,2% because of objective obstacles, such as smart working. Smart mobility is strictly connected to the concept of smart city. For this reason, it is interesting to assess the digital transformation of Italian cities. Prerequisites for a smart city include online accessibility to public services, availability of public apps, adoption of digital platforms, use of social media, release of open data, transparency, introduction of public wi-fi nets, implementation of smart technologies. These are only some of the services that are appearing in smart cities, making the daily life of citizens much easier. The 2020 accelerated this tendency, on one side revealing to people how this transformation can make cities more resilient, and on the other side showing to administrations how the digital transition is a key ingredient for the success of smart cities. The smartest cities of 2020 are those that managed to better develop the components mentioned above, strengthening a model of smart city more adaptive and responsive. The rank of most

⁵⁸ Shimano Steps, “State of the Nation 2020 Report”

digitalized cities provided by the “ICity Rank” of FPA sees Florence at the first place, followed by Bologna and Milan. Going on in order, we find Rome, Modena, Bergamo, Turin, Trento, Cagliari, and Venice⁵⁹. These are indicated as cities with a highly advanced level of digitalization. The digital transition is a fundamental element also for the success of smart mobility in all its declinations, as it is based on a high level of digitalization. Considering the data just presented, it is not a mystery to understand why these cities are often the ones preferred by mobility companies for the implementation of their services. In order to have a clearer picture about all these issues, two questions were asked to the interviewees, slightly different depending on whether they were Italian or not. The first question concerns the current situation of mobility in Italy, more specifically the extent to which people are interested in the new mobility methods, and if instead they are still tied to traditional practices, such as the ownership of vehicles. The second question instead tries to understand what are the reasons that make it difficult to implement the new mobility in the territory, starting from the premise that Italy is characterized by the presence of many small cities (differently from other countries) and that its biggest cities (Rome, Milan, Turin) are still considered small if compared to international realities. The results of the interviews somehow confirmed the premises and offered interesting sparks on the factors influencing the Italian situation. As far as the first question is concerned, the mobility habits of Italians, defining a unique trend is not easy. Indeed, habits and behaviors highly depend on the generation considered, on the type of lifestyle of the person and on its work condition. The main problem hindering the equal utilization of sharing services is attributable to the fixed structure of the system. As mentioned before, current mobility is characterized by the continuous distinction between different services, such as car sharing, rent-a-car, bus. This logic does not adapt to the person, but it is the person that has to adapt to the service. In this way, services are not accessible to everyone, but only to those categories that benefit from their use. Only after having solved this problem, sharing mobility could become a common service. Generally speaking, in terms of generations, younger users are certainly more rapid in adopting new habits, as they rely more on the concept of sharing, also thanks to social networks and online payments. This kind of trust could also be transferred to foreign countries, as domestic habits will be replicable also outside national boundaries. This factor favors the future

⁵⁹ FPA, “ICity Rank: Rapporto annuale 2020”

development and diffusion of sharing mobility since more and more people will get used to it. Another element to take into consideration concerning the younger generation is the role of the car. It is indeed a generation aware of the fact that cars no longer have the value they had twenty or thirty years ago, unless they belong to higher ranges. As a result, ownership is not attractive to them, and they prefer to move with the new means at their disposal, which ensures much lower costs. This aspect represents a true break with tradition, and an important turning point in the field of mobility. Starting from the '50s, the private car was considered as a status symbol. Once people obtained the driving license, the first thing that everyone bought was a car. It gave a sense of freedom and self-sufficiency. Nowadays, things have changed a lot. The car has become a tool to move and travel, no more a status symbol. Cities have changed a lot too. They have become increasingly chaotic and stressful. Moving inside urban areas is expensive, complicated, and trying, especially in big cities. Cars have become a source of stress, no longer of freedom. We can consider it a paradigm almost entirely overcome. Conversely, the concept of sharing (intended as a sharing economy) perfectly fits this context. Problems related to traffic congestion and parking vanish, and sustainability (the key concept of the new mobility) is incentivized. As a matter of fact, an important feature of modern society is that people believe in sustainability. In the past, the engagement to sustainability issues was used as a front, a marketing strategy that resulted in "greenwashing" practices. Now, knowing that it is possible to use an electric vehicle to move inside the city without polluting makes people more willing to live in urban life. Overall, we can say that the process of transition has already started, approximately since 2012. Many people, of different ages and needs, came close to sharing services, especially in big cities where there is a higher availability. However, the level of market saturation does not allow the disappearance of cars yet, as there still are too few vehicles in too few cities. According to 2Hire, at the moment there is a problem of vision from above. Italy does not seem to be a country suitable for mobility and for the technology it requires. A proof of this is the fact that successful companies such as Uber never established themselves in the territory. This lack of appropriate foundations is mainly attributable to a problem of mentality, caste, and infrastructures. Uber, together with car sharing, was an example of liberalization of mobility and of private cars but was stopped. It is the kind of technology that allows companies to reduce the costs and enhance the service, therefore a necessary technology. The fact that it never caught on confirms the absence of the right mentality at the base of

sharing mobility. If decreasing costs and increasing the performance is not enough, then it is difficult to understand what is necessary to bring innovation in the country. A little more optimistic is the vision of Share Now. They noticed how the paradigm in the habits of citizens in favor of sharing services has already changed, especially in the big cities where such services have by now been available for years, such as Milan, Rome, and Turin. The introduction of car sharing in these cities was a real revolution in terms of urban mobility. A proof of this is given by the data collected. In the last years, our cities changed consistently from the point of view of the mobility supply, thanks to the great work of administrations, which supported the usefulness of services different from private cars: from car to bike sharing, from scooter to electric micro-mobility. Today, cities offer a mix of mobility solutions that guarantee citizen the possibility to move even without an own vehicle. This generates a huge benefit for the environment, not only in terms of reduction of pollution, traffic, and noise, but also in the readaptation of the urban structure. There are different studies showing the usefulness of car sharing in this sense. If a private car remains parked about 95% of its life, on the contrary a shared car is in continuous motion and is used approximately six times more, without occupying public ground fruitlessly. As calculated by the MIT Senseable City Lab of Carlo Ratti in the study called "Unparking", car sharing could reduce by 86% the public spaces occupied by parking lots, thus destining them to the creation of green areas, lanes for micro-mobility and dehors for commercial activities (considering the impacts suffered from restrictions imposed by the pandemic). Moreover, according to the study conducted by the Karlsruhe Institute of Technology (KIT), for each Share Now vehicle, between 7,8 and 18,6 private vehicles have not been purchased, and between 2,1 and 5,3 private cars have been sold. Therefore, the effects of sharing mobility are clear, as it fully understands the needs of people, which have radically changed in the last few years. Indeed, nowadays users look for services that are always more connected, smart, and digital. Analyzing the results of the research Bva-Doxa for the Observatory "Change Lab, Italia 2030" realized by Groupama, which wanted to investigate the main trends that by 2030 will change the lifestyle of Italians, it is possible to see the extent to which sharing mobility has already entered in the habits of people. According to the data of the Groupama Observatory, currently only 3 Italians out of 10 (29%) have used a car sharing service, 4 out of 10 if we consider people under 35 years old. Conversely, scooter sharing, and bike sharing resulted in less adoption, respectively 12% and 21% of the sample. Almost all the interviewees (94%) feel satisfied

about the car sharing service. They appreciate the possibility to save time (54%) and money (47%), and the reduced environmental impact (34%). Scooter sharing registers very similar values for the levels and reasons of satisfaction. As far as bike sharing is concerned instead, the level of satisfaction is slightly lower (86%). In general, 1 user out of 2 appreciates its low environmental impact, while reasons of dissatisfaction include inefficiency of the service (38%), discomfort (31%), lack of points of usage (31%) and costs (31%). In addition to the good results in the present, car sharing will be much more used in the next 10 years: 62% of the sample is convinced that will make use of the service. Bike sharing should experience a boost of users too, given the fact that almost 1 Italian out of 2 imagines using this service. Scooter sharing will be chosen instead by 3 people out of 10. Users between 18 and 34 years old are the most willing to adopt sharing mobility solutions, in particular men much more than women. As a result, we can truly say that the old paradigm of ownership has almost completely vanished, thus giving optimism for a more sustainable and shared future. Concerning the second question, the focus was addressed to understanding the reasons that make it difficult to implement sharing services in Italy. On one hand, it was interesting to have a direct opinion from an Italian company about why in Italy services are not diffused across the territory, but only in single cities or regions. On the other side, it might be useful to compare the Italian situation to other international realities, to understand the factors that prevent the country from developing an efficient mobility system. From the testimony of Playcar, we can deduce that the absence of Italian players in the territory is historically attributable to a marketing reason. As a matter of fact, Italian companies never invested in sharing mobility, including car makers. This is a particularly determinant factor, as the first great sharing companies were owned by important car makers, such as Daimler with its Car2go, now become ShareNow thanks to the merger with DriveNow, resulting from the joint venture between Daimler AG and BMW. Counting on the strength and reputation of their founders, these companies rapidly became a point of reference for the mobility ecosystem and, being the pioneers, helped to develop new forms of transport, to the benefit of their country of origin. In the case of Italy instead, this approach was never undertaken, so that the attempts of creating a sharing system were not backed by a solid organization. Moreover, neither public service is managed by Italian companies, but are all owned by foreign groups, while Italy does not provide similar services abroad (only recently some actors started to enter new markets). Beside this marketing reason, there is also a

technical problem of the territory. Italian cities are on average very small, therefore not profitable for firms that want to invest in mobility. Playcar was probably the first company providing services in a small city. Before, the urban environment was characterized by public services supplied by public companies. Playmoove was created precisely for this reason, with the purpose of giving technology to small local realities, so that they could follow the example of the city of Cagliari, that is designing a made-to-measure service that responds to the local needs and peculiarities. Indeed, it is very different to design a MaaS service with 500 or 600 cars rather than one shaped according to the local culture and characteristics. In this sense, Italian cities need exactly this type of approach. A unique solution suitable for every city is not possible, as every place has its own shades and lifestyles, and people travel in many different ways. What is needed is a service capable of adapting to local necessities and cultures. At this moment, a good solution for Italian companies would be to create a distribution of services and software starting from Italy as a logistical base, following the lead of Playcar. A distribution no longer based on the vehicle itself, rather on the software, with the aim of creating in the future local connections all around the world. Imagine for example the possibility of travelling from one city to another keeping the service available in one's own city or country thanks to the use of a network. Implementing this process to foreign countries, it would generate a flow of tourists towards those places where people can use the service as if they were at home. Not having the possibility to rely on the investments of a multinational, Italian companies have to rethink the way through which they provide the service. In most cases, this means distributing the service at a local level, by developing a platform to create a sort of tailoring service, built on the needs and characteristics of each place. As mentioned before, Italy pays for the absence of big cities (in terms of population) where to develop new forms of mobility, compared to other realities at an international level. This factor might discourage companies from investing in the territory, as they do not find it interesting from an entrepreneurial point of view. With the help of Cooltra, it was possible to depict a clearer picture of what the main problems related to the implementation of mobility services in Italy could be. The first signal of the importance of being settled in a big city is the fact that Cooltra currently operates in the two main Italian cities: Rome and Milan. As a result, what we can immediately understand is that the real problem at the base of the difficult implementation of mobility services in the territory is due to the average small size of Italian cities. Companies, and especially multinationals,

look for destinations densely populated, to exploit the large number of users to increase the value. However, the company is also thinking of expanding the business to Florence, Bologna and Turin, all cities with a high inclination to digitalization, and therefore to becoming smart cities. In addition to the size and population, there are other criteria that companies carefully consider, such as the average income of people and the meteorological conditions of the area. If the city in question is considered small but has a high income, it can still be profitable for a company. In the same way, an area with stable weather conditions is more likely to be selected for mobility services, especially in the case of micro-mobility. However, among the parameters used to determine a suitable place, companies also consider the possible negative aspects, such as the likelihood of acts of vandalism. In the case of Cooltra, this translated into the impossibility to open a service in cities like Naples, Bari, and Palermo, despite the tourist flow would guarantee significant benefits, because there are not the right conditions. As a matter of fact, almost none of the criteria mentioned before applies to those cities, making them unsuitable for these kinds of services. Moreover, scooters require huge investments, therefore the company must be sure that they will not incur in further expenses due to people's disregard. This is one of the main differences between for example scooter sharing and micro-mobility. A company that provides kick scooters has completely different costs compared to scooters. Therefore, it might decide to take some additional risks and expand in more areas. Suffice it to say that for a scooter, a company invests 80% more than for a kick scooter. This means that for instance with an investment of 300.000 euros, a company would acquire 1000 kick scooters, while for the same amount of scooters it would pay 3 million euros. From these data is understandable the caution of many companies in expanding in too many areas. Another problem could be the lack of appropriate infrastructures, but it is also true that in many cases they are not so necessary as companies often recharge the batteries on their own. An element that would instead facilitate and encourage the adoption of sharing services is the introduction of parking lots designated to electric vehicles, in order to avoid the unpleasant issue of fines. Finally, thanks to the testimony of Share Now, it was possible to mention other requirements that a city needs to provide free-floating car sharing options. They include the presence of special agreements for parking lots with urban authorities, as well as the size of the city and the situation in terms of traffic and population density. Cities themselves should consider free-floating car sharing as a tool for sustainability and a part of the mobility mix.

