7

The Italian Automotive Industry: Between Old and New Development Factors

Giuseppe Giulio Calabrese

Introduction

The Italian automotive industry is characterised by a number of peculiarities compared to the rest of the other automotive-producing countries. In Italy, there is only one main automotive assembler, Fiat Chrysler Automobiles (FCA),[1] and a set of differentiated companies, which represents one of the most important automotive clusters in Europe, able to supply all types of modules, components and parts expected in a vehicle. However, the Italian automotive suppliers are mainly composed of small and medium enterprises, which, in the past, were mainly linked to the national producer.

The last decade has witnessed a number of important changes in this peculiar historical context. The first and most important change has been the process of internationalisation underwent by the former

G. G. Calabrese (✉)
CNR-Ircres (Research Institute on Sustainable Economic Growth of the National Research Council of Italy), Moncalieri, Italy
e-mail: giuseppe.giulio.calabrese@ircres.cnr.it

A. Covarrubias V., S. M. Ramírez Perez (eds.), *New Frontiers of the Automobile Industry*, Palgrave Studies of Internationalization in Emerging Markets,
https://doi.org/10.1007/978-3-030-18881-8_7

Fiat after the closing down of the agreement with General Motors in 2005 (Camuffo and Volpato 2002). The need to expand operative markets re-emerged with force during the last economic and financial crisis of 2008 that affected the automotive sector worldwide. Fiat was considered too small in the competitive scenario and a possible prey to its competitors (Volpato 2011). Therefore, in 2008, Fiat began to define a new strategy aimed at maximising the exploitation of the economies of scale through internal and external growth. In turn, the main objective of that plan was to increase the company capacity by 6 million units in terms of global production (Ciferri 2008). The internal growth was pursued by investments in new production lines in Brazil, China, Serbia and Argentina, whose results were partially achieved only in Brazil (Amatucci and Mariotto 2012). In the case of external growth, Fiat tried to conduct some mergers and acquisitions. The strategy has been partially realised with the integration with Chrysler (Balcet et al. 2013) and the establishment of Fiat Chrysler Automobiles, the lack of the acquisition of a second carmaker[2] has not allowed, so far, the achievement of the intended target in the production rate.[3]

The second important change is related to the last economic and financial crisis that has caused heavy repercussions on the automotive industry which, from 2007, has registered a strong decrease of vehicles produced, mainly in Italy (−51.2% from 2007 to 2013), but also in the European Union (EU) overall (−23.2% in that same period).

This chapter analyses the restructuring process of the automotive industry, which, on average, represents 3% of the Italian Gross Domestic Product (GDP) (ANFIA—*Associazione Nazionale della Filiera Industria Automobilistica* 2017). The balance is positive for the trade of parts and components, 5.7 million Euros in 2017, and negative for the trade of passenger and commercial vehicles (9.6 billion Euros). Indeed, contrary to expectations, foreign trade data provided by both the Italian association of the supply chain (ANFIA 2017) and the Italian National Institute of Statistics indicate that the automotive filière has shown a great deal of resilience to the crisis (Manello and Calabrese 2017).

The chapter is structured in five sections, including this one. The next section analyses the production and the Italian market of motor vehicles.

Data, herein discussed, highlight the increase, in recent years, of the importance of foreign markets, which, in turn, has contributed to the development of a number of changes in the quality required from Italian vehicles. Section "The Italian Supply Chain" applies the same methodology of Section 2 to the study of the production of cars. To the previous two factors of development (foreign markets and quality improvement), we have added a possible third factor represented by FCA. Section "Driving Factors for the Italian Automotive Industry" goes into detail in analysing the three drivers emerged so far, particularly focussing on the new industrial relationships developed within the job market. A fourth almost missing factor has been analysed, that is, the new business models for sustainable mobility.

Finally, conclusions provide some observations about the inconsistency of industrial policies implemented in Italy and, in particular, within the automotive sector.

The Italian Automotive Market

In quantitative terms, the economic and financial crisis has not been overcome as yet. Indeed, levels of production from 2007 have not been regained. However, the critical period of what has now become an already ten-year-long crisis can be divided into two main periods.

Up to 2013, vehicles' production had registered a rapid decrease, often drastic. The strategy of internationalisation run by Fiat—focussed on the integration with Chrysler, the delocalisation of lines of production originally based in Italy to foreign countries and the decision to postpone the renewal of models—has affected production levels, mainly for the Italian factories, although some of these issues had already been presented before 2007.

Indeed, the production of motor vehicles, in general (e.g. passenger vehicles, commercial vehicles, buses), had already dropped by 26.1% from 2000 to 2007 (see Table 7.1). A further loss of 35.7% was added in the following years up to 2013 (a total of −62.1% for the period 2000–2013), albeit there have been differences according to the type of vehicle.

Table 7.1 Production rates for motor vehicles in Italy

	Passenger vehicles		Industrial and commercial vehicles		Buses		Total	
Year	Units no.	%	Units no.	%	Units no.	%	Units no.	%
2000	1,422,284	100	312,868	100	3163	100	1,738,315	100
2001	1,271,780	89.4	305,710	97.7	2206	69.7	1,579,696	90.9
2002	1,125,769	79.2	298,715	95.5	2597	82.1	1,427,081	82.1
2003	1,026,454	72.2	292,327	93.4	2850	90.1	1,321,631	76.0
2004	833,578	58.6	305,451	97.6	3076	97.2	1,142,105	65.7
2005	725,528	51.0	309,365	98.9	3459	109.4	1,038,352	59.7
2006	892,502	62.8	316,225	101.1	2867	90.6	1,211,594	69.7
2007	910,860	64.0	372,003	118.9	1449	45.8	1,284,312	73.9
2008	659,221	46.3	363,209	116.1	1344	42.5	1,023,774	58.9
2009	661,100	46.5	181,135	57.9	1004	31.7	843,239	48.5
2010	573,169	40.3	263,952	84.4	1065	33.7	838,186	48.2
2011	485,606	34.1	303,919	97.1	823	26.0	790,348	45.5
2012	396,817	27.9	274,466	87.7	489	15.6	671,768	38.6
2013	388,465	27.3	269,320	86.1	421	13.3	658,206	37.9
2014	401,317	28.2	296,258	94.7	289	9.1	697,864	40.1
2015	663,139	46.6	350,319	112.0	765	24.2	1,014,223	58.3
2016	712,971	50.1	389,694	124.6	640	20.2	1,103,305	63.5
2017	742,642	52.2	399,178	127.6	390	12.3	1,142,210	65.7

Source: ANFIA

In 2013, cars' production had dropped by 72.7% overall, while that of industrial vehicles, in particular commercial ones, had nearly come back to pre-crisis levels and even reached higher ones than 2000 (for the years 2006–2008). Data for buses' production were worse, as they were deeply affected by the closing down, in 2012, of an Iveco plant entirely dedicated to that line of production.

Until 2013, the data, specifically for passenger cars, offered an image of the crisis affected by the specificity of the Italian panorama:

- Weakness of FCA levels of production in Italy because of the lack of replacement for models that had already reached their end-of-life point (e.g. Fiat Croma, Fiat Idea, Fiat Multipla, Fiat Punto Classic, Lancia Musa, Lancia Thesis).
- Closure of the Termini Imerese plant in Sicily, with its line of production moved to Poland, where the production of the new Panda was moved to Italy in Pomigliano to meet political complaints.

– Dramatic loss in the volume of sales of vehicles within the national market, which passed from 2.7 million in 2007—year of the absolute peak in positive—to just 1.4 million in 2013, with a decreasing rate of 48.9% (see Table 7.2).
– Limited inclination to the export of cars that is the weakness of entering into foreign markets. When comparing data from both Tables 7.1 and 7.2, a core feature of the Italian market can be highlighted: a low difference rate between motor vehicles produced and sold in Italy which, for 2017, corresponded to 52.1% (42.1% for cars).[4] This data appear extremely negative when compared to countries such as Spain, where the number of vehicles produced is nearly the double of that for registered cars, or to Germany and France, where produced cars are respectively 150% and 80% of the registered ones. Even when taking into consideration the British case, where a national firm car assembler is missing, 60% of the registered ones are locally produced.
– A strong under-exploitation of productive production plants and the subsequent unemployment benefits due to their workers. With regard to the European factories of FCA, in 2012, effective utilisation of their capacity for production goes from the 17% of Mirafiori (Turin) to the 65% of Tychy in Poland, which is still lower than the theoretical balance point of 80% (Ciferri 2013).

Table 7.2 Italian market for motor vehicles

	Registered in Italy		Exported	
Year	Units no.	Rate (in %)	Units no.	Rate (in %)
2007	2,777,175	100	650,508	100
2008	2,421,918	87.2	560,953	86.2
2009	2,357,886	84.9	382,609	58.8
2010	2,164,608	77.9	440,729	67.8
2011	1,942,644	70.0	452,808	69.6
2012	1,532,609	55.2	407,381	62.6
2013	1,419,941	51.1	393,233	60.5
2014	1,493,308	53.8	438,666	67.4
2015	1,726,275	62.2	682,955	105.0
2016	2,052,418	73.9	716,322	110.1
2017	2,192,223	78.9	742,418	114.1

Source: ANFIA

– Until 2013, the only positive fact is represented by the new FCA investments, the reopening of the body parts plant purchased from Bertone in Grugliasco (Turin) to devote to the production of Maserati's new models (Calabrese and Vervaeke 2017), and the renewal of the production lines for the plants in Melfi, Atessa (commercial vehicles) and Mirafiori.

