



AUTOMOTIVE INDUSTRY

20

20

INVEST
IN ITALY

ITCA 
ITALIAN TRADE AGENCY

INVITALIA

FOREWORD ON METHODOLOGY

The data contained in and employed for the present report was collected by Cerved Group through the exclusive processing of information from both public and private sources. The term 'public sources' is intended here as those available to the public, from institutions including but not limited to the OECD, the Italian National Statistics Institute (Istat), the Italian Automotive Industry Association (ANFIA), the European Automobile Manufacturers' Association (ACEA), the National Mobility Sharing Observatory, the Intesa Sanpaolo banking group and the European Commission. The term 'private sources' is intended here as Cerved Group's proprietary databases on the major companies that operate in the automotive industry.

The data collected has then been aggregated to build a complete picture of the automotive industry, and broken down to distinguish between four main segments: automobiles, trucks, commercial vehicles and buses, and components. The graphs presented have been prepared by Cerved Group based on proprietary data and/or public sources listed above.

With regard to aggregation criteria, the following economic activity (Ateco) categories have been included in the analysis:

- 29.1 – Manufacture of automobiles
- 29.3 – Manufacture of parts and accessories for automobiles and their engines

This enables our analysis to begin with a brief introduction to the automotive industry as a whole and then proceed to examine each specific segment.

AUTOMOTIVE AT A GLANCE

THE ITALIAN AUTOMOTIVE INDUSTRY RANKS 6TH IN EUROPE AND 19TH IN THE WORLD FOR PRODUCTION, WHILE IT IS 4TH IN EUROPE AND 9TH IN THE WORLD IN SALES.

65% OF MOTOR VEHICLES MANUFACTURED IN ITALY ARE SOLD ABROAD.

2.467

COMPANIES

163.202

EMPLOYEES

AGGREGATE REVENUE IN ITALY

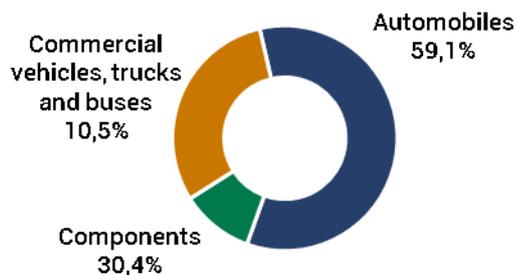
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AUTOMOTIVE AT A GLANCE

SEGMENTS

2018; 100%= €106,964 billion



THE ITALIAN AUTOMOTIVE SECTOR CONTAINS 25 START-UPS AND INNOVATIVE SMEs (a)

FDI STOCKS ARE ON THE RISE, GOING FROM €15.87 BILLION IN 2017 TO €16.693 BILLION IN 2018

a) companies registered under Ateco category 29.1 or 29.3

AUTOMOBILES	29 COMPANIES	43.226 EMPLOYEES
COMMERCIAL VEHICLES, TRUCKS AND BUSES	13 COMPANIES	14.532 EMPLOYEES
COMPONENTS	2.425 COMPANIES	105.444 EMPLOYEES

HIGHLIGHTS

The automotive industry has played and continues to play a very important role in Italy's economic development, especially given the huge number of jobs filled. This true for the entire value chain, from vehicle and component design to the manufacture and marketing of finished goods both inside the country and around the world.

With regard to vehicle **production**, in 2019 the Italian automobile industry ranked 6th in Europe and 19th in the world. In terms of vehicles **sales**, the Italian market is the 4th largest in Europe and 9th in the world.

The sector can be split into **three main segments**:

- automobiles
- commercial vehicles, trucks and buses
- components

In Italy, **motor vehicles** are manufactured by only a few large companies. Foreign multinational groups are active in the country through commercial subsidiaries or through partner importers and distributors. In the **component** segment, on the other hand, many different companies oper-

ate, including numerous small to medium sized businesses, spread throughout the country.

Cooperation and partnerships between companies along the chain are crucial, enabling firms to split the burdensome costs required to research, develop and manufacture increasingly advanced products, by having each partner use its specific skills and know-how.

There are four main automotive industry **regions** in Italy:

- the industrial district in **Piedmont**, dominated by the FIAT-Chrysler group;
- "**Motor Valley**" in Emilia Romagna, where the world-famous Italian luxury brands are produced;
- **Lombardy**, where there is a high concentration of component manufacturers, especially in the province of Brescia.
- The **Abruzzo** automotive industry district, which is active in new technological developments for motor vehicles and other machinery.

HIGHLIGHTS

In Italy, **R&D expenditures** in the motor vehicle manufacturing sector account for 12.6% of all R&D investments made in the country. Globally, the automotive sector is the third-leading industry for R&D spending, behind ICT and healthcare. Notably, Ferrari, a symbol of Italian motoring excellence, ranks 9th in the world for the intensity of its R&D investments.

Over the coming years, the following **major developments** observed will influence the automotive sector:

- sustainable mobility
- security systems and self-driving cars
- connectivity and in-car services
- car sharing



HIGHLIGHTS



Opportunities for the sector stem from:

- green mobility
- shared mobility
- legislative measures to stimulate new technology

The sector's **critical success factors** are:

- investments to develop advanced production systems
- building 'customer journeys' to improve customer loyalty
- cooperation between carmakers and component manufacturers
- international partnerships

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INDUSTRY OVERVIEW

KEY CHARACTERISTICS

In the automotive manufacturing sector overall^(a), there are 2,467 active businesses in Italy. These businesses' combined annual revenue came to around €107 billion in 2018 (2% higher than in 2017) and employ about 163,000 people.

The **automobile** segment accounts for 59% of the total sector revenue with €63.2 billion, 1.7% more than in 2017.

The **component** segment is the second largest by revenue, accounting for 30% of the total. In 2018, this segment's revenue grew by 3.3% year-on-year to €32.5 billion.

The **commercial vehicles, trucks and buses** segment recorded aggregate revenue of €11.2 billion in 2018, broadly stable (+0.2%) year-on-year.

All three of these segments have a number of active **start-up** companies. According to Chamber of Commerce data, there are 25 companies that officially qualify as

start-ups or innovative SMEs registered under the automotive manufacturing codes, twelve of which are located in either Piedmont or Veneto.

Italy has four main automotive industry **regions**: the Piedmont industrial district, Emilia Romagna's "Motor Valley", Lombardy (host to many component specialists) and the Abruzzo automotive district (which is active in developing new technology for motor vehicles and other machinery).