They could support car sharing with dedicated interventions, for instance by regulating parking issues or withdrawing the rent asked to operators for the development of the service, just as the city of Rome did last December. There are then other problems concerning the electrification of car sharing in Italy. In fact, if on one side companies such as Share Now believe that the future will be electric, on the other side Italy still has too few infrastructures, both in quantitative (scarce extensiveness) and qualitative (absence of rapid charge stations) terms. Just to make a comparison, a city like Amsterdam for example, similar to Milan for dimension and importance, provides a net of 4.000 public charging stations that allows the company to operate exclusively with an electric fleet. The possibility to rely on an adequate public network is a fundamental prerequisite for supplying a car sharing service in a way that turns out successful and economically sustainable. For this reason, Share Now believes that a public intervention on different fronts is needed: from the increase of recharge infrastructures and in particular fast stations to the extension of the incentives for the purchase or long-term rental of electric cars (not only to private users but also to car sharing companies), to again a plan of incentives on the purchasing price of the energy for the recharge of shared vehicles. Overall, the opportunities for companies of the sector are to be found in proximity of big urban areas, where perhaps other services are already available, or anyway where the criteria mentioned above can be applied. Problems of implementation are attributable to the absence of such conditions, thus discouraging companies from investing in the territory.

Conclusion

The picture described in the second chapter was confirmed by the testimonies of the four companies interviewed, namely Cooltra, 2Hire, Playcar and Share Now. What has emerged once again is that the mobility sector was inevitably largely affected by the pandemic, as it implies the movement of people for reasons related to work, education, or leisure. However, sharing companies were generally less impacted than public means of transport such as metro, bus, and train since the latter could not guarantee an adequate social distance. Nevertheless, it is still unknown what the real source of impact was, as it is not clear if the problem affecting the sector was the risk of transmission of the virus, or the lockdown that forced millions of people at home. Anyway, the result was almost equal

for every company. All of them experienced a stronger impact during the first lockdown, while the second one was a little bit better, as they were prepared for the situation. The healthcare emergency implied a greater attention to hygiene issues therefore companies took actions in that direction by implementing protective equipment and cleaning. They also relied on campaigns to increase awareness on safety measures, as well as questionnaires to understand people worries and needs, and fleet reduction to limit costs. Now they are returning to optimistic levels, even if still far from pre-covid standards. A positive aspect was that people remained on average confident about sharing services, both because they already knew their safety and because of the information provided by companies. What has changed with the pandemic is the use people make of the services, and they noticed a higher utilization from peripheral areas, denoting a diffusion of the technology. Overall, sharing mobility has given signs of great growth, while private vehicles are decreasing, as new generations are less interested in the concept of ownership. Inside the mobility ecosystem, micro-mobility gained momentum during the emergency, replacing in some cases other services such as car sharing. As a matter of fact, it allows users to avoid traffic congestion, as well as to circulate inside city centers. However, micro-mobility remains in general complementary to car sharing and public transport, providing an efficient and sustainable way to cover the so-called first and last mile of a trip. In fact, what characterizes the new sector is no more the distinction between vehicles or services, but the adaptability to people. This is related to an idea of MaaS which is personalized according to the needs of each person. The growth of micro-mobility will continue also in the next few years, as it perfectly fits the idea of a smart city. Concerning MaaS instead, companies rely on agreements with local entities and administrations, or with other companies, in order to integrate their services into digital platforms. The important aspect here is that MaaS must be open to fully integrate services, which means that operators must give less importance to the concept of data. Indeed, one of the factors hindering such integration is precisely the “jealousy” of data, which slows down its development. Other factors include the absence of public funds and the fact that all the actors are independent, thus caring only about their well-being. The final objective of MaaS remains reducing the use of cars in favor of more sustainable solutions, by providing increasingly more connected services. If on the one side the outbreak surprised companies, on the other they immediately tried to respond with focused interventions: they helped their customers reducing the costs of the service (2Hire), provided free cars

for people that continued to work during the lockdown (Playcar), expanded the area of service (Cooltra) and offered new mobility packages with discounts (Share Now). Overall, every company took immediate actions, some more successful than others. However, the diffusion of the virus at different stages and periods all around the world made it impossible to take equal solutions for everyone at the same time. As far as the future of mobility is concerned, opportunities for companies will emerge along the so-called "CASE" (connected, autonomous, sharing, electric) paradigm, with particular attention given to electrification and autonomous driving. However, the real turning point is represented by the combination of different services, according to people's needs. In the new era of mobility, people must be at the center. They do not have to adapt to the services, but the services must adapt to them. As a result, there will be no distinction between vehicles, as the only thing that will matter is the adaptability to users. It is time to start thinking differently, and technology allows us to do so. On their side, operators should start to think about how their services impact the environment as a whole. Focusing on Italy, the country experienced a strong contraction of rental and car sharing in 2020. However, pay-per-use mobility demonstrated to be the key for the implementation of the electrification process. During the pandemic, micro-mobility had a boost, and in particular bike sharing registered the greatest growth. Nevertheless, the private car is still the means of transport preferred by Italians. Italian cities started to become smart, thus attracting foreign companies, which started to provide services in the most developed ones. Habits of people are slightly more complicated to assess, as they highly depend on the generation in question, the lifestyle and work conditions. What is certain is that younger generations are more open to the concept of sharing. Overall, the transition towards sustainable forms of transport has already started, to the detriment of private cars. However, Italy seems to be a little bit in delay with respect to other countries. The absence of Italian players in the territory is due to the fact that in the past car makers never invested in sharing mobility. As a result, also the public services available in the country are supplied by foreign companies. Italian cities need solutions specific for each case, as each one has its own characteristics. It could be useful to invest in software development and provide them also abroad (as in the case of Playcar), to create a network with foreign countries, thus enhancing the flow of tourists. The multinationals that arrive in the country base their choice on several factors. They consider the size of the city, the average income of the population, the weather conditions, the density of the population

and of the traffic, the presence of other services, the likelihood of acts of vandalism, the possibility to make agreements for parking lots and the presence of infrastructures. Therefore, opportunities can be found where these criteria apply. On the contrary, problems arise when such prerequisites are not available, thus discouraging companies from investing in the territory.

CONCLUSIONS

In the last few years, the topic of mobility, and in particular of smart mobility or “Mobility 4.0”, has been largely discussed, suggesting the importance that this sector has on the economy and on the achievement of shared international objectives concerning sustainability, such as the UN “2030 Agenda”. The concept of smart mobility consists of a typology of mobility that satisfies the needs of the society, in terms of moving freely and in a sustainable way while also connecting with other users, without compromising other humans or ecological requirements for future generations. It derives from a wider vision characterized by the rethinking of urban dynamics through the use of state-of-the-art technologies now available, which leads to the increasing digitalization of the city that becomes in this way smarter. The new mobility represents a breaking point with a sector almost entirely dependent on carbon and on the concept of ownership, which has caused with the passing of time detrimental negative effects on the environment, not to mention the inconvenience generated by traffic congestion. A situation worsened by the growing urbanization trend, which has seen the number of people moving to cities increased in the last few years. Nowadays, the new watchword is sustainability. For this reason, car makers started to invest on the electrification of vehicles and ownership has been put into serious danger by the implementation of the sharing mobility, particularly appreciated by younger generations both for the lower costs it entails and for a higher engagement towards sustainability with respect to the past. The sharing mobility can take many forms, from the more traditional car sharing, carpooling or ride hailing services, to the scooter and bike sharing, until the new entry of the sector, that is micro-mobility. The main advantage of these services is that they are easily turned into electric, and they allow users to avoid traffic congestion and to travel according to their needs. However, sharing mobility is not the only component of the new sector. Another big part is played by the “Mobility-as-a-Service” paradigm, or MaaS. It consists of a new way of looking at mobility, no longer considering it as an asset, but as a service publicly provided by means of a digital platform. This disruptive logic changes the traditional hierarchies inside the ecosystem, according to which people must adapt to the services. Now instead, people are at the center, and services must adapt to them, meaning that they must be able to meet people’s wants when they need it. In order to reach such a level of flexibility, it is fundamental that all the actors involved in the ecosystem collaborate with each other, thus favoring the

necessary integration of services. All these aspects made part of a period of great technological transition of the sector, which had been suddenly impacted by the outbreak of the Covid-19 pandemic. This event has inevitably slowed down the progress of new technologies, thus favoring traditional forms of transport, and private vehicles regained momentum because of the growing fear of contagion of people using shared services. Companies and institutions all around the world took immediate actions to react to the crisis, but the standards of the pre-covid situation are still far from being reached. In this scenario, it was interesting to understand what the sector went through in these last months, as well as the opportunities that emerged in view of a future recovery. This was exactly the purpose of the thesis, that is providing a general picture of the mobility sector after the impact of the pandemic, with the aim of highlighting the key role that the new mobility can play in the recovery phase, thanks to all its implications on other sectors and on society (by changing consumers' habits and the structure of cities). In order to find an answer to this question, it was essential to start the research from a theoretical framework that provided the right basis to introduce the main topic. The framework was directed at the analysis of the global economic landscape, with the objective of assessing the situation of global trades and global value chains, also considering the various implications associated with the pandemic. The picture that resulted described an unprecedented crisis, characterized by an ongoing period of difficulties exacerbated by the effects of the pandemic. Moreover, the healthcare emergency rekindled a twenty-year-old debate about globalization and the current "just in time" production approach, underlying the need to shift from a model tied to a logic "push", to one focused instead on a logic "pull". In addition, the pandemic shed light on the excessive dependence of companies on a few (Asian) suppliers, a factor that led to the diffusion of near-shoring and regionalization processes to shorten supply chains and make them more resilient. The spread of the virus hit countries in different ways and especially at different times, therefore some of them were more affected than others. Western countries for example suffered more than Eastern ones. Italy in particular was one of the first countries to experience the virus and, given the lack of preparation, also one of the most affected. In a big domino effect, Italy's crisis poured onto other European countries that for reasons of supply chain depended on the country. The same reasoning stands for industries, among which one of the most impacted was undoubtedly the automotive one. The particularly strong impact was given to the fact that the sector was going through a period of

significant technological transition, which was as a result stopped by the virus. The diffusion of electric and hybrid cars registered a slowdown in favor of more traditional fuel and diesel cars (given their lower costs) and investments in connectivity and autonomous driving stopped because of liquidity shortages of firms. In response to this, policymakers and institutions intervened to provide businesses at least part of the liquidity necessary to ensure the continuity. However, the automotive industry still has the possibility to drive the recovery phase, thanks to the new trends in mobility. In order to achieve this result, the tools available must be accompanied by a general rethinking of the way of doing business, and in this sense the new technological paradigm can help to create a more sustainable world from an environmental, economic, and social point of view. After having investigated the features of the current economic scenario, the focus of the research shifted to the central topic of the thesis, which is the new mobility sector. A sector characterized by profound transformations, from disruptive technologies to new emerging trends. This is the result of centuries of evolution, which has brought to the current structure of cities and of the sector. Nevertheless, neither mobility could avoid the effects of the pandemic. The many lockdowns forced people at home, thus preventing them from using mobility services. The restricted share of the population which continued to travel was subjected to strict rules to guarantee social distancing, which discouraged many of them from using sharing services, in favor of private vehicles. Fortunately, after the first lockdown things started to change, fear almost completely vanished thanks to the high level of safety of sharing services, and companies began to register optimistic results, even if still far from pre-covid standards. In a way the pandemic accelerated the run towards the development of smart cities and mobility, as it intensified the attention and engagement on sustainable objectives, also at an international level. Smart mobility in particular saw the establishment of sharing services such as car sharing, ride hailing and, at a lower level, carpooling, as well as the emergence of new trends that facilitate the electrification process, among which scooter sharing, bike sharing and micro-mobility. The latter seems to be the real innovation, as it represents a complementary service to other ones that completes a part of the trip, generally referred to as the first and last mile. All these services need to be perfectly integrated between each other to create a new frontier of mobility that makes cities smarter. This concept is at the base of the MaaS paradigm, which requires the collaboration of all the actors involved in the urban ecosystem. That is exactly one of the great advantages of the mobility sector. As