From 2014, and more precisely from its second half, the production and sale trends changed direction, with the only exception of buses. In 2015, the production rate reached more than a million units. Compared to 2007, in 2017, only the export rate has increased (+14.1%) while the production rate is still below 21.0% and the registration rate, of about 2.2 million of units, is below 11.0%. Obviously, the bigger portion of this market is occupied by FCA (more or less 28% of it), followed by Volkswagen (an average 14%) and the French companies—Renault and PSA (more than 10% each).

The Italian automotive market is still characterised by a certain weakness. Some market segments that could have pushed for recovery are penalised by an unfair tax system compared to the main European markets. For example, the segment of company cars is negatively affected by the Italian tax system, as opposed to the rest of European countries. While in Italy, the cost of company cars is deductible for only 20% of its value, in other EU countries it can be deducted up to 100%. Furthermore, in Italy, the threshold of deductibility for cars used by companies or professionals has not changed since 1997 and Value-Added Tax (VAT) is deductible only up to 40%. On the contrary, in the main part of European countries, the deductibility of VAT reaches 100%. That is why the relevance of the segment of company cars in Italy remains very low (40% of registrations) as opposed, for example, to countries such as Germany (65%) where the use of a company car is regarded as an extra benefit for employees.

A specificity of the Italian market is represented by gas vehicles (liquefied petroleum gas [LPG] and compressed natural gas), which constitute one of the bridge technologies in terms of their lowest impact on the environment. Together with electrical and hybrids vehicles, in the future, gas vehicles can contribute to reduce pollution. Such advantage

is not limited to the environment but it also affects economics and the job market as Italy is a world leader producer of gas vehicles, thanks to its chain of production characterised by factories, vehicles, distribution and maintenance.

Also, thanks to its sale rates for gas vehicles, Italy is the EU country with the highest rate of no petrol vehicles. Eco-friendly cars represent about 10% of the car in use, having accounted for 17.6% of sales in 2014 when they enjoyed important tax benefits. All considered, in matters of emissions, this automotive subsector has allowed Italy to become one of the most virtuous countries in the EU and to reach, as early as 2011, the goal of 129 gr/km of CO_2 set up by the European Commission for average emissions of CO_2 by new cars (130 gr/km). In 2017, the emission average for new cars sold in Italy has been of 113.3 gr/km, lower than 5 gr/km of the European average.

Looking back at production rates for vehicles as expressed in Table 7.1, now those acquire a more intrigued meaning as we go beyond their simple volume and look, instead, at the turnover for the domestic national market and the volume of export (Fig. 7.1).

The different series of the trends do not appear too different in the table and the figure. However, what becomes interesting is that the total turnover production (red line) is always above the total production in

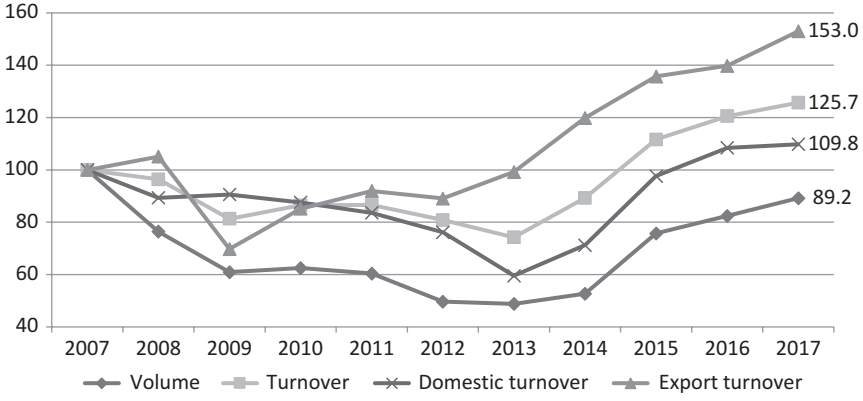

Fig. 7.1 Production rates of vehicles, expressed in volume and turnover. (Color figure online)

volume (black line), with increasing rates above all from 2014. In other words, we can now see a progressive movement up towards models with both a higher value and a better quality. The only exception is 2009, the year in which the economic and financial crisis had its major effects and tax benefits and discounts distorted the market. In that year, the trend of production in value for the foreign market (green line) performed better than that for the domestic market (blue line). In particular, we can observe how exporting anticipated the economic cycle and began to increase its value from 2009 onward, up to the point of reaching the rate index of 100 already in 2013. Thus, we can see how exporting became clearly an important driver for the Italian automotive industry.

In order to successfully compete within international markets, the quality of products is a necessity. Qualitative changes for automotive production in Italy clearly emerge in Fig. 7.2, where export and import turnovers—deflated in both cases—are expressed in Euros per kilogram. From 2014, and for the first time from 2000, export turnover is higher than the import one and keeps on constantly increasing from 2006 and in a significant way in 2013, becoming an important new factor of change for the Italian system.

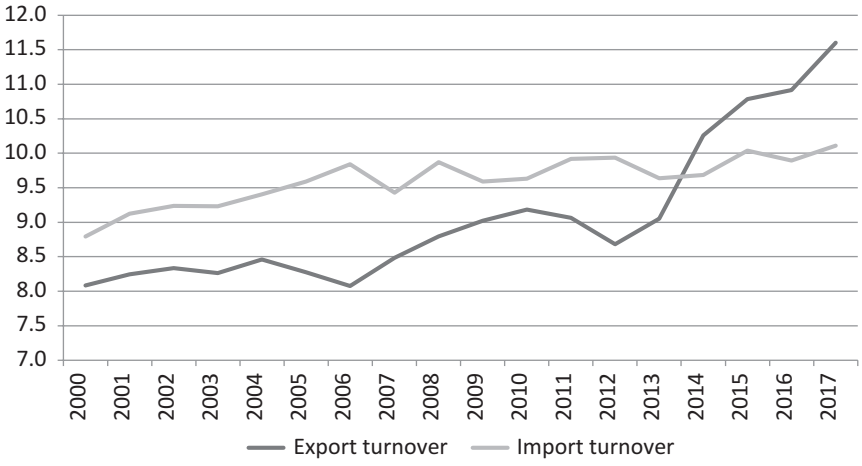

Fig. 7.2 Average of export and import turnover of vehicles, expressed in Euros per kilogram, that is, an exported Italian car costs per kilogram about 11.5 €, and an imported car about 10 €. (Color figure online)

Such change can be explained by looking at the FCA investment for premium models. Initially, it started with the Maserati brand and by increasing production from the Grugliasco plant. It followed with the success of models such as Jeep Renegade and Fiat 500X (both assembled at the Melfi plant), and more recently, it continued by relaunching the Alfa Romeo brand from the Cassino plant.

The Italian Supply Chain

The trend of the Italian supply chain is slightly different from that of the carmakers, even if, also in this case, export and product quality are confirmed as crucial drivers.

First of all, as it emerges from Fig. 7.3, in quantitative terms, even the suppliers of parts and components have not recovered production levels from 2007. However, their performance has been better than that of the final producers of vehicles, which, only in 2016, managed to surpass the former with their production rates.

According to the Italian association of the automotive filière (ANFIA 2017), the companies of this supply chain continue to account overall for about 3% of the national GDP and keep on investing 3.7% in research

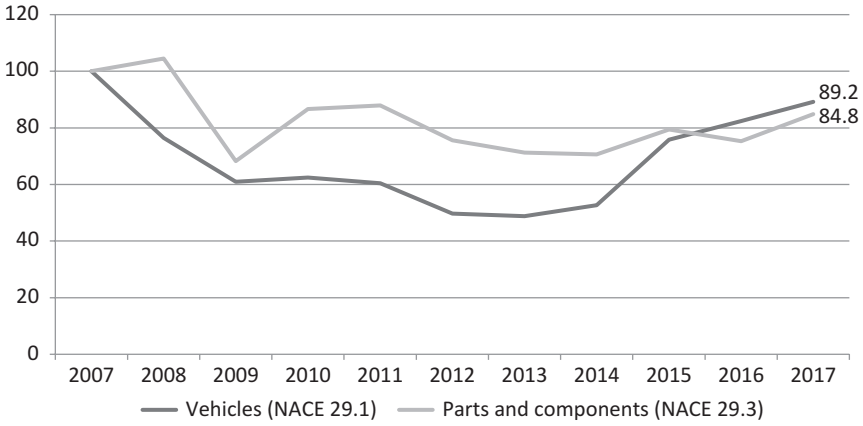

Fig. 7.3 Volume of vehicles production rates and parts and components. (Color figure online)

and development (R&D) of their turnover, which, for 2017, reached about 82 milliards of Euros. Such investments have generated an appropriate rate of innovation, which has allowed to compete at international levels and to achieve a significant positive trade balance (Manello and Calabrese 2015).