In addition, the country has several research institutions and technology hubs, where applied innovative technology is developed. For the automotive sector, an important technology hub is the Mechatronics Hub in the province of Trento.

a) companies registered under Ateco (economic activity) code 29.1 or 29.3

KEY CHARACTERISTICS

R&S AND PATENT

Given the importance of technical know-how and technological advances to survive in the industry, it is no surprise that companies invest heavily in innovation. Considering only the large companies with over €100 million in annual revenue, total research and development investments in the sector exceeded €1.7 billion in 2018. According to data from the European Patent Organisation, European **patent applications** in the transport sector rose by 6.6% year-on-year in 2019 to a total of 9,635. Of these applications submitted, 378 came from Italy, putting it third behind Germany (2,138) and France (999). Transport remained the leading sector for patent applications in Italy in 2019.

KEY FIGURES



KEY BUSINESS AREAS



KEY CHARACTERISTICS

AUTOMOBILES

The leading Italian car manufacturers **operate on an international scale**, yet pay close attention to the idiosyncrasies of each local market. Italy is the 6th leading vehicle producer in Europe and 19th in the world, with about a 1% share of global production.

Production within Italy is almost entirely attributable to companies belonging to the FIAT-Chrysler (FCA) group. Foreign multinational groups do business in the country through commercial subsidiaries or through partner importers and distributors.

The production structure is characterised by substantial economies of scale, highly automated and relatively inflexible production lines, along with high capital intensity.



KEY CHARACTERISTICS

In evaluating manufacturing activity, certain parameters are decisive:

- plant saturation levels, which is crucial for profitability given the high incidence of fixed costs – more and more frequently, sufficient saturation levels are reached through agreements between several manufacturers whereby competing models are actually assembled on the same physical production line;
- production line efficiency, as measured by stock levels, production speed and maintenance costs to keep it running safely;
- flexibility, as measured by how fast changes can be made to a given model produced on a given production line.

The extent of vertical integration in the sector is moderate. Almost all car manufacturers directly oversee vehicle assembly phases, whereas all upstream activities – from basic components (e.g. cables, plastic parts and fittings) to complex integrated systems (e.g. brakes) – are normally outsourced. However, manufacturers have significant business relations and partnership agreements with component suppliers, going from the design

phase to product development. Such vertical cooperation connects carmakers and their suppliers throughout the entire product life cycle.

Integration downstream has been expanding, as car manufacturers now tend to manage their commercial branches with a view to better direct control over key sales areas. In the corporate car fleet market, for instance, car manufacturers often run their own long-term rental companies.

EXPORTS & IMPORTS

In 2019, for automobiles, commercial vehicles, trucks and buses:

- **exports** fell by 8.0% in value from 2018 to €20.8 billion;
- **imports** fell by 1.3% in value from 2018 to €32.9 billion.

KEY CHARACTERISTICS

COMPONENTS

The supply side in Italy for automotive components is composed of three distinct types of companies:

- 1) a few multinationals that have Italian production facilities to serve both the Italian market and other European markets;
- 2) companies that can be best described as original equipment suppliers (OES), as they work in direct contact with vehicle manufacturers to provide parts for the production lines, and often in turn use smaller sub-suppliers;
- 3) small to medium-sized businesses that produce components mainly for the after-market (replacement parts) or operate as sub-suppliers.

As the long-established home of FIAT, the region of Piedmont also has a major automotive component industry: it is estimated that component producers in Piedmont alone still today account for around 45% of the national automotive sector's total revenue.

The component segment is highly influenced by auto manufacturers' strong bargaining power over most of their suppliers. Furthermore, carmakers ensure that most of the costs and uncertainties associated with technolog-

ical innovations are kept on component suppliers' shoulders.

The supply side can be broken down into three 'grades' of parts suppliers, as follows:

- Grade A: suppliers of complete modules and systems that have direct relationships with vehicle manufacturers: they oversee and assemble entire modules, reducing the manufacturer's need to coordinate each step in this process and thus simplifying component management for them; they design integrated systems (e.g. brakes), concentrating heavily on technological innovation; there are not very many of these businesses due to high entry barriers in the form of massive resources needed for R&D activities;
- Grade B: suppliers of single components with a high degree of complexity, such as brake discs, brake callipers or sensors;
- Grade C: suppliers of components characterised by a low degree of complexity: these businesses work mainly as sub-suppliers for 'A' and 'B' component companies and more rarely as direct suppliers to vehicle manufacturers (e.g. for cables and wiring, fittings and plastic parts).

KEY CHARACTERISTICS

The extent of vertical integration is moderate. Auto manufacturers have progressively spun off their component production activities, forming independent businesses.

In recent years, there has been a growing need for more extensive interaction between major component producers and companies that operate outside of the automotive sector. This is due to increasing demand for digital applications to be installed in vehicles – whether for communications, information systems, safety and security or entertainment.



EXPORTS & IMPORTS

In 2019 in the automotive components segment:

- **exports** remained broadly stable year-on-year (-0.4%), amounting to €14.0 billion;
- **imports** fell by 2.8% in value year-on-year to €8.6 billion.

KEY CHARACTERISTICS



The largest automobile production hub in Italy is in the north-western region of **Piedmont**, which is considered one of Europe's five '**automotive intensive**' regions. The provinces of Turin, Cuneo and Asti are where automotive activity is concentrated. The Turin area is the most important of all; it is indeed the only Italian province where there is a complete automotive production chain from the drawing board to final assembly. By contrast, Cuneo province has component manufacturers along with industrial and agricultural equipment producers, while in

the Asti area we find mainly component producers. The region's know-how encompasses all segments of the automotive industry: cars, light and heavy commercial vehicles, buses and agricultural equipment, all manufactured with the most **advanced technology in terms of both product engineering and the production process**.

The FCA group is accompanied by numerous companies that can provide parts and accessories, manufacturing machinery and equipment, along with multiple services, especially regarding styling and engineering aspects. Piedmont also boasts a robust IT sector, which ensures excellence in incorporating integrated circuits, software design and development, as well as solid knowledge in numerous areas linked with automotive features: electronics and microsystems, hydrogen technology and nanotechnology, wireless systems and mechatronics.

Piedmont is also home to **major research centres**. To begin with, the Centro Ricerche Fiat (CRF) has high-level labs and facilities that operate in several different fields, including environmental science, energy, security, materials and technology. GM Powertrain Europe has also established its own research centre to develop new low-emissions engines at the Cittadella campus of the Turin Polytechnic University.

KEY CHARACTERISTICS



PRODUCTIVE REGION:
EMILIA-ROMAGNA

Another industry district of fundamental importance in Italy is “Motor Valley” in the north-central region of Emilia Romagna, which is home to a few of the most famous car manufacturers in the world. In the provinces of Modena and Bologna, more specifically, are the headquarters of highly specialised companies dedicated to niche high-end vehicles and motorsport. **Intense, innovative research and development** activities take place in the area. The region boasts advanced specialised skills in mechatronics, which is being used with increasing frequency in both plant equipment and in the consumer products manufactured. In all, the motor vehicle and mechatronics industries in Emilia Romagna employ over

350,000 people, including workers in both manufacturing businesses and related services; it is an industry that is spread throughout the region, with hubs in Modena, Reggio Emilia and Bologna.