a matter of fact, it does not only directly involve the automotive industry, but also many other sectors apparently different and far from it, such as the insurance and energy one. The great influence that it has on many aspects of the economy is precisely the reason why mobility can be the key for a sustainable recovery, both at a global and national level. Overall, the future of the sector seems to be destined to develop along five main dimensions, namely electrification, multi-modality, autonomous driving, car sharing and micro-mobility. This vision is coherent with the “CASE” theory presented by the literature, which stands for connected, autonomous, sharing, and electric. However, some factors will be more determinant than others, such as connectivity and autonomous driving, and to make a real turning point, it might be necessary to shift completely the mentality from the focus on the separate services to a vision that puts together the various services to provide customers an increasingly personalized mobility experience. The above-mentioned aspects were almost completely confirmed by the testimonies of some companies of the sector. More specifically, four companies were interviewed (Cooltra, 2Hire, Playcar and Share Now) to better understand the situation through direct experiences. The information collected was then compared to the concepts mentioned in the literature, to come up with a coherent picture. What emerged was that the mobility sector undoubtedly suffered strong impacts, but differently from what one might think, to a lower extent with respect to public transport. However, it is still not clear the source of these negative effects, more specifically it is still unknown whether the real problem was linked to the risk of contagion using shared vehicles, or to the lockdown that forced people at home. The strongest effects were registered in the first lockdown, while the second one was on average lighter thanks to the better level of preparation. The healthcare emergency implied greater attention on hygiene matters, therefore companies invested in this direction also through communication campaigns and questionnaires to raise awareness. Now they are returning to optimistic levels, even if still far from pre-covid standards. A positive aspect was that despite the pandemic and the risk of contagion, people remained confident about sharing services, also thanks to the constant communication from the companies. A proof of the consumers’ trust is that usage of services increased in more peripheral areas, denoting a diffusion of the technology. While sharing mobility registered a significant growth, the same cannot be said about private vehicles, destined to become obsolete also because of the low interest of younger generations. Among the various services, micro-mobility gained momentum, as it allowed

users to cover the first and last mile and will continue to grow also in the next few years, since it perfectly fits the concept of smart city. Despite the great changes, what truly characterizes the sector is no longer the distinction between the different services, rather their adaptability to people. This is at the base of the idea of an open and personalized MaaS system, which aims at reducing the number of cars on the streets by providing users connected services. Overall, all the companies took (different) actions to react to the crisis, from reducing operating costs for customers and providing free cars for workers, to expanding the area of service and introducing new packages. However, the diffusion of the virus at different stages made it more difficult to adopt solutions equal for everyone. According to the interviewees, future opportunities are to be found inside the CASE paradigm, especially around electrification and autonomous driving. The real turning point however will not be the implementation of a single element, rather the combination of all the services available, according to people's needs. In the new sector, people must be at the center. It is necessary to rethink everything we know, and the key to do this is technology. Operators must start questioning not only what they can do to keep the pace with current trends, but also how their services impact the surrounding environment. Concerning Italy, rental and car sharing experienced a strong contraction, but pay-per-use services remain the means through which to implement the electrification process. Micro-mobility had a boost, in particular bike sharing turned out to be the real winner among all the other services. However, the private car continues to be the most preferred choice by Italians. Cities are becoming increasingly smarter, thus attracting the investments of companies. Beside the level of digitalization, it was interesting to see what foreign multinationals look for to expand their service. As a matter of fact, there are a series of criteria that they evaluate, such as the size of the city, the density of population and traffic, the presence of other services, the average income of the area, the weather conditions, the likelihood of acts of vandalism, the presence of appropriate parking lots and the adequate infrastructures. Opportunities are to be found where these criteria apply, otherwise companies might not be willing to invest in a specific territory. Changing habits of citizens are slightly more difficult to assess, as they depend on the generation, as well as on the lifestyle and type of work. In general, younger generations seem to be more ready and enthusiastic about the concept of sharing, also for the greater engagement on sustainability issues. As a result, we can say that the transition has by now started also in Italy, even if in delay with respect to other countries. A delay mainly due to the absence

of Italian players inside the territory, caused by a lack of investments from car makers in the past, which favored the diffusion of foreign companies. Italian cities need made-to-measure solutions that respond to the different needs and characteristics of each one of them. A possible solution could be investing in software and distributing the technology abroad while keeping in Italy the logistic base. In this way, companies would create a network also with foreign countries, which could favor for example a flow of tourism.

In my opinion, mobility can be the key factor in the recovery phase because there is no other sector that has the same potential to change so drastically the structure of cities, and therefore the way of living of people, while at the same time meeting sustainability standards. Mobility concerns every aspect of human life, and as we have seen throughout the thesis, it also involves other sectors, thus representing the driving force of the economy. In the current scenario, technology has already reached great results, with state-of-the-art means of transport and future prototypes under development (such as autonomous vehicles). However, the services now available in the market already exist and will not change so much in the next few years, therefore in a long-term perspective it is no longer useful to focus on the implementation of single services to bring them to the next level. Approaching mobility by separating the various vehicles and methods of usage will not bring any benefit in the future, because it is something that has already been done and is happening at this moment. Now, we need to take a step forward. We need a system that combines all the alternatives available into one unique integrated service, at people's disposal. The new keyword of the next phase is adaptability. Now that the tangibles have been developed, it is time to focus on the intangibles. The customer is at the center, therefore what is needed is a system able to respond to the specific needs of a person in a specific moment. This logic could represent a final chance for Italy to earn a place inside the international landscape, by for example focusing on software development. As a matter of fact, given the high number of multinationals operating in the market and in the territory, it would be impossible for Italian SMEs to compete in terms of sharing services, but they could still have a possibility with MaaS software, as they are not so diffused yet. In conclusion, the new mobility sector can have a double role. On a wider global perspective, it can favor a sustainable economic recovery thanks to all the implications it has on the environment as a whole. From a more local point of view instead, it could represent for Italy an opportunity to make something different than usual to find a place among the other international players of the sector.

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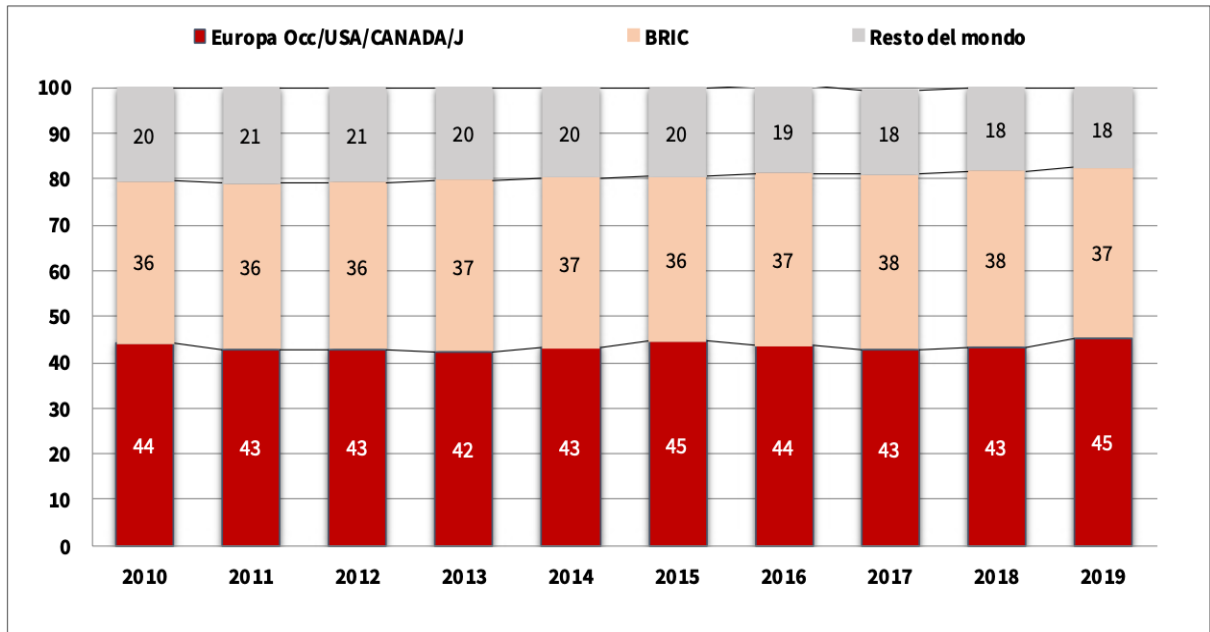
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APPENDIX

Appendix 1

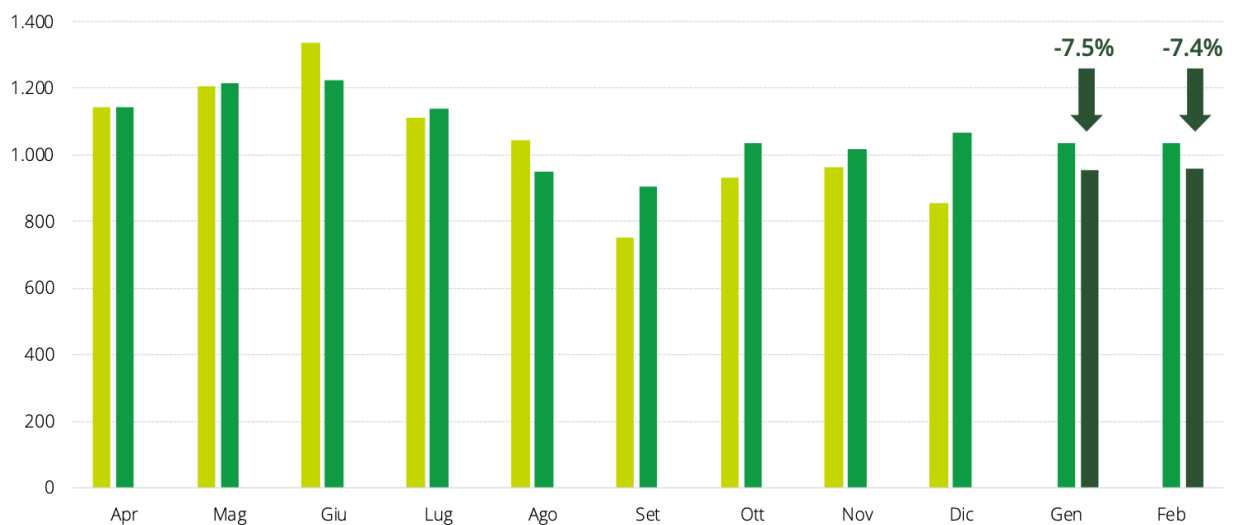
Global motorcars' demand for macroeconomic area (in % of total demand)



Source: ANFIA, Area Studi e Statistiche (2020)

Appendix 2

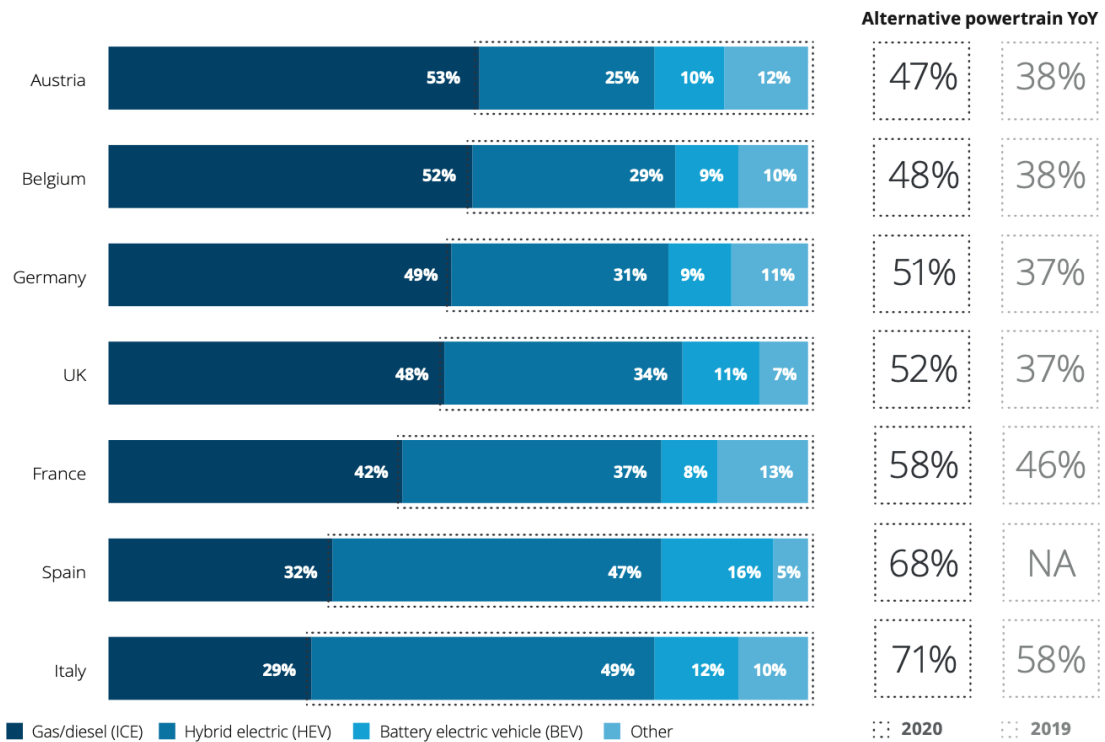
New cars' registrations in Europe



Source: ACEA (2020)