In the breaking down of turnover rates in different sectors of earnings (Moretti and Zirpoli 2017), exportations account for 39% of the total, of which 9 percentage points benefit FCA factories abroad, while the remaining national sales go for a 28% to the FCA group and a 33% to other companies. In short, despite the fact that overall FCA takes over 37% of the total turnover of the supply chain, this percentage is constantly decreasing (e.g. it was 55% in 2010). As anticipated, the comparison between the volume of car production and that of the suppliers' turnover presents a different trend for the latter. If we take again, as a starting point 2007, we can divide the following period in four moments (see Fig. 7.4).

The first two years—up to 2009—have been characterised by a severe recession, whereas we can see how trends for all the four indicators (volume, turnover, domestic turnover and export turnover) do not present relevant differences. However, in the following two years—up to 2011—all the indicators were growing apart from that for internal turnover (blue

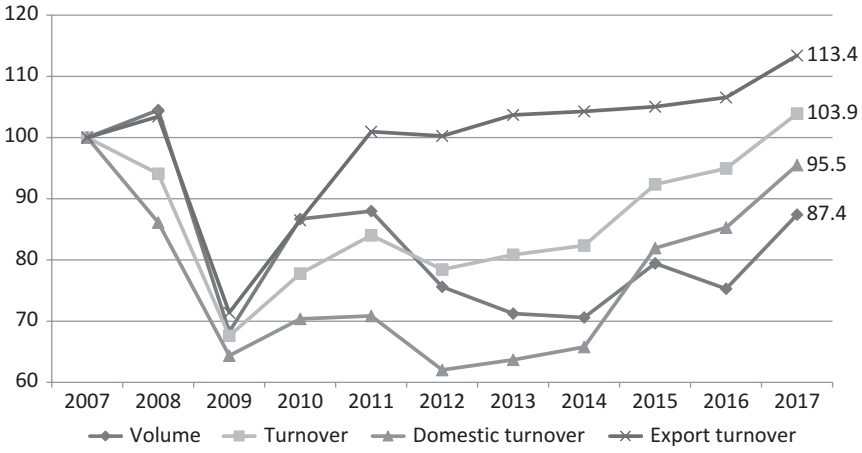

Fig. 7.4 Production rates for parts and components, expressed in volume and turnover. (Color figure online)

line). Therefore, the growth of the total turnover was only supported by export (green line). Although, if we compare the improvement registered in the volume rate for total production (black line) to the production expressed in the value of the total turnover (red line), we can see that the growth is more due to the policy of price than to a major qualitative change. The situation changed again in the following three years—from 2011 to 2014—when decrease in the volume production was more severe than that for the total turnover, while export kept on growing. The importance of the quality effect becomes evident for the last three years for which we can assume that a possible FCA effect shall be taken into consideration. Indeed, the production of parts and components for the domestic market—from 2014 to 2017—has increased by 30 percentage points, pushing up the final domestic turnover to 95.5.

The quality effect, as a driver for development within the Italian supply chain, clearly emerges in Fig. 7.5, where the turnover for components exported and imported is expressed in Euros per kilogram, deflated in both cases.

Considering a time period of 18 years, the average price per kilogram, at the net of inflation, has increased by 37%, moving from 5.0 € to 6.8 €. While the relative data for the import have increased by 32%, if we do

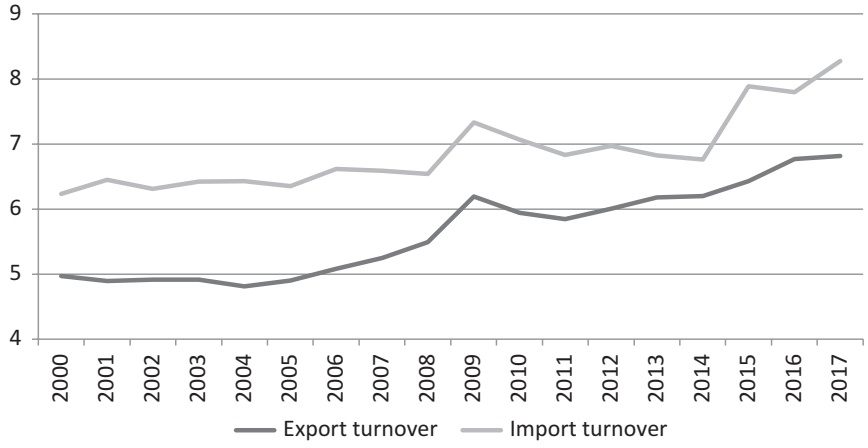

Fig. 7.5 Average turnover for import and export, expressed in Euros per kilogram. (Color figure online)

not take into consideration the last three years, the total increase has been by only 8.5%. On the one hand, the alignment in the trends of the two curves points at a considerable improvement in qualitative terms for Italian suppliers, something that is reflected in the raise of prices. On the other hand, the clear difference registered in the last three years shows that the process has not been completed as yet and, more importantly, that further actions are needed.

Undoubtedly, the raise in the relative data for the import turnover can be linked to the beginning of the production in Italy of new models of premium and luxury models, the components of which at an increased value are purchased by foreign sellers from FCA in greater numbers, as opposed to models of inferior value. Indeed, if we look at informal comparisons and evaluations on the total cost of the Fiat Panda, the weight of purchase by Italian suppliers is 40%, while that of the Jeep Renegade is only 27%, a percentage shared among European suppliers (15%) and above all non-European ones (25%).

Let us consider some of the specific characteristics of the Italian automotive supply chain:

– According to the Observatory of the Italian Automotive Supply Chain (Moretti and Zirpoli 2017) and based on the EU normative system, one out of every ten companies can be identified as "big" (10.4%). These types of companies generate a turnover of more than 50 million Euros or have more than 250 employees. Medium companies are 21% of the considered sample having a workforce of between 50 and 250 workers or a turnover between 10 and 50 million Euros. Small companies (up to 50 employees and a 10 million Euros of turnover) represent the core segment of the sample at 41.7%. Finally, the remaining part of the sample is constituted by micro-companies (up to ten employees and a two million Euros of turnover), which are 26.3% of the total.
– Production is still territorially concentrated: even if Piedmont, where the headquarters of FCA are located, weighs 35.9% in terms of the number of companies, it caters to 47.3% of the turnover and 54.4% of the total workforce (Bianchi et al. 2001).
– The internal structure of the Italian supply chain is structured according to production. First, we have those companies which are subsup-

pliers (55.0%), then the ones that produce parts and components (32.7%), those providing services of engineering and design (9.9%), and finally, producers of modules and systems (2.4% of the total of companies).

– Research centres for engineering and design are mainly based in Piedmont (more than 60%) but only a few of these are globally well-known, such as Pininfarina and Italdesign—both controlled by foreign companies.[5] The majority of these centres are quite small and only a dozen of them have more than 100 employees (Calabrese 2011).
– The majority of suppliers for modules and systems are controlled by foreign multinationals that have gradually bought plants run by big national suppliers and adapted them to a hierarchical production system structured in many levels (Bianchi et al. 2001; Calabrese 2001). Nowadays, their dependence from FCA has diminished, and they produce for other carmakers through their satellite companies. As a result of the increasing dependence on multinational companies abroad, several suppliers of modules and systems have resized or even closed down their Italian research and development centres to move those activities to foreign countries.
– Lately, one of the keywords, to keep turnover levels up and to try to bring them back to pre-crisis levels, has been "diversification" of both commercial and production activities. One of the strategies has involved those suppliers who have focussed on markets, including some of the domestic ones, that have recently increased in absolute or relative values, such as that of industrial and commercial vehicles (65% of companies from the supply chain have stated that they cater to the lines of production devoted to heavy commercial and industrial vehicles, while 36% for those to buses and coaches).
– Also, within the Italian automotive supply chain, there have been important specialisations. Half of the sample sees itself as able to produce parts for cars of medium-big dimensions (55%) or minivans and (Sport Utility Vehicle) SUVs (47%). Furthermore, there is a segment of sport and premium models, within which nearly half of the companies from the sample are active (49%). On the other hand, diversification can change from region to region. It is higher in companies from the Emilia-

Romagna region, which focusses not only on automotive but also on motorbikes, farming vehicles and other mechanic products, in general (Bardi and Calabrese 2007). It is lower in companies based in the Piedmont region, which are more strongly connected to FCA (Castelli et al. 2011).