Within this context, the **Clust-ER Meccatronica Motoristica** (Motor Mechatronics Cluster) works to introduce product and process innovations in the sectors that drive the regional economy, in order to develop a new generation manufacturing system capable of strengthening the region's positioning on the market and at the same time creating jobs. The Clust-ER is a private-sector association of businesses, research centres and training institutes that share their skills, ideas and resources in an effort to boost the local auto and mechatronics industry's competitiveness.

Another important association is **MUNER**, the Motor Vehicle University of Emilia Romagna, which is a joint initiative of the universities of five cities in the region (Bologna, Modena, Reggio Emilia, Ferrara and Parma) along with the car manufacturers headquartered in the region, which represent Italian-made excellence throughout the world. This university hub aims to attract students from all over the world. Its objective is to train top engineers who can design innovative vehicles and 'smart manufacturing' production lines for the local industry.

KEY CHARACTERISTICS



PRODUCTIVE REGION: LOMBARDY

Another important automotive sector production area of the country is **Lombardy**, which is home to many component specialists, with a very high concentration in the province of Brescia. In particular, many businesses produce parts that require advanced metalworking techniques; it is indeed a region with a long history of knowledge in metallurgy and skills in melting, pressing, casting and moulding metals. The regional government, in keeping with EU and national strategies, provides support to businesses to develop products and systems that will reduce vehicle emissions and increase their energy efficiency, as well as advanced safety systems, smart transport and logistics systems, including ways of har-

nessing the potential of the 'internet of things'. The goal is to bring about a transport system where infrastructure is used optimally in the interest of environmental sustainability. The **Lombard Mobility Cluster**, for instance, promotes and facilitates the development of a competitive mobility industry in Lombardy through research and innovation in 'smart specialisation' fields, where the most promising business areas on a global level are identified. This cluster sponsors innovative R&D projects in the automotive sector.

THE IMPROVES PROJECT

This is a project that aims to build a network of companies and research centres to manufacture electric vehicles as part of a vision for a large-scale conversion of road traffic to electric power. Sponsored by the Lombard Mobility Cluster and co-funded by the regional government with EU funding, the participants in this project include several local businesses, the Milan Polytechnic University and the University of Bergamo.

(Information taken from the website: <https://www.clusterlombardomobilita.it/it/progetto/inproves--integrazione-di-prodotto-e-processo-per-la-realizzazione-di-motori-elettrici-per-veicoli-stradali>)

KEY CHARACTERISTICS



**PRODUCTIVE REGION:
LOMBARDY**

THE ELECTRIC VEHICLE NOTEBOOK

This is another project under the Lombard Mobility Cluster, in partnership with the Brescia Industry Association, the Milan Polytechnic University, the Lombardy chapter of Confindustria (the Italian manufacturers' federation), the Brescia Chamber of Commerce and the University of Brescia. The purpose of this 'notebook' programme is to gather and summarise all aspects of regional innovation in the field of electric vehicles. This is to be achieved by first illustrating the global, national and regional context, then advancing a general regional vision and mission for

electric vehicles, focusing on innovative ideas put forward by local companies, research institutes and universities, including:

- extreme weight reduction of various components to compensate for battery weight, which increases energy consumption;
- developing chassis that can accommodate both traditional and electric cars;
- dynamic analysis of new layouts for electric vehicles, including new control systems;
- developing tyres that are optimal for an electric traction system;
- developing a new traction system that minimises both overall impact on the environment and energy usage;
- equipping components with sensors to monitor how each part is functioning, enabling preventive maintenance and facilitating prognostics;
- applying design paradigms wherever possible to improve user perception and experience of products (through workshops in automotive component design);
- facilitate access to available forms of financing at various levels and promote specific financing programmes;

KEY CHARACTERISTICS



PRODUCTIVE REGION: LOMBARDY

- rethink the vehicle as a product entirely from a circular economy perspective, encouraging the creation of a quality label;
- build new generation electric engines that combine the latest electrical technology, advanced materials and innovations in mechanics and control;
- design new vehicle-to-infrastructure interaction systems.

(Information taken from the website: <https://www.clusterlombardomobilita.it/it/progetto/quaderno-veicoli-elettrici>)

WEIGHT REDUCTION

The region is also holding a roundtable on the topic of reducing the environmental impact of vehicles by reducing their mass. Achieving lighter vehicles involves changes to both the products and production processes. This roundtable activity is tied in to roundtables on other issues and involves both companies and research institutions with specific knowledge in the field.

More specifically, it is a platform that promotes the use of conventional materials (especially metals) through new manufacturing techniques. The group studies innovative vehicle architecture to reduce mass. It also studies polymer-metal hybrid materials, concept design for lighter frames, as well as the use of advanced materials including biomaterials to reduce the weight of vehicles.

(Information taken from: <https://www.clusterlombardomobilita.it/it/tavolotematico/alleggerimento>)

KEY CHARACTERISTICS



PRODUCTIVE REGION:
LOMBARDY

VEHICLES AS SENSORS

The 'smart city' concept, with the Internet of Things/ Everything, forms a backdrop in which everyone is called upon to get connected. This means innovating through new approaches, models, systems, products and solutions. The "Vehicle as a sensor of the land" project, whose participants include the Lombard Mobility Cluster, Milan Polytechnic University and a major local ICT player, puts the vehicle at the heart of this context and aims to develop a sensor system that will collect applicable data – not just for the vehicle itself, but for the area in which it is travelling. The value of this project lies in the innovative use of vehicles as moving objects which can then observe an

area, interact with it and provide relevant data for managing it to those potentially interested. This data would constitute a decision support system for local authorities. Key contributions of this project will therefore be:

- better infrastructure management: road and motorway maintenance and repair in particular could be planned and managed more efficiently and accurately;
- insurance companies could have more precise information to improve their services and to help determine the cause of an accident (e.g. whether poor road conditions were a factor);
- citizens could benefit from improved signalling systems.

The project will be carried out in two phases. First, a demo vehicle will be equipped with a sensor system, which will be used to develop, calibrate and validate data analysis software. In the second phase, the system developed will then be evaluated and validated by means of a small fleet of vehicles, which could include public transport vehicles or last-mile delivery vehicles. This will include acquisition, geolocation, data storage and data analysis activities, as well as the development of a map of road surface wear.

(Information taken from: <https://www.clusterlombardomobilita.it/it/progetto/automezzo-come-sensore>)

KEY CHARACTERISTICS



**PRODUCTIVE REGION:
ABRUZZO**

The Abruzzo Automotive Hub aims to facilitate interactions between economic actors and institutions in order to contribute to research and technological innovations, and encourage the sharing of skills and know-how. It is a network of both globalised companies and public sector organisations (major manufacturers, SMEs, universities and research centres) that operate in the automotive and machinery sectors.