Appendix 3

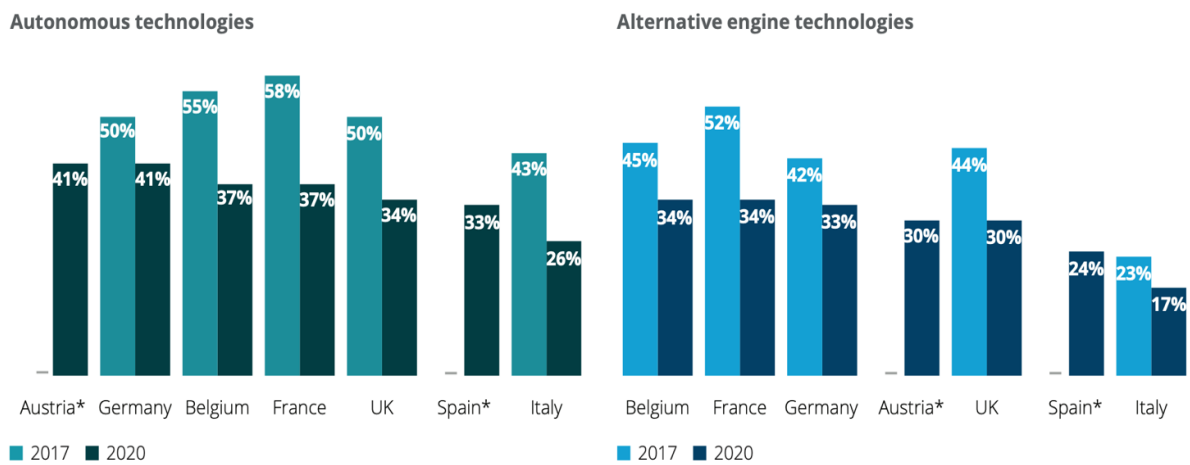
Consumer powertrain preferences for their next vehicle



Source: Deloitte, "2020 Global Automotive Consumer Study" (2020)

Appendix 4

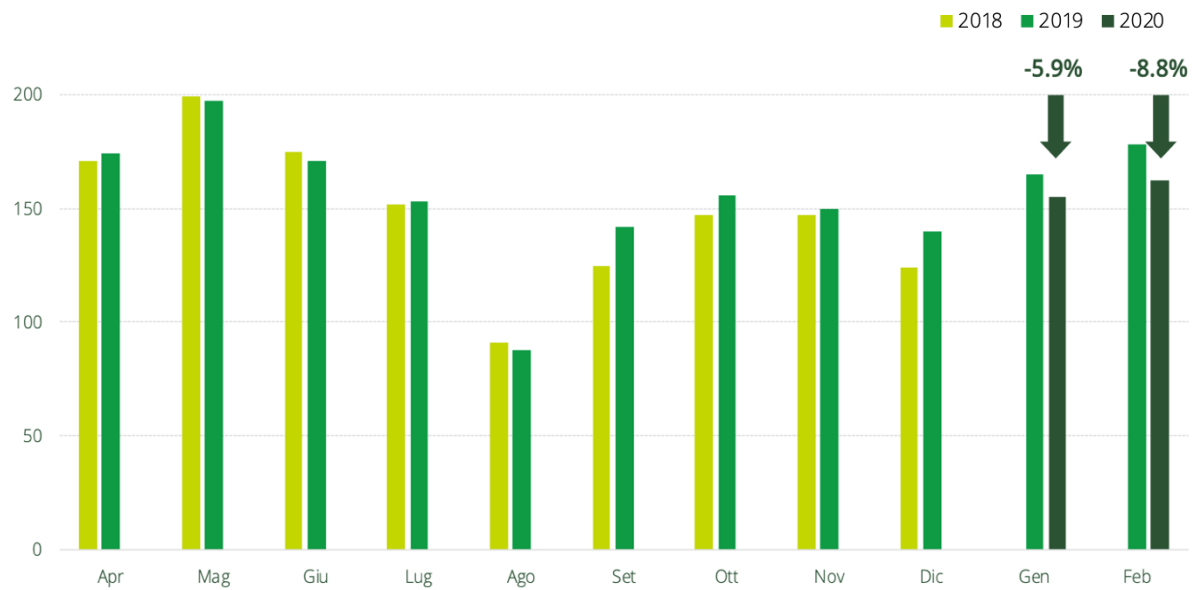
Percentage of consumers unwilling to pay any more for:



Source: Deloitte, "2020 Global Automotive Consumer Study" (2020)

Appendix 5

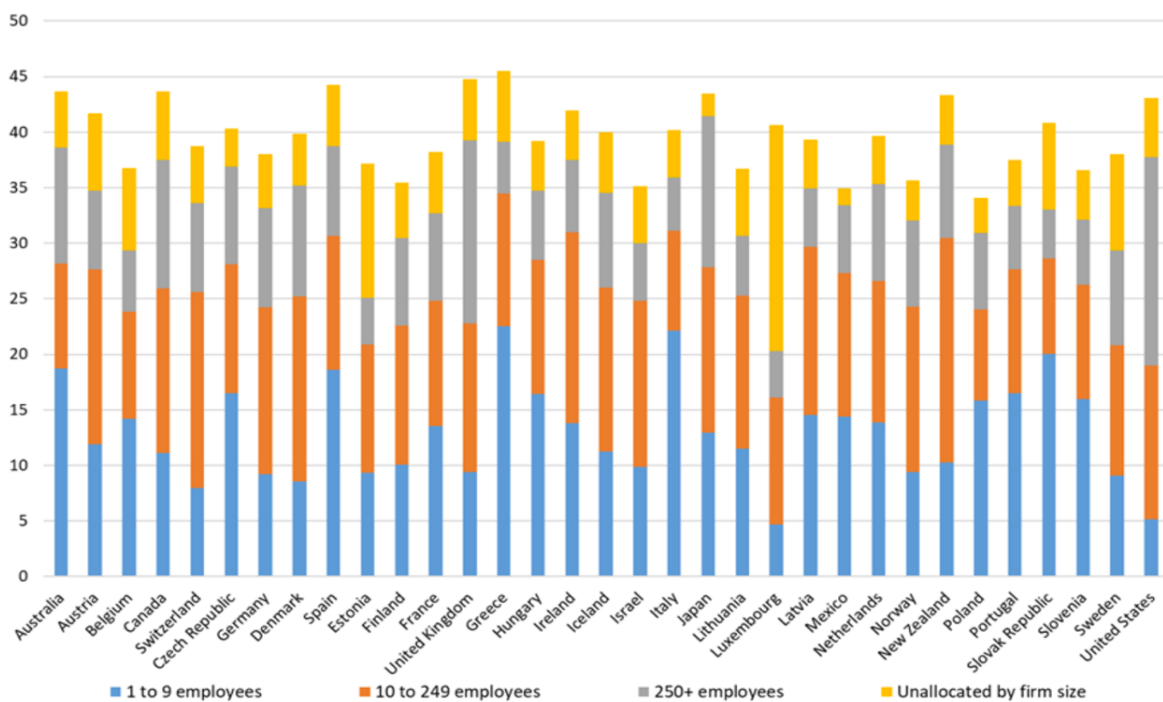
New cars' registrations in Italy



Source: ACEA (2020)

Appendix 6

Share of small firms in the most affected sectors



Source: OECD, "Coronavirus (COVID-19): SME Policy Responses" (2020)

Appendix 7

List of interviewees and related duration

Interviewee	N° of interviews	Duration
Italy Regional Manager Cooltra	1	40 min
CEO & co-founder 2Hire	1	20 min
Founder Playcar & Playmoove	1	50 min
Regional Sales Manager South-West, Share Now	1	---
Total	4	2h

Source: *Own elaboration*

Appendix 8

Enrico Pascarella

Cooltra Motors, 21 May 2021

- 1. Quali sono stati I principali impatti della pandemia sui vostri servizi, soprattutto dal punto di vista economico (calo della domanda, necessità di ottimizzare i costi e di migliorare le flotte) e sociale (maggiore diffidenza dei clienti, cambiamento delle abitudini di mobilità)?**

Chiaramente la pandemia è stata un grosso problema per la mobilità. Noi facciamo mobilità, e di conseguenza, contribuendo a spostare le persone per esigenze legate a lavoro, studio e leisure, siamo stati colpiti fortemente, anche se rispetto ad altri sistemi di mobilità (macchine, treni) siamo stati colpiti meno, perché comunque è un mezzo individuale che viene usato all'aperto, quindi problemi di contagio sono limitati. Però stando tutti a casa per il lockdown chiaramente i motorini non venivano usati. Noi siamo sempre rimasti aperti durante il periodo di pandemia, anche a marzo e aprile, e siamo stati l'unico servizio di scooter sharing a rimanere aperto. Abbiamo avuto una diminuzione dei noleggi e quindi dei ricavi di più del

90%. Questo nella prima ondata. A giugno, luglio e agosto siamo risaliti nei noleggi per poi riscendere nel periodo natalizio. La seconda ondata è stata meno impattante della prima, le persone si erano abituate alla pandemia, e si sentivano meno a rischio. Il nostro servizio di scooter sharing è un servizio che abbiamo adattato nel periodo di pandemia e successivamente, inserendo delle soluzioni come una maggiore pulizia dei caschi, bauletti e manopole. Ma già normalmente facciamo un servizio di questo tipo. Lavoriamo 24 ore su 24 cambiando le batterie in strada, e ogni volta che cambiamo le batterie interveniamo sulla pulizia dello scooter. Abbiamo quindi intensificato la pulizia, abbiamo anche le cuffiette sotto casco, che comunque già mettevamo prima, e abbiamo aggiunto le salviette monouso igienizzanti, e abbiamo fatto una comunicazione verso i nostri clienti informandoli del nostro operato e invitandoli all'utilizzo di mascherine. Oggi ti posso dire che stiamo tornando a lavorare molto, stiamo continuando ad aumentare i noleggi, quindi con la revisione delle restrizioni stiamo beneficiando fortemente perché le persone prediligono il nostro servizio al trasporto pubblico al chiuso.

2. L'emergenza sanitaria ha messo in luce nuove preoccupazioni dal lato dei clienti riguardo a questioni legate alla sicurezza (in termini di igiene) relativa all'utilizzo di mezzi di trasporto condivisi. In base alla vostra esperienza, avete notato una maggiore diffidenza da parte dei consumatori verso i servizi da voi offerti?

Noi abbiamo fatto una survey coi nostri clienti durante il periodo di pandemia per capire come vivevamo la pandemia, che difficoltà o che approccio avevamo nei confronti del nostro servizio, se si sentivano sicuri, se ci volevano suggerire qualcosa per farli sentire più sicuri. Siamo rimasti sbalorditi dal sondaggio, perché abbiamo avuto delle risposte molto positive, l'80% dei clienti Cooltra si sentivano già sicuri da prima, avevano apprezzato la comunicazione relativa alla sicurezza, e che avrebbero continuato a usare il nostro servizio anche di più, perché si sentivano al sicuro, piuttosto che usare il trasporto pubblico o il car sharing.

- 3. Secondo il vostro parere e la vostra esperienza, quali sono le reali prospettive della micro-mobilità all'interno dell'ecosistema? Più specificatamente, si può affermare che, in base ai nuovi comportamenti dei consumatori, questi servizi stiano oscurando le forme più tradizionali come il car sharing, o restano delle soluzioni complementari?**

La micro-mobilità sicuramente è complementare allo sharing ma a malincuore ha preso una parte del mercato del car sharing. Il car sharing è stato diciamo il servizio di sharing pioniere, il primo che è arrivato nelle nostre città con car2go. Ma oggi la micro-mobilità, in virtù anche delle restrizioni che ci sono dal punto di vista di centri storici e ZTL, ha portato in maniera fisiologica le persone ad utilizzare dei mezzi più piccoli, elettrici e facili da parcheggiare. La carenza anche di spazio nei centri storici crea un'esigenza fondamentale nell'utilizzo di mezzi più piccoli per la mobilità legata al trasporto pubblico. Probabilmente, nei prossimi cinque anni ci sarà un'accelerazione verso questa forma di utilizzo della micro-mobilità e della condivisione, proprio perché primo è un mezzo semplice e fruibile senza particolari esigenze e conoscenze, secondo ti dà la possibilità di muoverti e parcheggiare liberamente, anche se lì bisognerebbe aprire un capitolo particolare per quanto riguarda i parcheggi, infine il pagare solo per l'uso (pay-per-use), una formula fondamentale che non ti porta a incorrere in costi di proprietà, con assistenza, manutenzione e assicurazione, e quindi estremamente smart. Si sposa per questo benissimo con il concetto di smart city, e di città più a misura d'uomo anziché a misura d'auto.