– Another source of income is represented by the market of spare parts, a sector characterised by a strong competition. To give an example, it suffices to think of how many thousands of spare parts can a car have. If we then multiply that number for the different models and versions available on the market in the last 20 years, the result is an astonishing number. However, it is true that when a car owner wants to change a part in a model out of production, it is necessary to find a supplier able to cater to that particular spare part at a reasonable time and cost. Indeed, that is a profession in which Italy can effectively claim to have a historical specialisation thanks to its recognised manufacturing capacity and flexible production ability.
– As with regard to the diversification of markets and products, it is important to refer to one of the latest trends. In the latest year, one of the reactions to the crisis of the automotive sector has been to reutilise skills and capacities developed in this sector with the objective of attracting other industries. In this case, not all companies have the required skills (Follis and Enrietti 2001). Often, even when it does represent a potential resource, an opportunity of this kind is not enough for them to redirect the volume of business previously guaranteed by the automotive sector. This happens for two reasons. The first is that often other industries are less affected by the crisis than the automotive industry. The second is that members of the automotive supply chain, normally, are companies used to compete year after year and to gradually tune their competitive factors (such as quality, innovation, price, services, etc.), which overall makes them more competitive than companies from other industrial sectors (Manello et al. 2016). Strictly speaking, the automotive sector accounts for 74% of the sales for the supply chain, which means that the chain itself has managed to diversify up to a quarter of the source of its turnover.

Driving Factors for the Italian Automotive Industry

This section analyses, in more depth, the three driving developing factors of the Italian automotive industry as identified in the previous pages, namely: exporting, the improvement of quality, and finally, the FCA role with a particular focus on the new industrial relationships that the Italian carmakers have established with some of the Italian trade unions. Moreover, some considerations are reported concerning sustainable mobility in which Italy is experiencing some delay.

Exporting, an Always Important Driver

For the Observatory of the Italian Automotive Supply Chain (Moretti and Zirpoli 2017) nearly three-fourths of Italian suppliers sell their products abroad. On average, the turnover of companies from the supply chain comes for its 39% from the export and for its 61% from the domestic market. Accordingly, the producers of modules and systems report that 52% of their business relies on sales abroad, a percentage that surpasses the national average greatly, the same for the producers of components (45%). On the other hand, companies of engineering and design and tier-2 suppliers are below the national level by 35% and 32%, respectively.

Obviously, not all companies do export with the same intensity. We can consider, as small exporters, those cases in which companies earn less than a quarter of their turnover abroad, as medium exporter companies with a turnover generated abroad for the 25–50% of their total, and as big exporters those companies with a turnover of between half and three quarters of their total coming from abroad. In addition, there are also so-called exclusive exporters, an expression that refers to companies with an export rate of more than 75% of their turnover. Among Italian exporters, nearly 35% are big or exclusive ones, while only 17% are small. On the other hand, 54% of the sample is constituted by what we can define as “not-small” exporters.

Gradually, all the specialisations of the automotive industry have resorted to open up to a bigger market than the domestic one, and all have developed a prevalence of exporters (Calabrese and Manello 2018a). The biggest group of exporters (85%) has emerged from the supply chain, whereas the percentage of "not-small" exporters is highest than the national average (67%). In this case, we are dealing with companies at a high level of innovation, which have managed to easily adapt their products to international standards. Engineering companies are in the same situation as those producing components are. Thus, 74% of the former are exporters, among which 57% are of the "not-small" type. On the other hand, these are surpassed by companies producing modules and systems (original equipment manufacturer [OEM]), among which 81% are exporters, and among these, not less than 74% "not-small" ones. These data might come as a surprise considering that normally OEMs prefer big clients nearby and are usually controlled by multinational companies. However, the crisis in the automotive industry has pushed all chains to make an effort of adaptation. A possible explanation for that is the fact that these companies, usually dependant on bigger groups, have succeeded in effectively exploiting the international networks of the latter.

In terms of the destination countries of export, Europe remains the main one (for 77% of companies), followed by the American continent (11%), Asia (9%), Africa and Oceania (4%). Producers of components prefer Europe (81%) while OEMs push the national average rate up towards extra-European destinations (31%). If we narrow down our analysis to the U.S. and the BRICS countries (Brazil, Russia, India, China and Southern Africa), we see that North America receive more than half of all exports going to the Americas, while Brazil gets something less than a quarter; within the entirety of Asia, China less than a third and India roughly a tenth. In short, Italian companies seem orientated primarily towards the Americas and, in particular, to the U.S., with a secondary interest in the Asian continent and a preference for China.

As with regard to Southeast Asia, destinations from the area of the Association of Southeast Asian Nations (ASEAN) are scantly represented. While 57% of companies interviewed do not export to the ASEAN area, nor are they thinking of doing so ever, there is an average 6%, which goes

up to 11% in the case of OEMs, for which export towards Southeast Asia is increasing. Going into more detail, on average, there are 14% of exporters to the area, although that does not represent their main business destination. A small portion of companies, above all in the case of specialised and OEM exporters, have some of their production lines based in the ASEAN region.

It is interesting to observe that the main obstacles to export are directly linked to the activity of exchange, such as costs of transport (36% of the Italian exporters) and problems of logistics depending on the Italian infrastructures (15%).

The main competitors for Italian companies come from countries in Eastern Europe, followed by Asia, Central Europe and North America.

The best way to access new markets is to directly invest locally. Such process of direct investment is still in progress, albeit it has recently slowed down. It has been focussing on East Asia, mainly China. Indeed, when looking at the last three years, out of a total of 32 openings by Italian supplier companies of new plants abroad, only 3 of these appear to be in Western Europe, while 29 are located in more distant markets (8 in China, 3 in India and 3 in Uzbekistan). On the contrary, in the previous trimester, 39 plants had been opened. As for plants already located abroad, 20 of these have been closed between 2015 and 2017, as opposed to just 7 closed down in the previous period.

All considered, in relation to the data, it can be said that geographical diversification in the last years represents a key factor to overcome the crisis for the main part of the companies in the Italian automotive supply chain. While small companies still have work to do, the path has already been opened. A well-established chain originated in Italy is present in the international market, and indeed, it has gained a useful experience in dealing with global competitors.

Investing in Quality and Innovation

Improvements in quality in the production of Italian vehicles, all the way up from final producers to small suppliers working for third-party companies—as we have just discussed—follow two main paths.

The first goes in the direction of a generalised development of all models from a specific series, such as FCA investments on products with a higher added value. That is the case of small SUV or crossover, such as the Fiat 500X or the Jeep Renegade, both assembled at the Melfi plant—at 400,000 units per year. Both models have positively performed in the market, and they have effectively helped increase employment rates.

More specifically for the supply chain, a recent study has showed that, for the period 2010–2012 and according to European rankings, the technology levels and profits based on supply contracts for Italian OEMs have been very close to countries, such as Japan and Switzerland, that are normally considered to be better structured (Calabrese and Manello 2014). When compared to British, Canadian and Spanish suppliers, Italian ones have appeared to perform better on both indicators. Furthermore, when looking at the previous period, Italian suppliers registered the second-best improvement in technology levels after the Swiss. Here, it is important to note that when comparing different chronological periods, not only adjudications of "more attractive" supply contracts have been taken into consideration but also the process of renovation of the chain itself emerging from its consistent number of acquisitions.

Producers of modules and systems (OEMs) represent bigger companies, which are more inclined to invest in a formalised way on a specific type of innovation based on the balance of research and development. Thus, OEMs are better suited to separate an innovation investment from the rest of their business activities even when the former is undertaken in the conditions of co-design.

According to the Observatory of the Italian Automotive Supply Chain (Moretti and Zirpoli 2017), 68% of Italian automotive suppliers do invest in R&D. Investments of more than 5% of the turnover are made by 38% of engineering companies, 61% of suppliers of parts and components and 58% by OEMs. Particularly for the latter, half of OEMs invest more than 8% of the turnover, while more than half of the suppliers of parts and components (58%) have declared that they do not support any costs for R&D.

In Italy, 93% of companies declare that they do R&D internally: only 6% thanks to public funding, while 9% only acquire R&D from the market. A quarter claim that they do R&D in collaboration with other companies, only one-fifth work together with universities and the same

percentage works with customers and suppliers. In these collaborations, the most active are the OEMs, of which 35% co-design with customers or suppliers and nearly a third with the university.

A limited involvement in collaborative projects with universities constitutes a well-known national problem. On the one hand, this is linked to the variety of research technology available, which is more inclined to a theoretical development within universities, as opposed to more practical developments for the private sector. Thus, there is a certain lack of communication at the very origins of the problem. In addition, there are also different systems of incentives typical of those two entities: one willing to publish as little theoretical innovation as possible and the other aiming to keep its procedures as secret as possible until the achievement of a real competitive advantage.

The second path to an improvement in quality refers to premium models, basically the Alfa Romeo brand by FCA, as well as other similar models known as "exotic", which are produced not only by FCA (e.g. Ferrari and Maserati) but also by Volkswagen (e.g. Lamborghini).

Considered together, strategies pushing for the production of premium models bring about the identification—the creation of which is something that has been hoped for by many—of a district for luxury models, which hopefully will be able to compete with its counterparts in England (Jaguar, Land Rover, Bentley, Rolls-Royce, Aston Martin, McLaren, Infiniti) and Germany (Audi, BMW, Mercedes, Porsche).

In this context, numbers are meaningful: in five years, Maserati has moved from producing nearly 5000 units to 52,000 in 2017; Ferrari is planning to double its sales from its current 8000 units and Alfa Romeo wants to pass from the current 175,000 cars to twice as much that level of production. Finally, thanks to its new factories, Lamborghini should also double its production, which at the moment is 3000 vehicles.