This hub in the Val di Sangro, an 'automotive and mechatronic valley', brings together over 60 member institutions active in the automotive industry. It focuses on **cutting-edge research to develop technologically advanced products.**

The hub has participated in various research projects, four national (Industria 2015, Ministry of Environment programme, PON and MIUR) and four European (as part of the EU's 7th Framework Programme).

It has also initiated over 20 technology transfer projects involving companies requesting support to modernise their products or production processes.

This automotive hub is also a participant in the EMERGE project and in 5G experiments in the regional capital, L'Aquila. EMERGE is a project for scientific and technological advancement in intelligent transport systems, conducted in partnership with the University of L'Aquila and other producers and research centres in the field.

KEY CHARACTERISTICS



**PRODUCTIVE REGION:
ABRUZZO**

The Abruzzo hub also works in partnership with FIAT's research centre (CRF) on the STEV project. STEV, which is funded by the European Space Agency in connection with an EMERGE initiative, aims to design, develop and install a 'test bed' as part of a future validation centre for high-integrity localisation and global navigation satellite systems (GNSS) for automotive applications. As the technology evolves, STEV will also support testing and evaluation of multi-sensor solutions, including the use

of 5G technology. The heart of this test bed is the GNSS Radiolab located in L'Aquila.

Two further projects of note have also begun in Abruzzo: the Horizon 2020 FreeWheel and the Erasmus + AUTO 4.0 programme. The former is a project to design extended electric vehicles using modules and aiming for reconfigurable parts that will be easy to manage. The latter, meanwhile, is a training and continued professional development programme around Industry 4.0 topics in the automotive sector.

The Automotive Innovation Hub is also a member of the national Transport Italy 2020 association, which is acknowledged by the Ministry for Education and Research as a reference point for the transport sector (including mobility both on land and water); it brings together national industrial and scientific players. This hub also partners with the Competence Center Cyber 4.0, a highly specialised cybersecurity institute that also tackles related topics such as the e-health, automotive and space sectors.

KEY CHARACTERISTICS



In addition to the four main industrial districts described above, numerous other research institutes and technology hubs across the country are instrumental in developing applied technologies in many areas, including the automotive sector.

Most notably, a **Mechatronics Hub** was recently established in the north-eastern region of Trentino Alto Adige. This hub is a common space for manufacturing and testing products, conducting research, developing innovative products and new or more efficient production processes using a combination of advanced computer, electronic and mechanical technology. This cluster,

whose total annual revenue is over €49 million, includes companies active in various automotive sector segments including cars, heavy vehicles and component producers.

In the same region, the Hub for Innovation in Trentino (HIT) was established for the purpose of promoting economic growth in Trentino through advanced technology transfer and new innovations from scientific research. HIT has become a partner in numerous initiatives, including National Technology Cluster initiatives in 'Smart Factory' and 'Smart Communities' projects. It is also participating and/or running various EU-level innovation projects. HIT works to facilitate the transformation of positive scientific research results into value for businesses and investors (by means of licenses, patents and contracts) and supports the development of technologically innovative start-up companies.

One of HIT's founding members, which also plays an active role in the Mechatronics Hub, is Trentino Sviluppo, a local government agency that runs six Business Innovation Centres within the province. These business incubators oversee over 100 businesses (start-ups, other young businesses and research centre-affiliates of larger industrial groups), employ over 700 people and generate over €380 million in annual revenue.

KEY SECTOR DATA

According to the Italian National Automobile Industry Association (ANFIA), the global production of motor vehicles was approximately 95.9 million units in 2018, a year-on-year decrease of 0.8%. In Europe, production fell by 1.2% year-on-year to 20.8 million vehicles. The trend was broadly stable in the Americas with increases only in Brazil (+3.2%) and the USA (+0.9%). In Asia, vehicle production fell by 1.5% from 2017, driven by a 3.1% drop in China. Focusing on automobiles only, global production fell by 3.2% year-on-year to around 71 million units. This is primarily due to early purchasing that took place towards the end of 2017 ahead of tax increases on locally produced cars with 1.6L engines or smaller, although consumer confidence also dipped in early 2018.

In Italy, automotive businesses attained aggregate revenue of €107 billion, up 1.1% year-on-year.