- 4. Come vi rapportate ai vari enti pubblici, istituzioni o altri attori dell'ecosistema urbano per far coesistere al meglio i tradizionali mezzi di trasporto con le nuove modalità di spostamento? Quali potrebbero essere le ragioni che impediscono tale integrazione?**

Noi siamo presenti a Roma e Milano, ma anche in Europa. In ogni città ci stiamo interfacciando con il Dipartimento di mobilità di Roma e con l'AMAT di Milano, proprio perché stiamo integrando attraverso una full-integration il nostro sistema con una piattaforma che le due amministrazioni delle città italiane lanceranno proprio per integrare il trasporto pubblico al servizio di micro-mobilità privata. In

questi ultimi giorni stiamo proprio chiudendo le due integrazioni con Roma e Milano, che sono state ulteriormente accelerate perché considera che in virtù di quello che ti dicevo prima, la sharing economy è e sarebbe stata una delle economie più importanti da qui ai prossimi dieci anni. La pandemia ha accelerato fortemente quest'esigenza, e proprio quest'anno le città hanno fatto pressioni per chiudere questo aspetto, e stiamo lavorando proprio in questi giorni alla full-integration delle nostre API, con la piattaforma dei due comuni. Quindi a breve ci sarà un'applicazione che ti darà la possibilità di muoverti da un punto A ad un punto B selezionando le modalità di spostamento. Un fattore che potrebbe impedire tale integrazione è la gelosia dei dati, anche legato al concetto di privacy. Noi così forniamo a loro tutte le informazioni relative agli spostamenti degli utenti, ma questi dati vengono usati secondo i limiti posti dalla nuova legge sulla privacy.

5. Come valutate il livello attuale della mobilità in Italia in termini di offerta e soprattutto di domanda? Ritenete possibile un cambio di paradigma nelle abitudini dei cittadini a favore dei servizi di sharing (e quindi a discapito dei veicoli privati) nel breve termine?

L'auto privata, per noi italiana in particolar modo, è sempre stato uno status symbol dagli anni '50. L'auto è diventata un simbolo di libertà. La prima cosa che si comprava appena presa la patente era la macchina. Oggi questo concetto è stato un po' abbandonato, perché l'auto oggi è vista soprattutto come uno strumento per muoversi, non uno status symbol. Muoversi in ambienti estremamente stressanti, le nostre città. Avere un'auto oggi è costoso, complicato ed è stressante. Non è un oggetto di libertà, ma è un oggetto stress. Quindi, il paradigma dell'auto come segno di libertà e di status è quasi totalmente abbandonato ormai, e se oggi si facesse un'indagine fra le persone che usano l'auto tutti i giorni, probabilmente quello che ne uscirebbe è che lo devono fare e non hanno il piacere di farlo. In quest'ottica lo sharing si sposa benissimo, lo sharing inteso come sharing economy, quindi tutti quelli che sono i veicoli in città che ti danno la possibilità di non dover parcheggiare, o stare nel traffico, o di potersi muovere in maniera sostenibile (altro aspetto chiave). Mentre dieci anni fa essere green era solo un modo per pulirsi la coscienza e fare pubblicità, oggi la gente crede maggiormente nell'essere green. Sapere che io posso utilizzare un motorino Cooltra totalmente elettrico, senza

inquinare (dal punto di vista acustico e delle emissioni) mi rende più partecipe alla città.

6. Quali sono i principali problemi legati all'implementazione dei nuovi servizi di trasporto in Italia (dimensione delle città, infrastrutture, enti pubblici), rispetto ad altri Paesi Europei ed extra Europei? E quali sono invece le opportunità, non colte finora, che vi hanno portato ad allargare i vostri servizi nelle città italiane?

Come noti, noi siamo presenti a Roma e Milano, e già questo ti dà una risposta. Se guardi in giro per l'Europa, tutte le città in cui siamo presenti sono capitali o grandi città. Siamo leader assoluti in Europa col 50% e in Italia con il 75-80%. Stiamo pensando ad investire in città come Bologna, Firenze, Torino. Ti faccio questi nomi perché gli elementi che vengono considerati sulle nuove aperture sono: numero di abitanti, il reddito pro capite della città, le condizioni metereologiche, il senso civico. Non apriremo mai probabilmente a Napoli, Palermo, Bari, anche se ci dispiace, ma chiaramente non ci sono le condizioni per investire in quelle città. Anche perché è un tipo di investimento molto diverso dai monopattini per esempio. Noi dal punto di vista dell'investimento facciamo l'80% in più rispetto ad un monopattino. Un monopattino costa 300-400 euro, uno scooter 3000. Con un investimento di 300.000 euro metti su strada 1000 monopattini, mentre per lo stesso numero di scooter hai bisogno di 3 milioni di euro. Le infrastrutture sono un altro elemento fondamentale, anche se noi poco abbiamo a che fare dato che ci ricarichiamo da soli. Sto interagendo con le città affinché si creino dei parcheggi per lo sharing, anche per lo scooter sharing, perché ci diano la possibilità di incentivare il parcheggio in aree di sosta più consone e più sicure. Le opportunità riguardano le città che in cui esistono i criteri precedentemente citati.

7. Quali sono state le risposte immediate della vostra azienda volte a garantire una continuità aziendale, e/o le iniziative volte a mantenere alta la brand awareness e customer loyalty in un periodo di calo della domanda?

Abbiamo fatto la survey per capire di cosa avessero bisogno i clienti in questo momento particolare, e abbiamo cercato di rispondere in base alle loro esigenze.

Non abbiamo fatto grandi comunicazioni a riguardo, perché non ci va di cavalcare l'onda della crisi per dire che siamo bravi. È una logica da cui la nostra azienda prende le distanze. Ti posso dire che quello che hanno fatto altre aziende non sempre rispecchia la realtà, e sono anzi attività di marketing strumentali. Io da utente, se sentissi certe cose deciderei di non usare più il servizio, perché si strumentalizza un momento di crisi per fare pubblicità. Spesso magari sono servizi in difficoltà, che provano a farsi pubblicità con queste iniziative. Per quanto riguarda l'ampliamento delle aree, l'abbiamo fatto anche noi, ma non tanto per la pandemia, quanto per testare le zone. I rischi in questo caso sono molti, perché quando vai nelle periferie, i motorini o le macchine arrivano lì e ci restano uno/due giorni, e più stanno fermi più aumentano le probabilità di vandalismo.

8. Per quanto riguarda le opportunità future della mobilità, ho evidenziato nella mia tesi 5 fattori principali attorno ai quali si potrà presumibilmente sviluppare la nuova mobilità, che sono: elettrificazione, guida autonoma, multi-modalità, car sharing e micro-mobilità. Quali di questi aspetti ritenete che possano avere una maggiore influenza sulla nuova mobilità? E quali sono le loro reali prospettive future?

Lo sharing assolutamente e l'elettrificazione, intesa però come ricerca e sviluppo legato alla guida autonoma e alle auto elettriche. Le nostre città da qua a dieci anni saranno totalmente elettrificate, dove probabilmente si accederà solo se hai un mezzo elettrico. Lo dimostrano i grandi investimenti che stanno facendo le case automobilistiche oggi, e le grandi compagnie di energia. Toyota, BMW, Volkswagen, Audi, hanno un mezzo elettrico che stanno promuovendo. I prezzi si stanno abbassando, mentre l'autonomia è aumentata, quindi tra cinque anni avremo veicoli che fanno 600-700 chilometri di autonomia. Quello che è successo con la telefonia succederà con la mobilità. Era impensabile quindici anni fa avere uno smartphone che era un computer, oggi si usa lo smartphone come un computer. Un giorno noi utilizzeremo i mezzi elettrici come oggi utilizziamo lo smartphone. Ti daranno la possibilità di poter lavorare dalla macchina e mettere la guida autonoma, fare un viaggio senza il rischio di addormentarsi o pianificando

le soste. Sarà tutto sempre più semplice e sicuro, in un'ottica di sostenibilità totale e di qualità della vita migliore.

Appendix 9

Filippo Agostino

2Hire, 24 May 2021

- 1. L'emergenza sanitaria ha messo in luce nuove preoccupazioni dal lato dei clienti riguardo a questioni legate alla sicurezza (in termini di igiene) relativa all'utilizzo di mezzi di trasporto condivisi. In base alla vostra esperienza, avete notato una maggiore diffidenza da parte dei consumatori verso i servizi da voi offerti?**

Quello che abbiamo visto noi, soprattutto dalle aziende che offrivano questo tipo di servizi, è che c'è stata molta attenzione all'igiene, appunto perché molti avevano paura di entrare in mezzi in cui erano stati altri. Detto questo, i mezzi di sharing sicuramente hanno subito un impatto, ma è molto difficile da stabilire perché non si sa se sia stata impattata più dalla pandemia, cioè dal fatto di poter trasmettere il virus all'interno dei mezzi, oppure più dal fatto che non potevamo muoverci. Quello di igienizzare è stato un fattore importante non solo nell'utilizzo ma anche nelle operations, perché poi tutti gli operatori di sharing hanno dovuto, o per marketing o per effettivamente aumentare l'utilizzo, ricorrere ad una sanificazione dopo ogni viaggio. Quindi il costo è aumentato.

- 2. Secondo il vostro parere e la vostra esperienza, quali sono le reali prospettive della micro-mobilità all'interno dell'ecosistema? Più specificatamente, si può affermare che, in base ai nuovi comportamenti dei consumatori, questi servizi stiano oscurando le forme più tradizionali come il car sharing, o restano delle soluzioni complementari?**

Io credo che la micro-mobilità faccia parte di tutta la mobilità sostenibile e condivisa che ha visto come pioniere il car sharing, quindi la micro-mobilità è

complementare alla mobilità condivisa come il car sharing ma anche il ride hailing e ai trasporti pubblici. Diciamo che hanno tutti segmenti che da un lato sono diversi ma dall'altro si intrinsecano. Una stessa persona può appartenere a tutti questi gruppi, perché ha bisogno di fare a volte un percorso di 30 chilometri come di un chilometro e mezzo, quindi direi che è quella complementarità che serve proprio per diminuire il traffico nelle città, perché loro sono pionieri della trasformazione dei viaggi da uno a due chilometri e mezzo da macchine ad altri mezzi. Non sono competitor. Come lo era il car sharing per il trasporto pubblico, la stessa cosa la micro-mobilità con il car sharing e con il trasporto pubblico.

3. Come vi rapportate ai vari enti pubblici, istituzioni o altri attori dell'ecosistema urbano per far coesistere al meglio i tradizionali mezzi di trasporto con le nuove modalità di spostamento? Quali potrebbero essere le ragioni che impediscono tale integrazione?

Noi diamo la tecnologia soprattutto a privati che partono con un loro servizio di sharing. Quindi quello che facciamo noi spesso è dare tutti i dati di cui ha bisogno il comune o la società che si occupa di garantire la mobilità nel comune o nella città. Quindi noi non ci interfacciamo mai indirettamente ma sempre indirettamente. Cosa ferma l'integrazione? Io non credo che il futuro sia una sola app per gestire tutto, perché levando la competizione o comunque riducendola, si va ad interferire in maniera negativa sui prezzi, la convenienza, la qualità. Quindi credo che sarà poi il mercato che deciderà se ci sarà solo un'app o mille app diverse. Però non credo che fare l'orchestratore e convincere tutti a usare una stessa app sia funzionale soprattutto se tutti quanti gli utenti non decidono di usarla. Quello che ferma attualmente lo vedo solo come un problema tecnologico, quindi un ostacolo che si può superare. Un'altra cosa è che ancora non si capisce e non si sa qual è la domanda a cui si sta rispondendo. Molto spesso si fanno le cose senza pensare al bisogno di mobilità del consumatore. Io non faccio un car sharing a caso, io faccio un car sharing perché ho studiato che nel mio comune c'è bisogno di questo tipo di percorso per gli utenti che fanno cinque, dieci, quindici chilometri. Non si deve prendere un servizio di mobilità tanto perché non c'è in una città, ma bisogna soprattutto vedere cosa serve agli utenti, cosa sto dando, e in quel momento si

decide se si fa un'integrazione dei mezzi pubblici o tutte quelle cose possono essere nel MaaS.

4. Come valutate il livello attuale della mobilità in Italia in termini di offerta e soprattutto di domanda? Ritenete possibile un cambio di paradigma nelle abitudini dei cittadini a favore dei servizi di sharing (e quindi a discapito dei veicoli privati) nel breve termine?

Il cambiamento sta già avvenendo. Sempre più ragazzi, ma anche persone di tutte le età, stanno approcciando ai servizi di sharing. Molto spesso se vai in città come Milano sono solo lavoratori o universitari che non usano più la macchina privata ma preferiscono usare solo mezzi pubblici e condivisi. Io penso che questo sia un processo lungo ma che stia già avvenendo ormai dal 2012. È vero che non siamo arrivati ad un livello di saturazione tale che ti permette di levare la macchina e usare solo questi, perché ci sono ancora troppi pochi veicoli e in troppe poche città per abituare tutto il resto della popolazione. Il problema qua è la mancanza di visione dall'alto. Società come Uber ancora non sono riuscite a entrare, quindi l'Italia non è un paese per la mobilità e nemmeno per la tecnologia di quest'ambito. C'è un grosso problema di mentalità, non c'è nessun problema di infrastrutture, in tutte le città ci sono servizi di questo tipo. Uber liberalizzava tutto quello che era intorno alla mobilità, perché Uber permette di spostarsi senza incorrere in grosse spese. Quello poteva essere uno dei primi passi insieme al car sharing di liberalizzazione della macchina privata, però è stato stoppato quindi vuol dire che se non c'è Uber in Italia, che paese tecnologico sulla mobilità siamo. Uber è proprio quella tecnologia che ti permette di abbassare il costo e migliorare il servizio di una cosa già esistente, quindi è una tecnologia necessaria. Se invece non basta abbassare il costo e migliorare il servizio, allora non si sa cosa serve per portare un'innovazione in questo paese.