Such substantial increase in the production of premium and luxury models also influences the supply chain overall, which, obviously, is keen to provide models assembled beyond the national borders too.

In order to become a supplier for the sector of premium and luxury models, no special requirements are needed, although the low volume of the market for luxury models certainly does require better skills of flexibility in order to more effectively manage technology advancements.

Either way, suppliers are still asked to collaborate with the carmaker, as early as possible during the co-design stage to realise products whose quality is so high as to be perceived artisanal by the final buyer (Calabrese and Manello 2018b).

Such characteristics are present in the Italian automotive industry even when the scale of company and production dimensions are relatively small, albeit it would be better if that did not reach infinitely small dimensions.

However, niches rarely survive for too long. In the future, also this sector shall go through a process of consolidation, which is aimed not so much at performing in the economies of scale, but rather, at rationalising general costs. After all, luxury models will continue to be produced with little attention to their price because the exclusivity guaranteed by a small volume of production is one of the main characteristics that customers look for in this particular car segment. Generally speaking, the latter will never reach a size comparable to some of the big OEMs. Companies' small dimensions will endure, nearly for sure, in the case of the car body, internal finishing and personalised elements (both inside and outside the car). In such cases, small dimensions and artisanal quality can provide an advantage in terms of the flexibility with which the constructor is willing to invest for the sake of the characteristics of an exclusive (final) product, which, ultimately, will be paid for by its final buyer.

Towards Premium Models and Better Quality in FCA

Reactions to the crisis by carmakers have been different. While some of them have tried to consolidate their position through mergers or acquisitions, others have decided to invest in their product with hybrid and electric vehicles or to focus on the company's geographical expansion, or furthermore, they have resorted to technologies of process in order to contain costs.

As with regard to FCA, this leading Italian carmaker has faced this critical period with a governance that had no continuity with the past and heralded a completely new development agenda when compared with the past. In the automotive sector and, more in general, within FCA

industrial scenario, two case studies can be regarded as long-term features, above all now when they are in the process of joining up their destiny after having successfully survived a number of critical moments.

In particular, Chrysler has witnessed three acquisitions/mergers (Begley and Donnelly 2011). Although, by then, its profitability was among the highest in its sector, in 1998 "an alliance between equals" was signed with Daimler-Benz. From the very beginning, Germans acted as the strong side of the deal, and in fact, the fusion became soon an acquisition. However, Daimler-Benz was unable to effectively merge the two productive systems into one, and in 2007, Chrysler became the first carmaker controlled by a private equity capital (Cerberus Capital Management). The new situation offered some advantages from the point of view of the management, but the production strategy ended up being a disaster. Thus, in 2009, the financial crisis pushed Chrysler to the edges of bankruptcy. Fiat was the only one to step up to save it, earning in the process a certain credibility by the Obama administration (Balcet et al. 2013).

Mergers and acquisitions are not a cure-for-all-solution to deal with problems within the industrial sector—as we have just observed with the case of Daimler-Benz-Chrysler. Indeed, achievement of the initial optimistic objectives often is far from certain, as it is easier to build up synergies in the marketing phase than to follow up on those in the phases of innovation and production systems. Quite often, it is necessary to wait a long time in order to really see first positive results. Mergers and acquisitions, like that between Fiat and Chrysler, are neither easy nor straightforward. They mainly rely on the endurance of leaderships in both companies, which have to be capable of motivating two existing workforces by integrating them, and at the same time, avoiding forcing and patronising them.

With the legal merging of Fiat and Chrysler into one company and after the formal quotation of the new resulting bond, from August 2014, we can say that the third phase of FCA strategy has begun. Let us briefly recall those steps.

In the first phase—that is, "Searching for transnational integration"—FCA focussed on revamping its line of production for the American market as a way to exploit its recovery while the European market was languishing. This recovery plan has been far from unilateral. Fiat saved

Chrysler from certain bankruptcy because the latter had no technology or capital to support a renewal of its models (which appeared particularly weak after the divorce from Daimler-Benz). Fiat injected new technology and management while the American government put in additional capital, so the destiny of the U.S. historical brand could recover. On the other hand, Chrysler also saved Fiat, which was clearly too small to survive on its own. Additionally, during the years of the crisis in Europe, the alliance has mainly survived thanks to the selling of American brands under the protection of the North American Free Trade Agreement.

In the second phase—that is, "To do better with less"—FCA designed its project to rationalise factories and reduce costs. With these objectives in mind, FCA found particularly interesting, and decidedly feasible, the strategies linked to the economies of scale, by which more components are shared into different models. While each model has to be unique from the outside, in addition, it must have the highest possible number of shared components with other models (e.g. mechanics, electrical and structural parts). Indeed, it is not a secret that Fiat Panda and Fiat 500 are not so different as they look from the outside, or that all models of medium size by Volkswagen are more or less clones of the second to last model of its Golf. Areas emerged as the best ones to cut down costs are plants' coordination and the architecture of models with different brands. In the case of FCA, each segment is supplied by a dedicated production platform which follows specific national requirements (Becker and Zirpoli 2003). Small vehicles are to be developed by Fiat, while the other models will be on the charge of Chrysler. On average, each platform caters for a million vehicles, such as Volkswagen, Ford and Renault–Nissan, and guarantees a better power of negotiations with the suppliers.

Another strategy to cut down costs, albeit with limited results, is that implemented by Lancia[6] and Chrysler by starting to sell nearly similar models, with their respective brand names and in different markets. Something similar also happened with the brands Fiat and Dodge. The Freemont model is a crossover by Dodge, assembled in Mexico and sold in Europe as well, but with the Fiat brand on it.

Needless to say, costs can be reduced above all by eliminating unnecessary waste. The implementation in all FCA plants of the operative system World-Class Manufacturing (WCM)—which we will discuss in the fol-

lowing paragraph—has contributed to the overall improvement of production activities in terms of a decrease in delays, injuries and faulty products.

In the third phase of its new strategy—that is, "Quality first, not costs"—FCA has tried to capitalise advantages acquired by pushing on the development of a world car model: the Renegade. Initially produced in Italy and then also in Brazil and China, with this product, FCA is decidedly aiming at the premium and luxury segments of the market we have discussed above. Overall, the Jeep brand represents the mission at its highest global expansion. While Chrysler looks after U.S. markets and the selling of more traditional vehicles, Fiat develops the concepts of Panda and 500 models in order to expand on the number of buyers that can be further reached by those successful conceptual ideas. On the other hand—and for a different sector of the market—Turkish factories are in charge of producing all the models for the Tipo brand aiming at entering into the low cost market to compete with the Dacia brand produced by Renault. Also in this case, the FCA objective is to maximise the perception of quality for the final customer.

Until the last but one five-year plan, the only aspect that had been underestimated was represented by alternative electric propulsion as these types of models were still not regarded as being profitable. With the new business plan, the production of mild and full electric hybrids will be launched above all in the U.S. in order to satisfy the standards of the Corporate Average Fuel Economy. The current five-year plan provides for the reduction of diesels in the small passengers models in the Europe, Middle East and Africa area and the production of the first fully electric vehicles (500 in total).

New Industrial Relationships in FCA

Strategic change, the necessity to avoid obstacles to the investments needed for the renewal of plants and, above all, the process of integration with Chrysler have brought FCA to require the implementation of industrial relations similar to those in place in U.S. without taking into consideration the different socio-political structure of Italy.

Indeed, trade unions and industrial bodies (e.g. General Confederation of Italian Industry—*Confindustria*) have been unable to fully reform industrial relationships similarly in Germany, where, also thanks to a more flexible and decentralised contractual system, automotive companies have managed to become more competitive.

In Italy, the transformation of industrial relationships has halted in the middle of a difficult transition from a system based on the unity of action between the trade unions, based on the supremacy of the national collective agreement, to a new system that aims to put in competition the trade unions and based more on second agreements at business or territorial level.

Also, the legislator is to blame, since the Italian trade unions are partly regulated and follow the principle of unanimity. The current legislative system can not regulate competition among trade unions and dealings effectively when there are dissimilarities between collective contracts of the same level, neither can it decide which one of these contracts have to prevail (Bubbico and Pirone 2008).

The clash between the old and the new contractual systems has become manifest in occasion of the negotiations for the revamping of FCA plant in Pomigliano d'Arco. Before making the investment of 700 million Euros—which would bring Panda's production back to Italy from Poland—FCA had signed an agreement with some of the trade unions[7] with two main objectives in mind:

– To increase the plant's productivity up to the full exploitation of the hired workforce. In order to achieve that—by intervening on matters of work schedule, extra hours, breaks, rotating schedule and in the effort to fight anomalies linked to absenteeism—FCA had derogated for its metalworkers some of the clauses contained in the National Collective Labour Agreement (*Contratto Collettivo Nazionale del Lavoro* [CCNL]) that, originally, was signed by the totality of the unions.
– To guarantee the plant's governability and binding character of the collective contract, FCA had included the so-called clause of responsibility in the new agreement. Accordingly, those trade unions that had signed it, committed themselves not to go on strike to renegotiate its

conditions for as long as the agreement had been signed for. From the point of view of FCA—above all, after the acquisition of Chrysler and because of the higher productivity rates of factories in Poland and Brazil—such clause was extremely important and much needed in order to guarantee the sustainability of the investment, and ultimately, the conservation of production lines in Italy.