AGGREGATE REVENUE OF COMPANIES ACTIVE IN ITALY

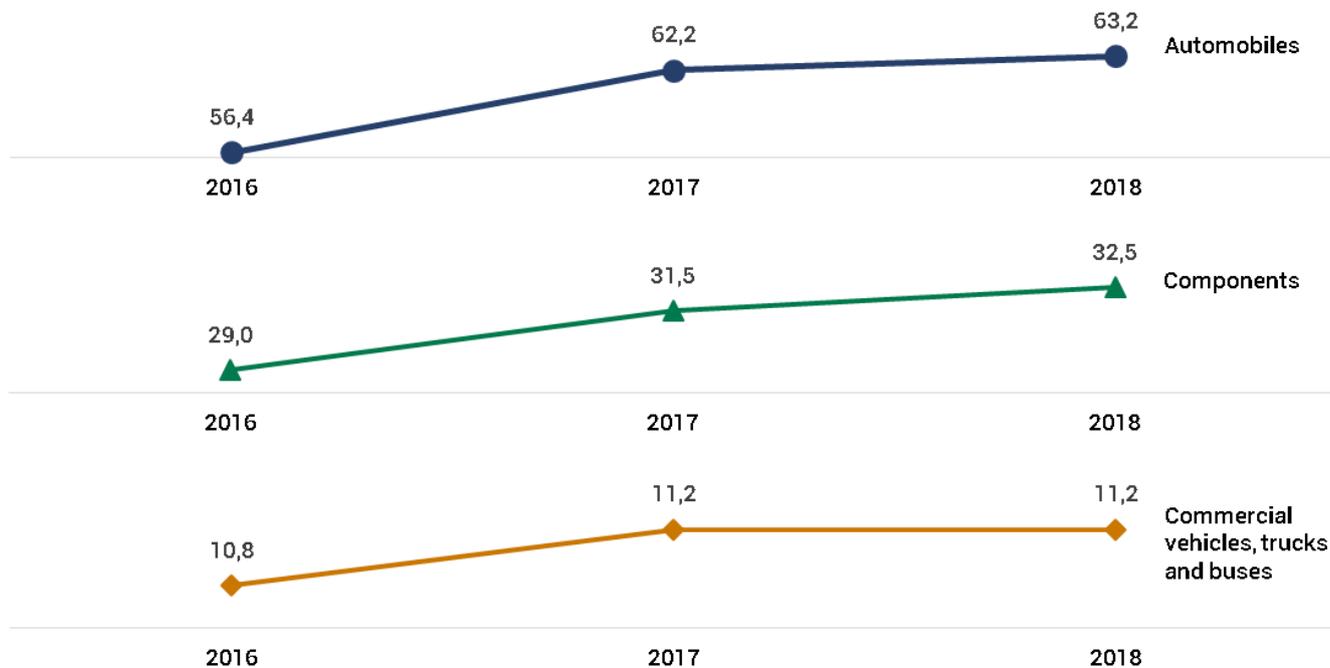
€ bn



KEY SECTOR DATA

AGGREGATE REVENUE OF COMPANIES ACTIVE IN ITALY: MANUFACTURERS OF AUTOMOBILES, COMPONENTS, COMMERCIAL VEHICLES AND BUSES

€ bn



MAIN TRENDS

SUSTAINABLE MOBILITY

Sustainable mobility means an ideal way of travelling quickly and efficiently with little impact on the environment. According to ANFIA, putting this philosophy into practice **requires and integrated approach** encompassing vehicles powered by alternative fuels, constant investments in traditional means of transport, enhancing public transport networks and developing new shared mobility networks, as well as optimising logistics and freight transport, investing in research and innovation to develop new kinds of autonomous, connected vehicles.

'Smart' mobility will have a significant impact on a wide range of sectors. The growing concern for energy efficiency, demand for alternative fuels, interest in shared mobility and automated vehicles and transport systems implies that changes are required in corporate organisational models, as new skills sets are needed and new value chains are emerging. These trends will also lead to a need for increasing cooperation between sectors, such as between automotive and energy players. In this vein,

the development of vehicles powered by alternative fuels (electric, hybrid, LPG, methane and hydrogen) that can effectively replace their fossil fuel-burning counterparts (in terms of performance and affordability) takes on central importance.



MAIN TRENDS

Technological advances have made attention to innovations in electric engine components critical. This brings about inevitable changes in supply chains, given the varying innovative capabilities of various different component suppliers.

In Europe, according to preliminary results compiled by the European Automobile Manufacturers' Association (ACEA), 1,753,307 new alternative fuel cars were registered in 2019; this figure is 41% higher than the 2018 total. Breaking down these registrations by fuel type, there were 564,225 fully electric (ECV) cars, 365,372 battery-powered (BEV plus fuel cell) cars, 198,853 plug-in hybrids, 931,801 HEV mild-full hybrids, and 257,281 gas-powered cars (natural gas, GPL or E85).

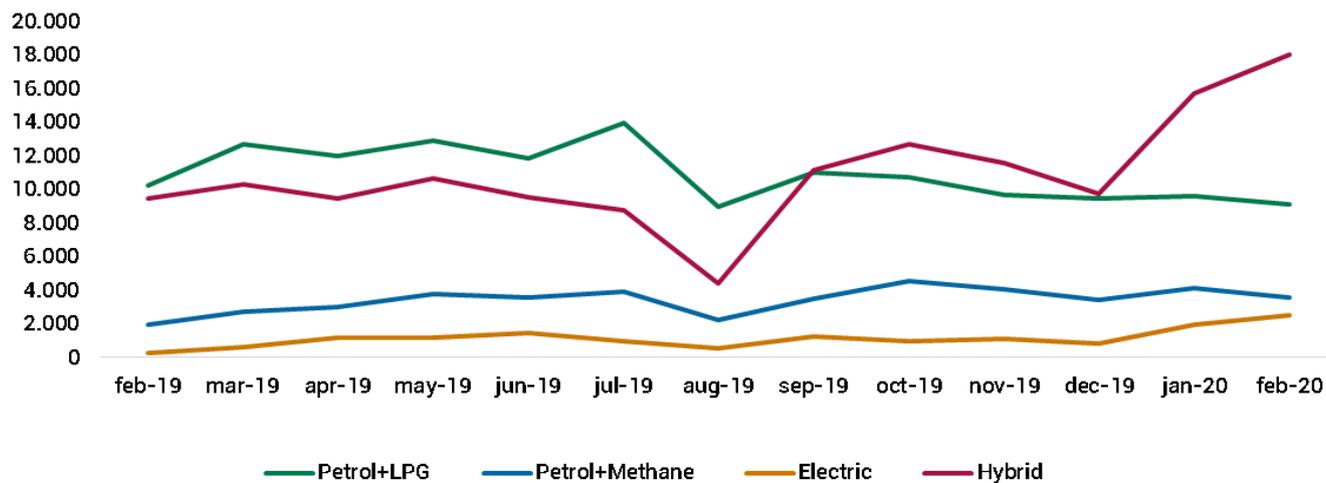
Alternative fuel vehicles have gained popularity in Italy, which was the second-leading market for new alternative fuel car registrations in Europe last year. According to the latest data available (from ANFIA), cars powered by alternative fuels accounted for 15.7% of all new car reg-

istrations in 2019, up from 13.3% in 2018. The biggest year-on-year increase was recorded by electric cars (+113.4%), followed by hybrids (+34.1%), but other mixed-fuel car registrations also showed year-on-year growth (petrol-LPG up 8.8% and petrol-methane a more modest 3.2% increase).

Parallel to the spread of alternative fuel cars, continual infrastructure developments have been required, including charge station installations (both public and private); such infrastructural development is currently uneven across the country, with a much greater concentration of stations located in the north. According to national electricity provider ENEL, there are currently 11,169 electric car charging stations in the country, and ANFIA claims that it would be optimal to have at least 30,000 stations installed by 2021, at least 170,000 by 2025 and 560,000 by 2030.

MAIN TRENDS

NEW REGISTRATIONS OF ALTERNATIVE FUEL CARS, FEBRUARY 2019 TO FEBRUARY 2020



Source: ANFIA

MAIN TRENDS

SECURITY SYSTEMS AND SELF-DRIVING CARS

Advanced technologies at the testing stage are opening the door to truly autonomously driven vehicles, as well as to connections and data exchanges between vehicles and even between vehicles and the road. The key technologies being developed in this area are CV2X (cellular vehicle-to-everything), LTE-V2X, and the 5G mobile network.

V2X (Vehicle-to-everything) is technology that enables information to be communicated between a vehicle and any other entity that could influence the vehicle or vice-versa, through WLAN and/or cellular telephone infrastructure networks. The single greatest enabling factor for refining and spreading this type of technology is the **5G** network, the next generation of mobile communications, which can facilitate data exchanges and allow greater interaction between different devices and equipment including smartphones, electric car charging stations, 'smart' traffic lights, road infrastructure components, other 'smart city' devices and much more. The importance of the **supercomputing** element of this

technology should be underlined. Thanks to sensors that can collect data from the external environment (e.g. whether pedestrians or obstacles are present), regarding infrastructure (information about electric car charging stations and about road conditions), from other vehicles – combined with parallel developments in artificial intelligence and machine learning – vehicles will become increasingly autonomous and able to react to external situations in order to substantially reduce the risk of accidents caused by human error.