5. Quali sono state le risposte immediate della vostra azienda volte a garantire una continuità aziendale, e/o le iniziative volte a mantenere alta la brand awareness e customer loyalty in un periodo di calo della domanda?

Noi abbiamo aiutato tutti i nostri clienti a non pagare e ad abbassare il costo del servizio quando non avevano tanti viaggi, quindi sicuramente noi abbiamo fatto un passo indietro di fronte a questa situazione, permettendo ai nostri clienti di abbassare tutti i costi operativi e quindi di poter resistere. Se abbiamo fatto bene o male ce lo dirà il tempo, però sicuramente Lyft, Wheels e Miles non sono gli unici, anche in Italia Helbiz, Dott hanno dato viaggi gratis per gli operatori sanitari. Quasi tutti si sono mossi in questa direzione.

- 6. Per quanto riguarda le opportunità future della mobilità, ho evidenziato nella mia tesi 5 fattori principali attorno ai quali si potrà presumibilmente sviluppare la nuova mobilità, che sono: elettrificazione, guida autonoma, multi-modalità, car sharing e micro-mobilità. Quali di questi aspetti ritenete che possano avere una maggiore influenza sulla nuova mobilità? E quali sono le loro reali prospettive future?**

Da tantissimi anni si parla del CASE (connected, autonomous, sharing , electric), quindi questi sono i pilastri su cui si basa la nuova mobilità. Sicuramente il primo passo è la connettività, però quello che farà proprio un cambio di rotta saranno i veicoli autonomi. Loro cambieranno completamente il paradigma. L'elettrico non risponde ad una domanda di come mi muovo da un punto A ad un punto B, ma solo di quale veicolo uso. In futuro saranno solo elettrici, almeno che non troveranno tecnologie migliori, quindi non è un fattore così rivoluzionario come la guida autonoma o la connettività. Lo sharing penso che sia fondamentale, ma come metodo di mobilità. L'importante è sempre capire cosa serve agli utenti, quindi multi-modalità, micro-mobilità e sharing faranno la differenza nel risolvere il problema al consumatore finale solo se tutti assieme. Perché poi la chiave di tutto è quella, se non si muovono le persone non c'è nessuno a cui devi risolvere il problema. Fortunatamente le persone ancora per tanto hanno bisogno di muoversi, e questa pandemia lo ha dimostrato. Però quello che cambierà il paradigma nei prossimi dieci, quindici, vent'anni sarà il veicolo autonomo.

Appendix 10

Fabio Mereu

Playcar & Playmoove, 24 May 2021

1. Quali sono stati I principali impatti della pandemia sui vostri servizi, soprattutto dal punto di vista economico (calo della domanda, necessità di ottimizzare i costi e di migliorare le flotte) e sociale (maggiore diffidenza dei clienti, cambiamento delle abitudini di mobilità)?

Sicuramente la pandemia ci ha colti impreparati, come del resto a tutti. Durante il primo periodo di zona rossa il calo è stato quasi totale. Forse ora stiamo risalendo con gli ultimi decreti, però non siamo ancora ai livelli di quando ci siamo fermati. Essendo partiti come startup innovativa, abbiamo giocato sulla reazione. Da subito abbiamo cercato di capire cosa potessimo fare. Abbiamo fatto un questionario per gli utenti per capire cosa pensassero loro, e siamo stati i primi in Italia a farlo, tanto che poi è stato ripreso dall' Osservatorio Sharing Mobility. Questi dati ci riportano indietro nel tempo, un tempo che per fortuna non c'è più e non vogliamo rivivere. Le azioni che abbiamo fatto subito riguardavano soluzioni per uscire subito dalla situazione, quindi indirizzate al bene della popolazione, perché prima se ne usciva tutti quanti, meglio era da un punto di vista economico. Quindi abbiamo preso tutta la flotta, e abbiamo dato gratis l'auto a qualunque associazione lavorasse durante l'emergenza Covid. Abbiamo scelto questa soluzione perché da un lato pensavamo che aiutando la popolazione potessimo uscire tutti prima dall'emergenza, dall'altro perché eravamo molto disorientati e abbiamo scelto soluzioni immediate. In secondo luogo, abbiamo messo tutti i dipendenti in smart working, però abbiamo continuato a sviluppare, cercando di vivere un po' come se nulla fosse successo. Abbiamo fatto anche dei progetti interessanti che non avremmo fatto se non ci fosse stato il covid. C'era una startup in un paesino a 50 chilometri da Cagliari che aveva sviluppato un sistema di pannelli fotovoltaici che in autoproduzione alimentavano il veicolo, scollegandosi quindi dalla rete. Quindi abbiamo dato un veicolo elettrico alla protezione civile di quel paese, per capire le performance di questo veicolo elettrico in autoproduzione. Perciò è stata anche un'occasione utile

per sperimentare qualcosa che altrimenti non avremmo mai fatto. Una volta diminuita l'intensità della pandemia, abbiamo investito nella micro-mobilità, perché abbiamo visto che era stata meno impattata rispetto ai soliti mezzi di trasporto. Quindi abbiamo comprato monopattini e bici, e a ottobre 2020 è partito un servizio nella città di Cagliari. Perché noi abbiamo una doppia veste, siamo operatori di servizio a Cagliari e poi vendiamo le piattaforme in white label ad altre città come Bologna, Padova, ma anche Buenos Aires, New York, Dallas. Questo ci ha aiutato perché ci siamo dedicati ad attività di sviluppo per migliorare il sistema per le nuove necessità, e anche perché durante il covid da una parte abbiamo visto calare il fatturato, dall'altra avevamo centinaia di richieste per fare nuovi servizi. Questo equilibrio ci ha dato l'ottimismo giusto che serve per andare avanti, perché comunque la nostra azienda è piccola. Riguardo a cosa abbiamo fatto per rendere più sicure le persone, abbiamo preso una serie di accorgimenti che poi abbiamo trasferito agli altri colleghi. Ci siamo fatti fare delle boccette di igienizzante personalizzate Playcar, e altri accorgimenti base, considerando che all'epoca non si sapeva ancora niente. Inoltre, pubblicavamo i vari studi sul covid sui social per informare i nostri clienti. Tutta la logica culturale di condivisione del veicolo ha alle spalle anche tutto un processo logico e culturale di rispetto del prossimo, e non c'è niente più del covid che ha dimostrato di dover avere rispetto nel prossimo. Nell'estate 2020 abbiamo fatto il fatturato più alto di Playcar in assoluto per il servizio, perché la tecnologia era evoluta. Un servizio di car sharing può infatti diventare un rent-a-car, un noleggio a lungo termine, può cambiare il suo aspetto perché la vera differenza che c'è è la tecnologia che ci applichi sopra.

2. L'emergenza sanitaria ha messo in luce nuove preoccupazioni dal lato dei clienti riguardo a questioni legate alla sicurezza (in termini di igiene) relativa all'utilizzo di mezzi di trasporto condivisi. In base alla vostra esperienza, avete notato una maggiore diffidenza da parte dei consumatori verso i servizi da voi offerti?

La consapevolezza viene dall'informazione che quella persona possiede. Anche noi eravamo insicuri, però man mano che si andava avanti col tempo e l'informazione veniva trasferita alle persone, si acquisiva anche più sicurezza nel car sharing. Tutto sta tornando alla normalità, soprattutto nell'ultimo periodo i servizi stanno

crescendo, cosa che non noto sull'acquisto dell'auto. Noi abbiamo iniziato dieci anni fa a Cagliari, una città che non aveva particolari problemi né di traffico né ambientali, e abbiamo lavorato per inculcare la cultura dello sharing. Quindi eravamo abituati a comunicare con le persone per inculcare una certa cultura, e perciò tornando alla normalità abbiamo continuato con le comunicazioni, cercando di innovare dall'altro lato con i servizi di micro-mobilità che garantivano di più la parte di contatto.

3. Secondo il vostro parere e la vostra esperienza, quali sono le reali prospettive della micro-mobilità all'interno dell'ecosistema? Più specificatamente, si può affermare che, in base ai nuovi comportamenti dei consumatori, questi servizi stiano oscurando le forme più tradizionali come il car sharing, o restano delle soluzioni complementari?

Io penso che non esista più questa distinzione tra micro-mobilità, veicolo normale, ma esiste l'adattabilità alla persona, cioè il veicolo deve rispondere alle necessità di mobilità di una persona. Perciò deve fornire più tariffe possibili, sempre però con delle regole per mantenere l'ordine. Quindi i gestori in questo senso devono mettersi una mano sulla coscienza e dare meno flessibilità, studiare di più (avere più informazioni su dove si va ad operare), confrontare anche gli open data e i dati statistici, e lavorare su quei dati lì prima di iniziare il servizio. Infatti, una persona ha più vite (studia, lavora, fa sport), perciò il servizio dev'essere accessibile e modificabile per la persona. Questo è un concetto che rientra nel discorso MaaS. Il veicolo dev'essere adattabile a quello che voglio io. Non che io mi adatti al servizio. Come l'autobus, che ha un percorso fisso e impiega un determinato tempo ad andare da un punto all'altro, spesso non in maniera efficiente per l'utente. Ma se lo stesso autobus prendesse solo le persone che lo avvisano di passare, ci metterebbe la metà del tempo. Questo è quello che penso del MaaS e di come va vissuto, non va inteso come un sistema specifico di trasporto, o come un servizio che offra tutti i veicoli come succede adesso, ma semplicemente deve personalizzare il viaggio. Quando potremo avere accesso alle capacità di calcolo quantistiche, lì potremo fare delle cose eccezionali, perché il sistema si adatterà alla persona in maniera intelligente (non intelligenza artificiale).

4. Come vi rapportate ai vari enti pubblici, istituzioni o altri attori dell'ecosistema urbano per far coesistere al meglio i tradizionali mezzi di trasporto con le nuove modalità di spostamento? Quali potrebbero essere le ragioni che impediscono tale integrazione?

Essendo una piccola azienda, noi abbiamo sviluppato prima tutta la parte affinché gli operatori, compresi noi, potessero dare i servizi sul territorio. Perché c'è anche il problema che se non trovi operatori nel territorio, nelle città più piccole questi servizi non nascono, mentre il bus c'è sempre. Poi abbiamo fatto l'integrazione del parcheggio, inteso come sensori che indicano i parcheggi liberi, e stiamo integrando su quella parte lì la parte di ricarica del veicolo, perché sono accessori che vanno per l'intera sharing mobility. Il passaggio successivo è quello di integrare la parte bus, tramite sistemi (GTFS Open) volti a calcolare il percorso migliore da un punto A ad un punto B. Dopodiché ci piacerebbe migliorare il lato operatore, perché noi non siamo un MaaS per terzi, noi diamo la tecnologia per fare i MaaS, che è diverso. Noi pensiamo che il MaaS debba essere open, perciò forniamo una serie di open data in uscita affinché sviluppatori terzi possano fungere da aggregatori o da sistemi locali di MaaS. L'elemento che potrebbe impedire l'integrazione sta nel fatto che sono tutti attori separati, e ognuno dà valore ai propri clienti, ma si dà troppo peso al cliente. Questo deriva da una mentalità antica per il quale il cliente è la tua base dati che ha un valore. Io sono più per l'apertura di dati a terzi. Purtroppo, adesso ci sono ancora troppi sistemi che sono poco aperti, per cui il sistema non consente di essere molto MaaS.

5. Come valutate il livello attuale della mobilità in Italia in termini di offerta e soprattutto di domanda? Ritenete possibile un cambio di paradigma nelle abitudini dei cittadini a favore dei servizi di sharing (e quindi a discapito dei veicoli privati) nel breve termine?

Dipende molto dalla generazione di cui stai parlando, e dalla tipologia di lavoro e vita che fa una persona. Secondo me c'è un grosso problema ancora sulla questione della struttura fissa. Cioè questo schema per il quale il car sharing è il car sharing, il rent-a-car è rent-a-car, il bus è bus, è uno schema che non si adatta alla persona, ma è la persona che si adatta alla mobilità. E questo non permette un accesso di

massa ai servizi ma solo a chi può andare bene. Dal momento in cui si risolverà questo problema qui, la sharing mobility diventerà un servizio comune, perché i giovani ci mettono pochissimo ad imparare e appartengono già ad una cultura della condivisione, grazie all'uso dei social. I giovani sono quelli che hanno più fiducia di tutti, ed è una cosa bella. Penso che questa fiducia nel futuro potrà essere trasferibile anche all'estero.

6. Esiste un motivo in particolare per il quale in Italia non ci sono aziende italiane di sharing presenti in tutto il territorio, ma solamente servizi specifici per ogni città/regione? È un problema di dimensioni delle città, infrastrutture, enti pubblici? Quali sono le opportunità, non colte finora, all'interno del territorio italiano?