Despite the promise of investments and the unanimous position of all the other Italian unions, not only FIOM[8] refused to sign but it immediately declared an open opposition to the implementation of the agreement because—from its point of view—no change could be made to the CCNL after 2008. FIOM claimed that all derogations to the CCNL were illegitimate. Clearly intending to delegitimise the whole agreement, it dragged FCA in a harsh and long confrontation.

Even the referendum won by the trade unions that had signed the agreement did not manage to improve the situation. In turn, because of the intricate conflict originated from the overlapping of two different contractual systems, there was an increase of centrifugal pushes, something that in Germany had been attenuated by the so-called clauses of opening (Garibaldo 2008). As FCA decided to build up new companies for each plant in order to keep these out from the association of entrepreneurs (Confindustria) and the collective contract, it began a delicate process of revision of the contractual system for the metalwork sector—and thus, of the original CCNL signed also by FIOM. From that moment on the clash went up to the highest levels of the negotiations, questioning the union representative system on the ground, as well as the decision taken by joint union representatives (*Rappresentanze Sindacali Unitarie*). This critical moment was not limited to FCA factories alone but it also spread into other production sectors.

Trying not to get stuck into the difficult transition from the old to the new contractual system, FCA and trade unions—with the exception of FIOM—resorted to the creation of a new system of industrial relationships for the FCA plants, similar but independent than the one already in place. Its guiding lines had been the respect for constitutional principles and those established in the third title of the statute of the workers (Law 300, May 20, 1960). Based on reciprocal acknowledgement of

the parts involved in the negotiations, the aim of this new agreement was to set the whole sector—and FCA—free from that intricate net of rules that had allowed FIOM to effectively exercise a veto power.

This way, FCA and some of the unions did sign a specific collective contract of labour (CCSL), which had emerged from the first level of negotiations. This time, it was exclusively devoted to the automotive sector, and in theory destined to eventually become a reference contract for the entire supply chain.

In addition, to give greater political and juridical consistency to the new collective contract , there was a massive recourse to the tools of direct democracy. Indeed, every time that a new working system was introduced in a plant, its workers were called to express their agreement by voting in a referendum. Furthermore, following Article 19 of the statute of the workers in its version reformed after the 1995 referendum, unions' representation within the company—which is a requirement of the third title of the statute—has been limited to those included in the collective contract in place within the firm. In fact, this feature aimed at the exclusion of FIOM from additional negotiations or protests. In 2013, the Constitutional High Court declared such sub paragraph unconstitutional because it violated the principles of solidarity, equality and freedom of representation through trade unions—as stated in the Italian Constitution—so FIOM representatives could not be put at one side.

In addition to the new systems for wages, the rotating schedules and breaks, the extra hours and the new hiring, the CCSL is characterised by three innovative aspects, which are the following: (1) FCA's investments are discussed with the unions, (2) wage increases depend on the overall productivity of both the company and the plant's adoption of the new operating system WCM, and (3) a better treatment for the unions that have signed the new specific collective contract.

The first two aspects were intertwined, as FCA had always declared its commitment to fix plants' saturation, and in this way to apply the same rules to all workers. For FCA, this was the only way to improve productivity and justify larger investments, as well as to safeguard occupation and bring unemployment benefits to an end, in favour of a higher turnover together with the improvement of income for workers. However,

whereas this new situation implies a different organisation of working shifts and breaks, it also calls the trade union to undertake a completely new task—that of controlling that the company keeps its word and that it really does make the promised investments.

As for the third aspect—a better treatment for unions included in the CCSL—FCA has agreed into paying workers' fees for the members of the signing unions, which account for an average 1% of their wages. Furthermore, officials from the signing unions enjoy more leave hours than officials from other unions do, and they have preferential access—though advanced invitations on separated panels—to meetings between FCA and trade unions.

Finally, with regard to the WCM system, originally developed in U.S. in the 1990s and introduced in Italy by FCA in 2005 (before the integration with Chrysler), as an innovative operation system, it shares several aspects with concepts such as Total Productive Maintenance, the logics of Lean Manufacturing and Total Quality Management. At the same time, WCM presents an important difference from those, as the basis of its strategies and choices of "critical" factories rely on the so-called Cost Deployment. In other words, when dealing with a variety of organisational and labour issues—such as maintenance, logistics or safety —the working team draws up according to their incidence on the economic level. Thus, all activities, even when run by different teams, aim at the realisation of projects with the following objectives: zero imperfections, zero malfunctions, zero accidents and zero spare parts. In short, there is a general and pervasive tendency towards the reduction of costs within the plant, as WCM works as a consistent methodology for production that refers to the entire organisation by engaging all phases of production and distribution.

The WCM system has been implemented in nearly all FCA plants in the world. Accordingly, in 2015, an average of 65,000 projects have been realised, including several specifically designed to produce a lower pollution impact on the environment.

Last but not least, FCA has also implemented an environment-friendly management system on a global scale following the ISO 14001 standard, which has then been certified for all of the FCA factories.

An Almost Missing Driver: New Business Models for Sustainable Mobility

For what concerns sustainable mobility and the related business opportunities, Italy displays some specific features that stand out in the international automotive industry.

As explained in Section 4.2, FCA will begin investing heavily in electric vehicles only from its 2018 to 2022 business plan, but, as we will see, this has not prevented the Italian supply chain from offering some solutions in the field of green vehicles.

Second, the Italian legislation has introduced carpooling, but it has forbidden the diffusion of peer-to-peer ridesharing to protect the profession of taxi drivers. This is why companies like Uber are not allowed to operate in Italy, except for UberBlack, whereas businesses like BlaBlaCar can offer their services.

Difficulties have emerged also in relation to car sharing. Early car-sharing services were set up by local municipalities, but many have gone out of business since then, while in 2017, the four major private companies (Car2go, DriveNow, Enjoy and Share'ngo) reported losses amounting to 27 million Euros over a total turnover of 48 million Euros, equal to a loss of 4700 Euros for each car. Furthermore, the average usage time of car-sharing vehicles is lower than that of private vehicles, and the diffusion of electric car sharing is limited to few large cities (Rome, Milan, Turin and Florence).

Conversely, Italy has been particularly quick to act in terms of regulations to be applied to the testing of connected and autonomous vehicles.

Indeed, the so-called Smart Roads Legislative Decree of March 2018 regulates road tests for these types of vehicles to ensure that they are carried out in a safe and uniform way across the entire nation. The content of the decree is in line with the principles recently established by the UN Road Safety Forum, requiring the presence of a person who is "ready and able to take control of the experimental vehicle(s)" at any moment; this person may or may not be inside the vehicle. The decree also addresses the topic of infrastructural upgrades, with the aim of transforming the national road network and making it able to communicate with connected and autonomous vehicles. Additionally, the government is due to

launch a Technical Monitoring Unit to identify suitable interventions to support testing activities (creation of databases and shared platforms for the use of data from the vehicles being tested).

As for alternative vehicles, currently of greater interest for the supply chain, despite the announcements made by carmakers and the recent growth in the sales of cars with low environmental impact, their numbers are still very low compared to those of traditional vehicles (Hildermeier 2016). Moreover, their distribution is uneven and tends to increase, especially in urban areas among the wealthier portions of the population and among young people. This limited penetration is mostly due to the difficulties in managing electric cars as well as to the lack of charging infrastructures (Chávez and Lara 2016).

Whereas in Italy, the presence of purely electric vehicles is extremely limited (0.2% new vehicle registrations in 2017), but hybrid vehicles are rather widespread (3%), in the countries that have already built the required charging infrastructures, the numbers are considerably higher (in Norway, 40% of new vehicles are electric and 13% are hybrid, while in Sweden both types stand at around 5%).

This is why it is reasonable to conclude that registrations of new vehicles with low environmental impact will concern mostly hybrid cars, pending the completion of Italy's charging network for electric cars.

In any case, the spread of hybrid vehicles will allow for better restructuring and reconversion of the current automotive supply chain and of its companies. These will continue to be necessary for the supply chain, which, rather than scrapping it completely, will keep relying on the old technological paradigm for quite some time, although its progressive downsizing is inevitable.

In this regard, three possible consequences can be identified over different time periods:

– About 34% of companies in the Italian automotive supply chain claim that they already have the necessary expertise to develop electric cars. More specifically, this percentage increases to 81% among companies specialising in engineering and design and to 50% among the producers of modules and systems, which are more heavily involved in the automotive business compared to parts and processing suppliers

(Lanzini and Stocchetti 2017). These results indicate that Italy already possesses the knowledge and skills to develop innovative vehicles and that the Italian supply chain will not be excluded in the short term.
– Nevertheless, only 3.6% of companies state that, over the medium term (3–5 years), sustainable mobility will be a strategic priority and main target for their business investments (Lanzini and Stocchetti 2017). This result confirms that a complete shift in the technological paradigm is still a long way off and that Italian automotive suppliers, especially small and medium enterprises, currently have other strategic priorities.
– Conversely, looking at the long term, half of the companies in the Italian automotive supply chain report that they are developing sustainable mobility projects with other companies and research institutions, while almost a fifth are working on electric or hybrid models and 4% on autonomous driving. This is not in contrast to the above results, since these collaboration and research projects are for the most part financed by public bodies.