Also of fundamental importance is the use of **virtual reality** and **augmented reality** solutions, in order to provide further support to driving safety. Examples of this include systems that scan and detect objects in surroundings and project information in order to avoid distractions (e.g. with heads-up displays). Such developments are clear steps towards 'driverless' or **self-driving** cars equipped with a system over 20 different sensors, video cameras, radars and ultrasounds in order to see objects that humans cannot, and to generate a mathematical representation of the moving vehicle's scenario at each point in time.

MAIN TRENDS

The internal information system then reads and interprets this scenario to make decisions that will ensure safe travel, as well as manage the vehicle's various functions to reach the destination.

SAE International, an automotive and mobility industry association that sets engineering standards in these industries, has established six levels (from zero to 5) to define the degree of autonomous driving in vehicles

with a view to establishing limits and restrictions. The current levels in which the majority of investments are being made by carmakers are 3 and 4. According to the European Commission, the self-driving car market will grow exponentially over the next few years, creating jobs and leading to profits of up to €620 billion for the EU-12 automotive industry.



MAIN TRENDS

CONNECTIVITY AND IN-CAR SERVICES

Alongside the evolution of the self-driving car, there has also been exponential growth in vehicle **infotainment systems**, which have become increasingly significant factors in consumers' purchasing decisions.

In this regard, the main tendency is to turn the time spent travelling into time that can be used for other activities including work, socialising or playing games thanks to new '**cognitive technologies**'.

In this sense, smart devices (smartphones, tablets, computers, smart watches and other wearable devices) can in many cases already be integrated with in-car software, with a growing number of useful applications offered by online stores.



MAIN TRENDS

CARSHARING

According to the Osservatorio Nazionale Sharing Mobility (National Shared Mobility Observatory), the **use of shared mobility strategies are growing continuously**: over five million Italians use some form of shared mobility. In 2018, there were 363 services dedicated to shared mobility in the country, including but not limited to car sharing schemes, scooter sharing schemes, car-pooling platforms and bike sharing schemes; this is 14 more than there were in 2017. About 5.2 million people were signed up to these schemes, a million more than a year before. Also, around 33 million shared journeys were registered over the course of 2018, which is on average 60 per minute, double the figure recorded in 2015.

More specifically regarding car sharing, 1.86 million people were registered for such services in 2018, about 90% of whom were signed up for free-floating services. There was a sharp 37% year-on-year increase in 2018 in the number of people registered for station-based services, while free-flow registrations rose by 27%. In the three-year period from 2015 to 2018, the number of

registered users of station-based and free-floating car sharing services rose by 22% and 40%, respectively, per year on average. A positive trend has also been seen in shared vehicle rentals, both station-based and free-floating, with respective rental numbers of 270,000 and 11.8 million, around 25% higher than the previous year. The distance travelled in shared cars in Italy reached



MAIN TRENDS

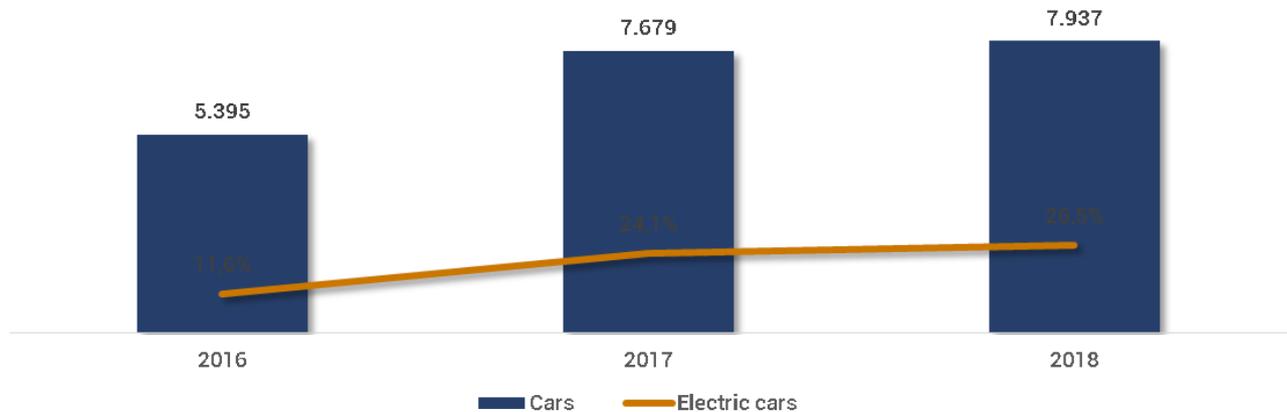
88.9 million kilometres in 2018. The distance attributable to free-floating services (80 million km) has doubled since 2015, while the station-based segment total in 2018 was 12% higher than in 2017 and only slightly lower than the all-time high reached in 2016.

With regard to the total fleet of shared cars, there was a slight slowdown in the growth rate in 2018 to 7,937 vehicles, 26.5% of which are electric cars; by segment,

the fleet grew by 11% in free-floating and by 39% in station-based services year-on-year.

Geographically speaking, free-floating car sharing remains a phenomenon that is heavily concentrated in the large cities of northern and central Italy, while station-based car sharing services cover a more extensive area of the country.

ITALIAN CAR SHARING FLEET



MAIN TRENDS

ITALIAN CAR SHARING FLEET BY GEOGRAPHICAL AREA AND FUEL TYPE, AS OF 31/12/2018

Area	total cars	petrol	diesel	hybrid	electric	LPG/ methane
North-West	4,281	3,265	8	0	1,008	0
Centre	2,855	1,945	29	0	881	0
North-East	393	54	6	64	158	11
Islands	365	191	60	4	30	80
South	43	0	18	0	25	0
TOTAL	7,937	5,455	121	68	2,102	91

Source: Cerved Group illustration of data from the Osservatorio Nazionale Sharing Mobility

INTERNATIONAL PERSPECTIVE



INVESTMENTS IN ITALY

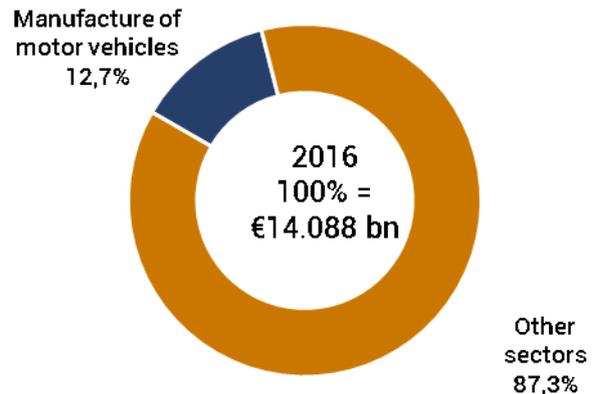
R&D EXPENDITURES

The latest data available from the Organisation for Economic Cooperation and Development (OECD) show that spending on research and development in the automotive manufacturing sector in Italy reached €1.792 billion in 2016, accounting for 12.7% of total R&D expenditures in the country. Focusing on the top 2,500 R&D spenders in the world, in 2017-2018, investments in the automotive sector reached €61 billion, 1.9% more than the previous two-year period and putting it among the **top ten sectors for corporate R&D investments**.