Secondo me storicamente è stata presa come una questione di marketing, e le aziende italiane non hanno investito su questo, compreso i produttori d'auto, a differenza degli altri paesi (per esempio car2go deriva da Daimler). Inoltre, i servizi pubblici in Italia sono gestiti da aziende straniere, mentre noi non abbiamo fatto lo stesso all'estero, a parte qualche eccezione ultimamente. Dall'altra parte le città italiane sono molto piccole e non sono redditizie per il numero di persone. Noi siamo stati forse la prima azienda di car sharing in una città piccola, a parte i servizi pubblici offerti da aziende pubbliche. Playmove è nato proprio per questo, per dare tecnologia a piccole realtà locali affinché potessero riprodurre il Cagliari, cioè adattare al territorio il tipo di servizio. Perché è molto diverso fare un servizio di MaaS con 500-600 macchine dal fare un servizio che tu disegni a seconda della tua cultura locale. Ora che stiamo acquisendo clienti grandi, ci stiamo accorgendo che forse la nostra mission è più centralizzare l'Italia come sistema di distribuzione che tende a trasferire richieste verso la nostra nazione. Tutto questo con lo scopo finale in futuro di poter creare connessioni del piccolo, quindi un network che permette di muoversi di città in città usufruendo dello stesso servizio. Se moltiplicato anche all'estero, questo creerebbe un flusso turistico verso alcuni punti. Il concetto è quello di creare una piattaforma che funzioni come un servizio sartoriale.

7. Quali sono state le risposte immediate della vostra azienda volte a garantire una continuità aziendale, e/o le iniziative volte a mantenere alta la brand awareness e customer loyalty in un periodo di calo della domanda?

Guardare domanda numero 1.

8. Per quanto riguarda le opportunità future della mobilità, ho evidenziato nella mia tesi 5 fattori principali attorno ai quali si potrà presumibilmente sviluppare la nuova mobilità, che sono: elettrificazione, guida autonoma, multi-modalità, car sharing e micro-mobilità. Quali di questi aspetti ritenete che possano avere una maggiore influenza sulla nuova mobilità? E quali sono le loro reali prospettive future?

Tutti quelli che mi hai elencato sono sistemi, che sono quelli che già esistono. Io penso che invece vada ripensato tutto quello che conosciamo. Per quanto riguarda la guida autonoma abbiamo sviluppato anche un nostro prototipo, ma resta sempre un veicolo. La verità è adattare il servizio all'utente. Il centro del servizio è l'utente. Non possiamo più fare una distinzione tra micro-mobilità, car sharing, multimodale, guida autonoma. Il veicolo è un veicolo. Serve invece risolvere il problema di flessibilità di tutti i sistemi, per cui l'utente deve avere accesso ad un sistema adattabile alle sue necessità. Tutto il settore, compresa la micro-mobilità, è da ricostruire perché ha le sue problematiche (per esempio i monopattini lasciati per strada). Il servizio va ridisegnato, mettendo anche dei vincoli alle cose. In questo per la micro-mobilità si tratterebbe di passare ad una logica più dock-based, con le apposite stazioni in prossimità di altri servizi, piuttosto che un free-floating che genera solo confusione. Dall'altra parte devi garantire al cliente di variare velocemente la sua mobilità. Nel caso di un bus a guida autonoma, per esempio, prenotando prima la fermata il bus sa già che percorso seguire. Ma se noi prendiamo l'autobus tradizionale e facciamo la stessa cosa con un servizio di prenotazione della fermata e lo facciamo andare solo dove serve, abbiamo tagliato il percorso (rendendolo magari elettrificabile), abbiamo ridotto le dimensioni del veicolo, e le emissioni. La stessa cosa vale per l'auto. Il problema è che ora non c'è un sistema che modifichi la tipologia di utilizzo di quell'auto. Bisogna ragionare diversamente, la tecnologia ti aiuta a farlo però serve una volontà anche politica,

perché poi ci sono una serie di contratti dietro. Il futuro si gioca su questo, non sul tipo di veicolo. Ogni operatore di mobilità dovrebbe iniziare a pensare non solo con la logica dell'elettrificazione perché è la moda, ma di come vado ad incidere sull'ambiente in generale quando faccio le cose.

Appendix 11

Horacio Reartes

Share Now, 9 June 2021

1. Quali sono stati I principali impatti della pandemia sui vostri servizi, soprattutto dal punto di vista economico (calo della domanda, necessità di ottimizzare i costi e di migliorare le flotte) e sociale (maggiore diffidenza dei clienti, cambiamento delle abitudini di mobilità)?

Il car sharing è stato senza dubbio uno dei servizi all'interno dell'industria mobilità più colpiti dal Covid, con cali a due cifre fin dalla prima fase del lockdown di marzo 2020 (meno 90% passando da una media di 10 noleggi a 2 per auto). Inaspettatamente, da un giorno all'altro, abbiamo visto crollare il numero dei nostri utilizzi in modo drastico. Abbiamo, però, reagito nell'immediato su tre livelli:

1. A livello operativo – Siamo intervenuti sulla flotta: in particolare durante la Fase 1, pur mantenendo sempre attivo il servizio in tutte le nostre città, abbiamo ridotto il numero di vetture disponibili nella nostra flotta così da ridurre i costi di gestione della stessa, vista la riduzione degli utilizzi da parte degli utenti a causa del lockdown forzato.
2. A livello di sicurezza – Abbiamo rafforzato le misure igieniche e sensibilizzato maggiormente gli utenti: da inizio emergenza (marzo 2020), SHARE NOW ha attivato un rigido protocollo per cui pulisce e disinfetta le auto della flotta quattro volte più frequentemente rispetto al periodo pre-crisi. Il team dedicato alla pulizia dei veicoli utilizza prodotti chimici disinfettanti a stampo medico e presta particolare attenzione alle superfici di maggior contatto, come volante, cambio e freno a mano. Allo stesso tempo però, oltre al nostro impegno come azienda, gioca un ruolo fondamentale anche il comportamento dell'utente. Ora

più che mai è essenziale che tutti facciano la loro parte, rispettando regole e buon senso. È per questo che richiediamo ai nostri clienti di indossare sempre la mascherina a bordo, disinfettarsi le mani prima e dopo la guida, arieggiare per mezzo minuto l'abitacolo sia prima di salire sull'auto che dopo esserne scesi e non lasciare rifiuti sulla vettura. Tutte queste sono misure efficaci necessarie per mantenere il rischio di infezione per l'intera community di SHARE NOW il più basso possibile.

3. A livello di prodotto/offerta – Ci siamo strutturati al meglio per rispondere alle nuove esigenze di mobilità dei cittadini: fin dalla prima fase di lockdown abbiamo migliorato le nostre offerte per venire incontro a quelle che sono diventate le nuove abitudini di mobilità ed in particolare:
 - Abbiamo lanciato a marzo uno speciale pacchetto da 30 giorni che permettesse agli utenti di mantenere attivo il proprio noleggio per un mese intero. Il pacchetto è stato accolto benissimo dai nostri utenti e per questo è diventata un'opzione di noleggio fissa.
 - Sempre durante la Fase 1 abbiamo lanciato la campagna CARE NOW rivolta a tutti i lavoratori coinvolti in prima linea nella lotta contro il virus, per cui tutte le tariffe SHARE NOW, da quella al minuto al pacchetto da 30 giorni, sono state scontate al prezzo di costo.
 - Abbiamo lanciato il pacchetto Comfort grazie a cui è possibile prenotare in anticipo un'auto pulita, completamente disinfettata e col pieno di carburante e farsela portare all'indirizzo scelto in fase di prenotazione. Il pacchetto è attivabile solo per noleggi superiori a 1 giorno.
 - Abbiamo lanciato il Pass sia per l'utenza privata che quella aziendale: in un periodo di difficoltà economiche come quello che stiamo vivendo oggi, è stato di fondamentale priorità per SHARE NOW offrire a tutti quei clienti che utilizzano regolarmente il servizio un importante vantaggio in termini di prezzo. SHARE NOW è stato infatti il primo fornitore di car sharing a flusso libero ad introdurre un modello di abbonamento mensile che permette di ricevere uno sconto del 25 o 50% sulla tariffa al minuto del servizio sia per gli utenti privati che per quelli business.

Dunque, se il lockdown di marzo ha praticamente bloccato la mobilità delle persone causando un drastico calo delle nostre attività, queste azioni che abbiamo introdotto fin da subito ci hanno permesso di vedere dei segnali positivi durante la Fase 2. Anche se ancora lontani dagli standard a cui eravamo abituati prima del diffondersi del virus, da maggio ad ottobre abbiamo infatti assistito ad una crescita rilevante delle nuove registrazioni al servizio, del numero dei noleggi e della loro durata, segnali che evidenziano quanto gli utenti abbiano continuato a percepire come sicuri i nostri mezzi. Da maggio, dunque, i valori sono tornati a crescere: in Italia, rispetto ad aprile, abbiamo registrato un +184% nel numero di noleggi nel mese di maggio (sono quasi triplicati) e un +438% nel mese di giugno (sono quintuplicati). Durante l'estate, poi, eravamo sulla buona strada della ripresa: nonostante il numero di noleggi fosse ancora lontano dai nostri standard, ad agosto in Italia la durata dei viaggi a bordo dei nostri veicoli è cresciuta del 230% rispetto allo stesso mese del 2019. Questa crescita si basa in particolare sul costante sviluppo da parte nostra ed utilizzo da parte degli utenti, dell'offerta di car sharing a lungo termine di SHARE NOW, ovvero noleggi che possono durare fino a 30 giorni consecutivi. A settembre ed ottobre, i numeri sono tornati ad essere vicini all'epoca pre covid anche se da novembre fino ai primi mesi del 2021, con le nuove chiusure, abbiamo riscontrato un nuovo calo delle attività – di certo non paragonabile a quello subito a marzo. Abbiamo dunque chiuso il 2020 con numeri comunque positivi, nonostante gli effetti della pandemia: l'Italia, infatti, con i suoi 710.000 utenti, si attesta al secondo posto nella classifica dei Paesi con il più alto numero di iscritti e con più auto disponibili, subito dopo la Germania. Nello scorso anno, inoltre, a livello nazionale sono stati percorsi circa 30 milioni di chilometri a bordo delle 2.400 auto presenti in flotta. Milano, con 16 milioni di chilometri all'attivo nel 2020, è la seconda città a livello europeo con più strada percorsa (Berlino è al primo posto). A Roma, invece, gli utenti SHARE NOW hanno guidato per 9,4 milioni di chilometri e a Torino per 4 milioni. Roma, inoltre, è la città italiana dove i noleggi durano più a lungo: con una media di 73 minuti, la Capitale nel 2020 segna un +132% rispetto all'anno precedente. A Milano invece un noleggio dura mediamente 49 minuti (+61%) e a Torino 31 minuti (+66%).

2. L'emergenza sanitaria ha messo in luce nuove preoccupazioni dal lato dei clienti riguardo a questioni legate alla sicurezza (in termini di igiene) relativa all'utilizzo di mezzi di trasporto condivisi. In base alla vostra esperienza, avete notato una maggiore diffidenza da parte dei consumatori verso i servizi da voi offerti?

Non appena scoppiata la pandemia, molti preannunciavano la fine della sharing mobility. Di certo possiamo dire che usufruire di un servizio in cui lo spazio fisico è condiviso con altre persone ha inizialmente spaventato gli utenti, ma successivamente, al contrario di quanto si pensava e soprattutto grazie alla messa in sicurezza della flotta e alle costanti campagne di comunicazione diretta (newsletter e social) sulla sanificazione dei veicoli, i nostri clienti hanno compreso quanto il car sharing (così come altre forme di mobilità condivisa) non fossero pericolose. Al contrario di quanto previsto, l'utente ha preso consapevolezza e ha dunque continuato ad utilizzare ugualmente il servizio. Quindi il calo dell'attività possiamo dire sia dovuto alle misure restrittive che hanno ridotto la mobilità degli italiani, piuttosto che alla percezione di sicurezza nei confronti del servizio. Inoltre, grazie alla formula dei 30 giorni, che permette di mantenere attivo il noleggio tutto per sé fino ad un mese, il car sharing si è confermato come uno dei mezzi più sicuri in assoluto. Se lo rapportiamo all'ordinario trasporto pubblico, ormai contingentato e impossibilitato nel mantenere standard qualitativi di sicurezza efficienti al 100%, il car sharing è sicuramente tra le scelte di mobilità più sicure. Ciò che invece possiamo dire essere cambiato è l'uso che i cittadini hanno fatto del car sharing in questi mesi di pandemia. Abbiamo, ad esempio, osservato che i noleggi nelle zone più periferiche della città sono aumentati. Ciò significa che il car sharing si sta diffondendo verso l'esterno della città, distribuendosi in modo più uniforme. Inoltre, con l'aumento del numero di persone che lavorano da casa, l'ora di punta ha quasi cessato di esistere: analizzando i dati dell'ultimo periodo, si nota come l'uso del car sharing resti relativamente stabile e diffuso dalla tarda mattinata fino alla sera presto.