The latter result strongly suggests that although FCA has so far shown limited interest in electric and hybrid vehicles, the Italian supply chain has not ignored the expansion of the segment. This phenomenon may be attributed to diversification within the national supply chain and to the fact that Italian enterprises have long been supplying large European assemblers, as well as the major national automaker.

Lastly, as illustrated in Section 2, the Italian supply chain is characterised by specific strengths that should be tapped into, such as its competitive advantage in the manufacturing of methane—and LPG-powered models, in terms of both producers of systems (such as Landi Renzo S.p.A., which has 700 employees and a yearly turnover of 200 million Euros, 80% of which is exported) and models available (above all, within the FIAT range). In this context, it might be logical for the national supply chain to specialise further in the manufacturing of hybrid vehicles combining gas (methane or LPG) and electric propulsion.

Ultimately, sustainable mobility in Italy implies an all-round, integrated approach that relies on the spread of alternative fuels, on continued investments in traditional powertrains (especially diesel), as well as

on strengthening local public transport and new models of shared mobility (Aguiléra and Grébert 2014), optimising logistics and sustainable goods transportation, and investing in research and innovation to develop the technologies needed for autonomous and connected vehicles.

In order to obtain real benefits in the short term, conventional and alternative technologies must be combined, in line with the principles of technological neutrality and functionality. This means that each technology has a specific mission. For example, electric propulsion is particularly suited to urban areas, diesel to long-distance journeys, and liquid methane gas to industrial vehicles, making the most of the already available expertise and aiming at the quick renewal of the fleet to guarantee safety and environmental protection (Chevalier and Lantz 2015).

Conclusions: An Industrial Policy for Automotive Industry/Sector

As we have discussed earlier, there is one striking aspect that has emerged forcefully. In accordance to their objectives and specificities, all the actors of the Italian automotive industry have taken an active role in the latest changes taking places. Just an actor is still missing from the whole picture and up to now: the State.

Whether we consider at central or, in a minor scale, regional level, it is clear that in Italy the State is not able to build and effectively pursue a feasible political and industrial agenda for the automotive sector. Indeed, such agenda should be both political and industrial at once, while it cannot focus exclusively on safeguarding production and occupation rates. On the contrary, it must necessarily engage more consistently with the broader dimension of sustainable mobility.

In the last decades, the trajectory of industrial politics in Europe has generally developed into a competitive model based upon more generic political decisions aiming at all of the industrial sectors. The main features of this model were born in the 1990s, thanks to guidelines on free competition set up by the European Commission to foster growth and occupation which, in turn, brought to the writing of the so-called White Books on competitiveness. In short, it was put a great deal of attention on

the creation of an environment favourable to private investments, with incentives to enter the market and few restrictions to leave it, flexible rules for both the labour and the production markets, and with a certain number of funding and subsidies. In part, these politics are also aimed at improving training opportunities and the acquisition of new skills.

Currently, in some countries, it is believed that to rely mainly on a horizontal approach for the elaboration of politics has not performed well in catering for the several industrial needs of the different nations that constitute the EU. As a consequence, industrial policies—above all in France and U.K.—have moved to a system within which the existing horizontal approach is integrated with specific initiatives, focussing on those sectors that are perceived as being more able to generate opportunities for development. Up to a point, at least as far as the level of a generic framework goes, even the EU has begun to be more inclined towards vertical policies, such as the Action plan for a Competitive and Sustainable Automotive Industry in Europe (a.k.a. CARS 2020), created to improve competitiveness and sustainable development. In addition, the EU has also looked into other sectors with programmes such as LeaderSHIP 2020 for the shipbuilding sector, Global Construction 2020 for the construction sector and the Action Plan for the sector of iron and steel industry.

To give some examples of this new trend, in France and U.K., two new operative structures have been built up, the *Plateforme de la Filière Automobile* and the *British Automotive Council*. These programmes present two common features (Calabrese et al. 2013). The first is the acknowledgement that a "new" politics for the sector of reference must derive from strategic and long-term collaborations between private companies and the government. The second is that in the case of pervasive sectors, such as the entire automotive economy, the involvement of different levels of the government must be complete—both at the horizontal and vertical levels—and that it requires a renowned leadership for its coordination in order to minimise the risk of inappropriate interventions.

Something similar to the British model has also been tried in Italy. However, because of the crisis and above all the lack of a clear political agenda by the government, the whole initiative has collapsed.

If, on the one hand, Italian initiative with regard to an industrial policy for the automotive sector, and in a broadest sense for mobility,[9] is absent

(Calabrese 2015), on the other hand, the only available opportunities in a structural sense must refer to those initiatives designed for the industrial sector overall. Among these kinds of interventions, we can differentiate policies of attraction of foreign investments from policies of networking, to gather companies from different sectors according to pre-defined objectives.

An example of the first type of interventions has happened precisely within the automotive sector, with the decision by Lamborghini—under the control of the Audi Group Volkswagen—to base the production of its Urus SUV in Italy, rather than Slovakia, because of the better conditions offered by the Italian government. Of a total of 70 million Euros in public incentives, Audi's investment will be of 800 million Euros, out of which 350 million Euros will be invested in R&D, experimental development and design, with 500 newly hired people. In agreement with trade unions, all new factories will run according to the German model of trade unions' relationships[10] and implement the Universal Analysis System, adopted also by FCA and by the firms producing cars all around the world.

As with regard to networking policies, there are two main types of this kind of interventions: bottom-up, through so-called network contracts[11] to foster the collaboration among companies, and top-down, usually promoted by regions to help the creation of technology districts, scientific parks and innovation areas.

Obviously, even in the case that such structural industrial policies are fully implemented, that alone would not be enough. What is much more important is the existence of an industrial political agenda able to influence the country competitiveness, characterised by things such as a tax system that supports business, a consistent culture of effective administration, proper ways to access credit, professional training, communication among the different research centres, an effective and robust juridical system, the normalisation of transport and communication networks.

More specifically, to ensure a smooth transition towards the new technological paradigm, allowing components manufacturers to slowly but progressively shift their production capacity from the traditional to the innovative sectors, what is needed above all are industrial policies able to stimulate new investments in innovation (Begley et al. 2016).

In this regard, it might be worth analysing what has happened in other sectors that are affected by new technological paradigms, for instance, in cases like the introduction of biotech medications to replace chemical drugs in the pharmaceutical sector, or the subsidised development of renewable energies to replace traditional ones in the energy sector. In some cases, the replacement of old, traditional products with new, innovative products has been remarkably fast and has had a strong impact in terms of distribution/substitution of jobs. In other cases, instead, the new technologies have developed much more gradually through progressive steps, such as in the field of mechatronics, which has changed how machinery is manufactured while also allowing companies to keep up with the innovations introduced.

Since current trends seem to point to the quick short-term development of hybrid vehicles, with 75% new vehicle registrations expected in 2025, and to the slow development of pure electric vehicles, with 12% new vehicle registrations in 2025, it is possible to implement industrial policies that support immediate access to the hybrid segment and slow but progressive reconversion of the supply chain towards pure electric propulsion.

Such supply chain reconversion is stimulated by the growing demand for cars with low environmental impact, and it is, therefore, logical to combine supply-based policies with public policies to stimulate demand.

First of all, it is certainly vital to boost the development of charging infrastructures, above all by means of incentives to promote agreements among firms for the construction of shared infrastructures.

Secondly, a wide range of heterogeneous measures can be taken to promote, both directly and indirectly, the spread of electric/hybrid vehicles in Italy. These include discouraging the use of polluting vehicles in urban areas, redistributing the tax burden in favour of low environmental impact models, applying EU Directive 2014/94 about the obligation to provide new buildings with communal charging points, and supporting the environmentally friendly approach espoused by the European Commission to achieve a 30% target reduction in CO_2 consumption between 2021 and 2030 (Degirmenci et al. 2017; Dijk and Parkhurst 2014).