According to the 2018 EU Industrial R&D Investment Scoreboard of the European Commission, the automotive sector is the third-leading sector for R&D investments after ICT and healthcare, absorbing 17.6% of total R&D expenditures following a 6.9% year-on-year increase. **In Europe, the automotive industry is the number one focus on R&D investments**, taking up 30.5% of the total after a 6.1% year-on-year increase in spending in 2018.

Leading Italian carmaker Ferrari is ranked ninth in the world for R&D investment intensity, having invested around €740 million in 2017-2018.

R&D EXPENDITURE IN ITALY



Source: Cerved Group illustration of OECD data

INVESTMENTS IN ITALY

FOREIGN DIRECT INVESTMENT (FDI)

Based on the OECD's data on foreign direct investments (FDI), the stock of inward FDI into Italy in the "Manufacture of motor vehicles, trailers and semi-trailers" sector made up 3.9% of the total in the country. Over the last two years (2017-2018), FDI inflows have exceeded outflows in the automotive sector. In 2018, inward FDI stocks rose by 5.2% from 2017 to reach a value of \$16.693 billion.

ITALY'S INWARD FDI STOCK, 2017 AND 2018

(figures in million USD unless specified)

Activity	Inward FDI			
	2017	2018	% Change 2017-18	as % of 2018 stock
Manufacture of motor vehicles, trailers and semi-trailers	15,870	16,693	5.2	3.9
Other sectors	422,594	409,718	-3.0	96.1
All sectors	424,743	426,411	0.4	100

a) FDI positions represent the value of direct investment stocks held at the end of the investment period

Source: Cerved Group illustration of OECD data

INVESTMENTS IN ITALY

FOREIGN DIRECT INVESTMENT (FDI)

Income from inward FDI stocks in the Italian automotive industry rose sharply in 2018, going from a loss of \$139 million the previous year to a net gain of \$2.921 billion .

INCOME FROM ITALY'S INWARD FDI STOCKS, 2017 AND 2018

(figures in million USD unless specified)

Activity	Income from inward FDI		
	2017	2018	% Change 2017 -18
Manufacture of motor vehicles, trailers and semi-trailers	-139	2,921	N.S.
Other sectors	24,135	29,945	24.1
All sectors	23,996	32,866	37.0

Source: Cerved Group illustration of OECD data

INVESTMENTS IN ITALY

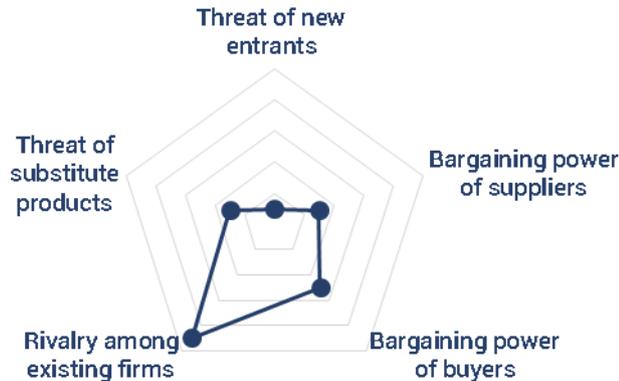
FOREIGN-OWNED COMPANIES IN ITALY

There are 186 active automotive sector companies in Italy that are at least partially foreign-owned. The majority of these firms are located in the north. They employ a total of 7,958 workers and their combined annual revenue is over €1.1 billion. It should be noted that 153 of those 186 companies, foreign ownership constitutes a majority of the share capital.

ACTIVE FOREIGN-OWNED OR PARTLY FOREIGN-OWNED COMPANIES, AS OF MARCH 2020

	Area		
	North	Centre/South	Total
Number of active companies at least partly foreign-owned			
- Total	39	147	186
- Majority foreign-owned	32	121	153
- % majority foreign-owned	82.1	82.3	82.3
Number of employees of such companies			
- Total	7,958	61,202	69,160
- Majority foreign-owned	7,749	58,081	65,830
- % attributable to majority foreign-owned companies	97.4	94.9	95.2
Revenue (2018 aggregate) of such companies, in € mn			
- Total	11,158	53,772	64,931
- Majority foreign-owned	11,122	52,332	63,455
- % attributable to majority foreign-owned companies	99.7	97.3	97.7

INDUSTRY ATTRACTIVENESS RADAR, 2020(a)



a) The smaller the area between the five points, which represent attractiveness factors, the more attractive the sector is for business.

THREAT OF NEW ENTRANTS

The likelihood of new entrants is low because entry barriers are high. Automobile manufacturers must invest very heavily, require advanced knowledge in production processes and industry strategies, and sustain burdensome

costs to build distribution networks. Meanwhile, component producers need to have solid relations with vehicle manufacturers and access to the after-market distribution network. These factors also mean that there are substantial exit barriers, given the substantial level of non-recoverable costs.

BARGAINING POWER OF SUPPLIERS

As far as vehicle manufacturers are concerned, only top-grade suppliers of strategic components and component systems are in a position to command significant bargaining power with them, whereas sub-suppliers and lower-grade suppliers are in a much weaker bargaining position than the major carmakers. For component companies, relations with their raw material and electrical and electronic parts suppliers usually depend on the relative sizes of the businesses involved. Larger multinational component groups generally have the ability to negotiate much better terms and conditions than smaller local producers.

INDUSTRY ATTRACTIVENESS RADAR

BARGAINING POWER OF BUYERS

For auto manufacturers, direct client bargaining power is low, as dealerships and other retailers are normally subject to the producers' commercial policies. For component producers, on the other hand, the bargaining power of their clients (the auto manufacturers) is high: carmakers are often able to impose their terms onto suppliers with which they develop and maintain close relations.

RIVALRY AMONG EXISTING FIRMS

Competition is, in general, very fierce. Among car manufacturers, it is based especially on aggressive pricing strategies, often under the guise of promotional campaigns such as very high rebates offered for trading in used vehicles, or offering interest-free financing. Competition has become accentuated partly as a result of

stronger new overseas competitors (especially Chinese and Indian producers) that have progressed from simple production partners of European carmakers into companies that market vehicles in Europe under their own brand names. In the component segment, competition has also intensified as a consequence of pressure from carmakers to lower prices, combined with competing suppliers from emerging countries for products with low value added.