3. Secondo il vostro parere e la vostra esperienza, quali sono le reali prospettive della micro-mobilità all'interno dell'ecosistema? Più specificatamente, si può affermare che, in base ai nuovi comportamenti dei

consumatori, questi servizi stiano oscurando le forme più tradizionali come il car sharing, o restano delle soluzioni complementari?

Uno degli effetti più importanti causati dalla pandemia da Covid-19 è sicuramente stato il boom dei servizi di micro-mobilità. Dopo diversi mesi in cui le Amministrazioni Comunali hanno dovuto gestire la regolamentazione di tali servizi, l'esplosione della micro-mobilità ha raggiunto quasi tutte le piccole e grandi città italiane. Questo fenomeno è dovuto proprio all'importanza e al ruolo che questi servizi hanno all'interno dei flussi di mobilità delle città, ossia di coprire il primo e ultimo miglio e favorire lo sviluppo di una comunità consapevole e attenta all'ambiente. Assolutamente non crediamo che i servizi di car sharing e quelli della micro-mobilità siano in competizione tra loro, ma al contrario che essi siano complementari, proprio perché, all'interno di un forte e stabile ecosistema di mobilità, i servizi dedicati al primo/ultimo miglio fanno da connettore e permettono all'utente di raggiungere il mezzo con cui fare la tratta più lunga del percorso (sia esso il car sharing, il treno regionale oppure la fermata dell'autobus o della metropolitana). Ricordiamoci infatti che il nostro servizio funziona meglio in quelle città in cui il network di trasporti pubblici è più capillare e funzionante possibile. Solo infatti avendo diversi servizi e mezzi a disposizione, i cittadini sceglieranno di adottare soluzioni di mobilità sostenibili in alternativa al mezzo privato.

4. Come vi rapportate ai vari enti pubblici, istituzioni o altri attori dell'ecosistema urbano per far coesistere al meglio i tradizionali mezzi di trasporto con le nuove modalità di spostamento? Quali potrebbero essere le ragioni che impediscono tale integrazione?

Molte amministrazioni italiane stanno pianificando la progettazione di piattaforme MaaS che abilitino l'integrazione tra le diverse opzioni di mobilità sostenibile presenti in città, disincentivando l'uso dell'auto privata. In SHARE NOW siamo generalmente aperti a nuove partnership e collaborazioni volte allo sviluppo e l'implementazione della multi-modalità urbana, sia in termini di collaborazione con le città, che nel trovare partner per l'inclusione dei nostri servizi all'interno di piattaforme multimodali. Il nostro obiettivo, comune a tutte

le società che si occupano di sharing mobility e alle amministrazioni comunali, è quello di ridurre l'utilizzo massivo dell'auto privata e di favorire scelte di mobilità alternative e sostenibili che migliorino l'assetto urbano delle città in cui viviamo e operiamo. L'unico limite che riscontriamo nell'integrazione dei nostri servizi all'interno delle piattaforme MaaS è la mancanza di fondi pubblici nel finanziamento dei voucher destinati al coinvolgimento degli utenti. Spesso, infatti, alcune amministrazioni hanno richiesto agli operatori di predisporre dei voucher scontati per coinvolgere maggiormente gli utenti nell'utilizzo delle piattaforme MaaS. Tali bonus, invece, dovrebbero essere erogati tramite fondi pubblici proprio per evitare che, in un momento di crisi economica, gli operatori della sharing mobility non siano aggravati da ulteriori costi.

5. Come valutate il livello attuale della mobilità in Italia in termini di offerta e soprattutto di domanda? Ritenete possibile un cambio di paradigma nelle abitudini dei cittadini a favore dei servizi di sharing (e quindi a discapito dei veicoli privati) nel breve termine?

Negli ultimi anni, le nostre città sono cambiate molto dal punto di vista dell'offerta di mobilità, questo grazie al grande lavoro delle amministrazioni, che hanno sostenuto l'utilità dei servizi alternativi all'auto privata: dal car al bike sharing, dallo scooter alla micro-mobilità elettrica. Ormai le nostre città offrono un mix di soluzioni di mobilità che garantisce al cittadino di potersi spostare anche senza avere una vettura di proprietà. Ciò ovviamente genera un enorme beneficio per l'ambiente, non solo in termini di riduzione dell'inquinamento, del traffico e del rumore, ma anche nel riadattare l'assetto urbanistico delle nostre città. Vi sono diversi studi che dimostrano l'utilità del car sharing in questo senso. Se un'auto privata rimane generalmente parcheggiata circa il 95% della sua vita utile, al contrario un'auto condivisa è in continua circolazione e viene usata circa sei volte più frequentemente senza quindi occupare suolo pubblico inutilmente. Come calcolato dal MIT Senseable City Lab di Carlo Ratti nello studio "Unparking", il car sharing potrebbe ridurre dell'86% gli spazi pubblici occupati dagli stalli per la sosta, ridestinandoli così alla creazione di spazi verdi, corsie per la mobilità dolce e dehor per le attività commerciali, particolarmente colpite dalle restrizioni imposte dalla pandemia. Inoltre, secondo lo studio condotto dall'Istituto

Tecnologico di Karlsruhe (KIT), per ogni vettura SHARE NOW non sono stati acquistati tra i 7,8 e i 18,6 veicoli privati e sono state vendute tra le 2,1 e le 5,3 automobili personali. Sono chiari, dunque, gli effetti della mobilità in condivisione che recepisce a pieno le esigenze dei cittadini che, negli ultimi anni, sono cambiate radicalmente. L'utente di oggi è, infatti, sempre alla ricerca di servizi più connessi, smart e digitali. Riprendendo i risultati della ricerca Bva-Doxa per l'Osservatorio 'Change Lab, Italia 2030' realizzato da Groupama Assicurazioni, che ha voluto indagare i principali trend che entro il 2030 cambieranno le abitudini di vita degli italiani, vediamo quanto la mobilità condivisa ha già trovato spazio nelle abitudini di spostamento degli italiani. Secondo i dati dell'Osservatorio Groupama, attualmente solo 3 italiani su 10 (29%) hanno utilizzato almeno una volta il servizio di car sharing; 4 su 10 se consideriamo i giovani under 35. Meno adoperati invece lo scooter sharing e il bike sharing: rispettivamente 12% e 21% del campione. La quasi totalità degli intervistati (94%) risulta pienamente soddisfatta del servizio di car sharing: ne apprezza il risparmio di tempo (54%) e denaro (47%) e il minor impatto ambientale (34%). Lo scooter sharing riporta valori del tutto simili per livelli e motivi di soddisfazione. Per quanto riguarda invece il bike sharing, il livello di soddisfazione è leggermente più basso (86%): in generale, 1 utente su 2 ne apprezza il basso impatto ambientale, mentre tra i motivi di insoddisfazione vengono citati l'inefficienza del servizio (38%), la scomodità (31%), la carenza di punti di utilizzo (31%) e i costi (31%). Il servizio di car sharing, inoltre, sarà molto più utilizzato nei prossimi 10 anni: il 62% del campione intervistato è convinto che ne farà uso. Anche il bike sharing dovrebbe registrare un'impennata degli utenti, dato che circa 1 Italiano su 2 immagina di poter utilizzare questo servizio. Lo scooter sharing sarà scelto, invece, da 3 su 10. I giovani tra i 18 e i 34 anni si dichiarano i più propensi a far ricorso alla mobilità condivisa. Gli uomini in maggior numero rispetto alle donne. Il paradigma nelle abitudini dei cittadini a favore dei servizi di sharing è dunque già cambiato, in particolare nelle grandi città dove tali servizi sono operativi da anni, come Milano, Roma e Torino. L'introduzione del car sharing in queste città si è rivelata una vera e propria rivoluzione in termini di mobilità urbana.

6. Quali sono i principali problemi legati all'implementazione dei nuovi servizi di trasporto in Italia (dimensione delle città, infrastrutture, enti pubblici), rispetto ad altri Paesi Europei ed extra Europei? E quali sono invece le opportunità, non colte finora, che vi hanno portato ad allargare i vostri servizi nelle città italiane?

Ci sono alcuni requisiti che una città deve soddisfare per offrire il car sharing a flusso libero:

- Ad esempio, devono esserci accordi di parcheggio speciali con le autorità cittadine.
- Un altro fattore importante è la dimensione complessiva della città, la situazione del traffico o la densità della popolazione.
- Le città stesse dovrebbero considerare il car sharing a flusso libero come uno strumento sostenibile e come parte del mix di mobilità. Possono supportare il car sharing con interventi speciali ad es. regolamenti di parcheggio speciali oppure annullamento del canone richiesto agli operatori per lo svolgimento del servizio, come ha fatto il Comune di Roma lo scorso dicembre.

Vi sono poi dei problemi specifici riguardanti l'elettrificazione del servizio di car sharing nel nostro paese. Se infatti da un lato SHARE NOW da sempre crede che il futuro del car sharing sia elettrico, d'altra parte, in Italia, vi è ancora una grave carenza infrastrutturale sia in termini quantitativi (scarsa capillarità) che qualitativi (mancanza di colonnine a ricarica veloce). Una città come Amsterdam, ad esempio, simile per dimensioni ed importanza a Milano, mette a disposizione una rete di 4.000 colonnine pubbliche che ci permette di operare con una flotta completamente elettrica. Potersi appoggiare ad un network pubblico adeguato è un prerequisito fondamentale per fornire un servizio di car sharing elettrico di successo ed economicamente sostenibile. Per questo SHARE NOW ritiene sia necessario un intervento pubblico su più fronti: dall'aumento dell'infrastruttura di ricarica ed in particolare di colonnine veloci, all'estensione degli incentivi per l'acquisto o il noleggio a lungo termine di auto elettriche anche alle società di car sharing e non solo ai privati,

ad un piano di incentivi sul prezzo di acquisto dell'energia per la ricarica dei mezzi condivisi.

7. Quali sono state le risposte immediate della vostra azienda volte a garantire una continuità aziendale, e/o le iniziative volte a mantenere alta la brand awareness e customer loyalty in un periodo di calo della domanda?

Guardare domanda numero 1

8. Per quanto riguarda le opportunità future della mobilità, ho evidenziato nella mia tesi 5 fattori principali attorno ai quali si potrà presumibilmente sviluppare la nuova mobilità, che sono: elettrificazione, guida autonoma, multi-modalità, car sharing e micro-mobilità. Quali di questi aspetti ritenete che possano avere una maggiore influenza sulla nuova mobilità? E quali sono le loro reali prospettive future?

Il futuro del carsharing per SHARE NOW è assolutamente elettrico, quindi gli sviluppi futuri della nostra strategia viaggeranno verso questa direzione. Attualmente la società gestisce oltre 2.900 veicoli elettrici in 8 città europee, 4 delle quali con flotte completamente elettriche (Parigi, Madrid, Stoccarda e Amsterdam) e le altre 4 parzialmente elettriche (Copenaghen, Amburgo, Monaco, Budapest). I nostri dati sull'elettrico confermano che, dove ci sono le giuste condizioni infrastrutturali per implementarlo, il servizio riscontra ottimi successi:

- Oltre 10.000 viaggi su auto elettriche al giorno
- 200 milioni di chilometri elettrici percorsi fino ad oggi
- I noleggi a bordo di vetture elettriche sono diventati sempre più lunghi: nel 2020 abbiamo registrato un +62% nella durata dei noleggi effettuati a bordo di auto elettriche rispetto al 2019

Sempre parlando del futuro, la mobilità per noi ha una sola chiave di lettura, ovvero l'integrazione tra i diversi servizi. È proprio questo il motivo della nascita della Joint Venture tra Bmw e Daimler: i 3 brand nati dalla JV devono collaborare

tra di loro, scambiarsi esperienze e know how con l'obiettivo un giorno di essere tutti parte di un unico ecosistema mobilità. Nel loro viaggio urbano, i clienti si muoveranno all'interno di un ecosistema sostenibile perfettamente collegato e on-demand che combina carsharing, ride-hailing, ricerca di parcheggio, ricarica e multimodalità. Il nostro obiettivo è creare una soluzione di mobilità unificata, completa e digitale per una vita migliore in un mondo connesso. Sicuramente entrerà in gioco la tecnologia della guida autonoma. È un futuro lontano questo ma sicuramente prevedibile per noi. L'utilizzo di veicoli autonomi nella flotta del carsharing richiederà ancora di più l'utilizzo e l'analisi dei nostri dati per permettere al veicolo di raggiungere il cliente in autonomia e, terminato il viaggio, tornare in una zona in cui la domanda è più alta, sulla base di algoritmi intelligenti. Il veicolo sarà praticamente sempre in movimento: la domanda del servizio potrà dunque essere soddisfatta utilizzando un numero significativamente inferiore di veicoli, che saranno però utilizzati in maniera più efficiente. Saranno necessarie meno macchine per garantire la mobilità a disposizione di tutti. Ad esempio, se oggi tutte le auto della nostra flotta fossero del tutto autonome, potremmo garantire lo stesso numero di noleggi che abbiamo oggi nel mondo, ovvero 35 milioni, con la metà delle auto. Quindi potremmo dimezzare il numero delle automobili e mantenere lo stesso numero di noleggi.