Notes

1. Fiat Chrysler Automobiles (FCA) is a part of the Exor Group controlled by Agnelli family. The FCA's portfolio includes automotive brands such as Abarth, Alfa Romeo, Chrysler, Dodge, Fiat, Fiat Professional, Jeep, Lancia, Maserati and Ram Trucks. FCA also owns automotive suppliers such as Comau, Mopar and Teksid. Ferrari and Iveco (industrial vehicles, coaches and buses) are not part of the FCA group but they are controlled by Exor, the former directly, the latter through CNH industrial (capital goods).
2. Just after the deal with Chrysler, Fiat tried to purchase the Opel unit of General Motors without success. In 2017, Opel was sold to the group PSA (Peugeot–Citroën).
3. In 2017, worldwide production of FCA automobiles for passengers and small commercial vehicles has reached 4.7 million units. The production has been stable in the last three years.
4. In 2013, these results were worst and 46.4% and 29.8%, respectively.
5. Pininfarina is controlled by Mahindra & Mahindra, and Italdesign by Audi Volkswagen group.
6. Lancia is an old Fiat's brand. Nowadays, it is limited to the Italian market with only one model: Ypsilon.
7. In Italy, all FCA employees have been contracted through a collective contract and 32.3% of them are the members of a trade union. Globally, 85% of FCA employees enjoy collective contracts.
8. Federazione Impiegati Operai Metallurgici (FIOM) is the workers' union operating in the metalworking companies that belongs to the Italian General Confederation of Labour. It is the oldest Italian industrial union and is politically deployed on the left.
9. While it is true that, for the mobility, there is the plan for electrical vehicles, that is nothing more than the application of a European legislation for the infrastructure of alternative combustible (DAFI).
10. The German model is based upon the "Charter of relations" in place within the main central plant of Volkswagen. Its objective is to guarantee and increase the group's competition and productivity. It does so by pushing for unions' relations mainly characterised by cooperation and participation.
11. The network contract (in Italian, *contratto di rete*) is a particular juridical tool introduced by the Italian government to help the development of a

more cohesive and conscious process of collaboration among companies involved in shared projects leaving untouched their full management autonomy. While the diffusion of this type of contracts is not a direct effect of public funding, the increase of a number of initiatives—above all those promoted by regions—has certainly helped. Indeed, it has been registered an increase of calls aimed at fostering networks with the objective of supporting research and innovation projects (40%), entrepreneurial development (30%) and internationalisation (22%).

References

Aguiléra, Anne, and Jean Grébert. 2014. Passenger Transport Mode Share in Cities: Exploration of Actual and Future Trends with a Worldwide Survey. *International Journal of Automotive Technology and Management* 14 (3–4): 203–216.

Amatucci, Marcos, and Fábio Luiz Mariotto. 2012. The Internationalization of the Automobile Industry and the Roles of Foreign Subsidiaries. *International Journal of Automotive Technology and Management* 12 (1): 55–75.

ANFIA. 2017. *L'Industria Automotive Mondiale nel 2017*, Accessed June 15, 2018. www.anfia.it/it/studi-e-statistiche.

Balcet, Gianni, Giuliana Commisso, and Giuseppe G. Calabrese. 2013. Structuring and Restructuring Fiat-Chrysler: Can Two Weak Carmakers Jointly Survive in the New Automotive Arena? *International Journal of Automotive Technology and Management* 13 (2): 183–197.

Bardi, Andrea, and Giuseppe G. Calabrese. 2007. Spatial Organisation and Company Performance: A Comparison Between Two Models in the Motor Vehicle Industry. *International Journal of Automotive Technology and Management* 7 (1): 88–107.

Becker, Markus C., and Francesco Zirpoli. 2003. Knowledge Integration in New Product Development: The FIAT Autocase. *International Journal of Automotive Technology and Management* 3 (1–2): 30–46.

Begley, Jason, Nigel Berkeley, Tom Donnelly, and David Jarvis. 2016. National Policy-Making and the Promotion of Electric Vehicles. *International Journal of Automotive Technology and Management* 16 (3): 319–340.

Begley, Jason, and Tom Donnelly. 2011. The DaimlerChrysler Mitsubishi Merger: A Study in Failure. *International Journal of Automotive Technology and Management* 11 (1): 36–48.

Bianchi, Ronny, Aldo Enrietti, and Renato Lanzetti. 2001. The Technological Car District in Piedmont: Definitions, Dynamic, Policy. *International Journal of Automotive Technology and Management* 1 (4): 397–415.

Bubbico, Davide, and Francesco Pirone. 2008. Industrial Action and Working Conditions in a Green Field Site: The Case of the FIAT-SATA Assembly Plant in Southern Italy. *International Journal of Automotive Technology and Management* 8 (2): 170–184.

Calabrese, Giuseppe G. 2001. Innovation Capabilities in Small-Medium Autocomponents: Evidence from Italy. *International Journal of Automotive Technology and Management* 1 (4): 471–489.

———. 2011. Structure and Transformation of the Italian Car Styling Supply Chain. *International Journal of Vehicle Design* 57 (2/3): 212–229.

———. 2015. Outlining Policy Responses to Stimulate Automotive Car Demand by Environmental Impact Reduction. *Journal of Environmental Planning and Management* 58 (1): 55–68.

Calabrese, Giuseppe G., Dan Coffey, and Tommaso Pardi. 2013. New Industrial Policies for the Automotive Industry in Europe. *Working paper CNR-Ceris* 21.

Calabrese, Giuseppe G., and Alessandro Manello. 2014. La filiera italiana dell'Automotive e il Ruolo dei Fornitori Italiani. In *Evoluzione della Grande Impresa e Catene Globali del Valore*, ed. Giovanni Zanetti, 231–284. Genova: Fondazione Ansaldo Editore.

———. 2018a. Firm Internationalization and Performance: Evidence for Designing Policies. *Journal of Policy Modeling* 40: 1221–1242. www.sciencedirect.com/science/article/pii/S0161893818300140.

———. 2018b. The Influence of Reputation on Supplier Selection: An Empirical Study of the European Automotive Industry. *Journal of Purchasing and Supply Management* 25: 69–77. www.sciencedirect.com/science/article/pii/S1478409218300578.

Calabrese, Giuseppe G., and Monique Vervaeke. 2017. Strategies for Facing the Crisis: the Case of the Car Design/Style Supply Chain in France and in Italy. *International Journal of Product Development* 22 (1): 21–37.

Camuffo, Arnaldo, and Giuseppe Volpato. 2002. Partnering in the Global Auto Industry: The Fiat-GM Strategic Alliance. *International Journal of Automotive Technology and Management* 2 (3–4): 335–352.

Castelli, Cristina, Massimo Florio, and Anna Giunta. 2011. How to Cope with the Global Value Chain: Lessons from Italian Automotive Suppliers. *International Journal of Automotive Technology and Management* 11 (3): 236–253.

Chávez, Artemio, and Arturo Lara. 2016. Evolution of the Complex Nature of Electrical Vehicles. *International Journal of Automotive Technology and Management* 16 (4): 389–411.

Chevalier, Amandine, and Frédéric Lantz. 2015. Personal Car or Shared Car? Predicting Potential Modal Shifts from Multinomial Logit Models and Bootstrap Confidence Intervals. *International Journal of Automotive Technology and Management* 15 (2): 149–170.

Ciferri, Luca. 2008. Marchionne: The Party is Over. *Automotive News Europe*, December 8.

———. 2013. Marchionne's Big Gamble. *Automotive News Europe*, March 7.

Degirmenci, Kenan, Sandra Lapin, and Michael H. Breitner. 2017. Critical Success Factors of Carsharing and Electric Carsharing: Findings from Expert Interviews in Continental Europe. *International Journal of Automotive Technology and Management* 17 (3): 294–315.

Dijk, Mark, and Graham Parkhurst. 2014. Understanding the Mobility-Transformative Qualities of Urban Park and Ride Polices in the UK and The Netherlands. *International Journal of Automotive Technology and Management* 14 (3–4): 246–270.

Follis, Massimo, and Aldo Enrietti. 2001. Improving Performances at the Second Tier of the Automotive Supply Chain: A Draft Case Study of an Innovative Initiative in the Italian Car Industry. *International Journal of Automotive Technology and Management* 1 (4): 449–458.

Garibaldo, Francesco. 2008. A Company in Transition: Fiat Mirafiori of Turin. *International Journal of Automotive Technology and Management* 8 (2): 185–193.

Hildermeier, Julia. 2016. Which Role Should the Electric Car Play in Europe's Cities? An Analysis of Publicly Funded Demonstration Projects 2007–2013. *International Journal of Automotive Technology and Management* 16 (1): 90–107.

Lanzini, Pietro, and Andrea Stocchetti. 2017. Filiera Automotive e Mobilità Green: Quadro Attuale e Scenari Futuri. In *Osservatorio sulla Componentistica Autoveicolare Italiana*, ed. Anna Moretti and Francesco Zirpoli, 211–228. Venice: Edizioni Ca'Foscari.

Manello, Alessandro, and Giuseppe G. Calabrese. 2015. The Restructuring of Tier 1 Automotive Suppliers in Europe During the Crisis. *International Journal of Automotive Technology and Management* 15 (1): 80–95.

———. 2017. Firm's Survival, Rating and Efficiency: New Empirical Evidence. *Industrial Management & Data Systems* 117 (6): 185–1200.

Manello, Alessandro, Giuseppe G. Calabrese, and Piercarlo Frigero. 2016. Technical Efficiency and Productivity Growth Along the Automotive Value Chain: Evidence from ITALY. *Industrial and Corporate Change* 25 (2): 245–259.

Moretti, Anna, and Francesco Zirpoli. 2017. *Osservatorio sulla Componentistica Autoveicolare Italiana*. Venice: Edizioni Ca'Foscari.

Volpato, Giuseppe. 2011. Fiat Group Automobiles. *Le Nuove Sfide*. Bologna: Il Mulino.