THREAT OF SUBSTITUTE PRODUCTS

Alternative forms of transport constitute viable threats, including various forms of public transport and, especially for urban mobility, motorcycles, bicycles, e-bikes and e-scooters.

OPPORTUNITIES

INNOVATION

The automotive industry is widely considered to be a driving force for the economy, not just directly, but indirectly owing to the positive impact it can have along the value chain, from mechanical components to software products. Innovation is therefore an important competitive factor.

Of the many trends that have emerged recently in the automotive sector, we have identified two key areas of innovative developments that will influence the sector over the next few years: green mobility and shared mobility.

GREEN MOBILITY

Using cleaner technology constitutes the biggest growth opportunity for the sector as customers will be seeking to replace their vehicles in a shift from fossil fuels to electric power, to what can be considered a new phase of motorised travel. In this respect, the main innovative benchmarks are:

- reducing energy consumption;
- reducing carbon dioxide emissions;
- research on alternative fuels;
- reducing vehicle mass;
- alternative engines (electric or hybrid).

Italy is currently the second-leading national market in Europe for new alternative fuel cars: in 2019, cars powered by alternative fuels accounted for 15.7% of all new car registrations in 2019, up from 13.3% in 2018.

OPPORTUNITIES

SHARED MOBILITY

According to the Italian National Shared Mobility Observatory, the fleet of vehicles dedicated to car sharing services continues to grow, as have the number of operators offering shared mobility services, in step with rising demand. In 2018, about 5.2 million people were registered users of shared mobility services in Italy, a million more than in 2017. With a view to overhauling fleets to make way for vehicles powered by alternative fuels, car sharing fleets offer auto manufacturers a clear opportunity to penetrate the electric car market, in which demand is coming mainly from large urban areas. Furthermore, shared mobility services could be used as a launch pad to introduce other automotive innovations, especially self-driving cars, which are already being trialled in some other countries.

LEGISLATION

Further motivation for continued innovations – to varying degrees depending on the geographical area – stems from measures introduced to reduce pollution. Such laws and regulations stimulate demand, as they encourage consumers to replace existing vehicles with ones that pollute less, particularly electric or hybrid vehicles.

CRITICAL SUCCESS FACTORS

PRODUCTION

The first success factor is how efficiently a company can run its production platforms in order to make the most of its production capacity. Within this context, investments allocated to developing advanced systems are currently extremely important, especially with regard to user-experience components and software such as infotainment systems, mobility as a service, V2X systems, artificial intelligence and augmented reality.



CRITICAL SUCCESS FACTORS

BRAND

Something that has always been crucial in the automotive sector, although less so today than it was in the past, is brand image and brand positioning as perceived by consumers. Customer loyalty is not just about product quality because cars also function as status symbols. As such, the following factors are critical for success:

- brand image: this can be seen as the 'possible worlds' a brand can project through storytelling that appeals to and captures the emotional side of its audiences and leaves a deep impression; building a strong brand image in the automotive sector involves many factors, though, notably including the carmaker's historical standing;
- the customer journey: this refers to the dialogue that a brand manages to establish with drivers in all phases of the relationship, from the purchase to maintenance, repairs and emergency situations.

INTERNATIONAL PARTNERSHIPS

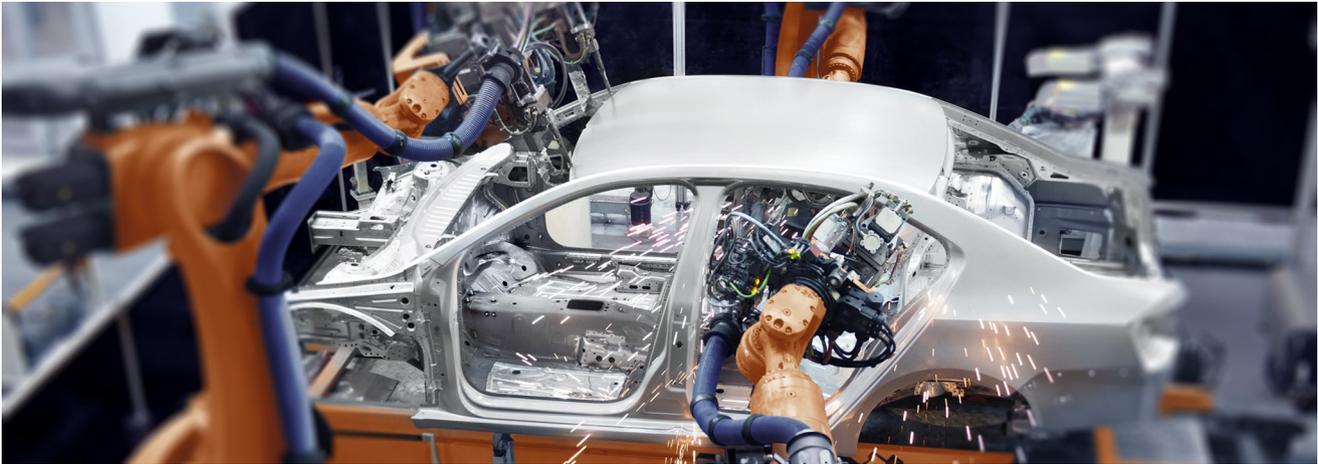
Forging joint ventures with foreign business partners constitutes a key factor for continued growth and for spreading the innovative component technologies developed in Italy. This is true for the entire sector, but especially for electric mobility and the broader 'smart' mobility phenomenon. The automotive hub in Lombardy exemplifies this: through commercial exchanges with the USA, companies achieved 3% year-on-year growth in 2019 on the back of 5% growth the year before, bringing annual sales up to €13 billion. Exports from Lombardy surpassed the €10 billion mark following 10.5% growth last year and total trade value came to around €13 billion.

CRITICAL SUCCESS FACTORS

COOPERATION BETWEEN CARMAKERS AND COMPONENT PRODUCERS

Collaboration along the entire production chain goes hand-in-hand with R&D investments in the automotive sector. Cooperating enables the burdensome R&D costs to be shared, thus substantially reducing business risk. A cooperative approach also pools the knowledge and know-how of numerous companies together. One exam-

ple of this can be seen in the close partnerships that have been established between car manufacturers and companies that design and develop integrated, interconnected component systems such as brake systems. In addition, some suppliers manage logistics and assembly operations for complete modules (i.e., sets of components that can then be installed on the vehicle in fewer steps), thus reducing assembly time and complexity for manufacturers and simplifying their component procurement process.





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