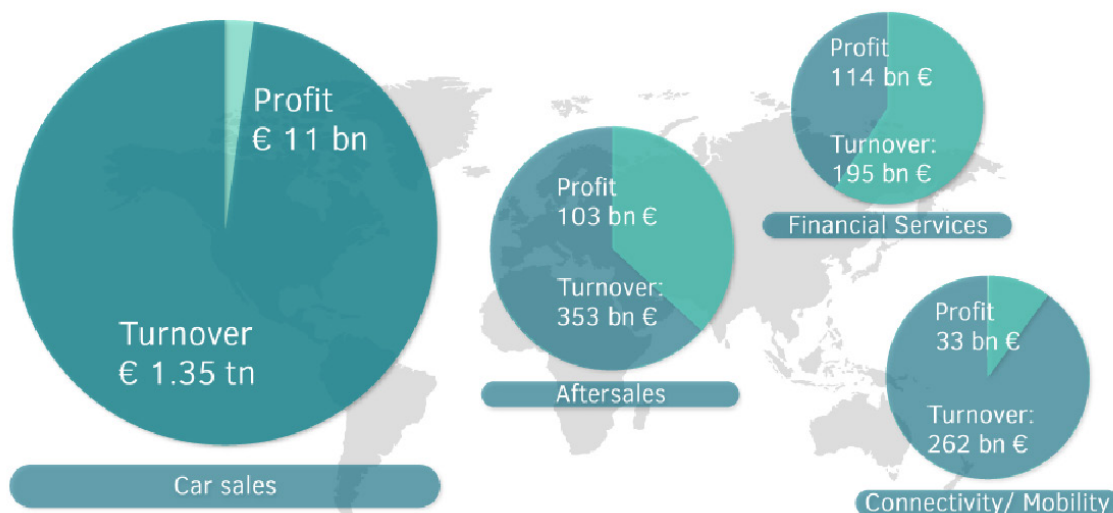


## Market overview

The manufacturing of vehicles constitutes the majority of the turnover in the auto industry. However other markets within the auto industry are also relevant. Combined the after sales, financial services and connectivity markets are good for more than 35% of the total turnover. Moreover these markets operate at a way higher profit margin than the car sales market. While car sales market operate at only a few percent profit margin, after sales and financial services have profit margins of 20 up to 60 percent. These markets are however not immune to the disruption of electric vehicles. In this lecture we will focus on the after sales market.

### Key profit drivers



*Image:* Looking at the backbone of the automotive industry: the retail organization (of the future). *Source:* Accilium



## The after sales market

Let us first start with a general description of the after sales market. The market exists out four levels: the parts manufacturers, the distributors, the workshops and the costumers. The parts manufacturers can be separated into three different stakeholders: the original equipment manufacturers, those that also produce the vehicles. Dedicated suppliers that supply original equipment and those that are operating in the so-called gray market. Businesses operating in this gray market mainly make generic parts that can fit onto many different vehicles.

The original equipment manufacturers and suppliers work with a different distribution channel which mainly supplies to workshops that are linked to dealerships, but they can also supply to the independent workshops. The generic part suppliers usually only deliver to independent garages but do so often on a higher profit margin. The costumers level can be separated into private and business customers, the last constituting out of fleet owners.

## EVs disrupting the after sales market

Electric vehicles are going to disrupt the market in several ways. The main drivers behind this disruption are the following: the decreasing share of mechanical and moving parts, from more than 10.000 in an internal combustion engine car to somewhere between 30 to 150 in an electric vehicle. Longer service intervals, due to the lower need of repair, customers will visit the workshop less often. Developments in battery technology. This new technology will need to be learned



by maintenance personnel, requiring additional investments in knowledge and equipment. Less additional units can be supplied. Many car enthusiasts liked to tune their car for which they bought additional components. Electric vehicles allow for fewer modifications to the car. The last major disruption is that costumers are less able to repair their car themselves. This forces the driver to go to the repair shop when the car breaks down.

## Consequences for the repair shop

So how do these developments affect the market for maintenance and repair? We should note that the market for maintenance and repair has already been in decline for years. This is mainly due to increasing quality that automakers deliver. Electric vehicles will make suppliers to focus on different parts. They have to switch from mechanical to electrical parts. The shift to electric means that regular maintenance such as oil change, changing of spark plugs and the replacement of the timing belt will no longer be necessary. This can entirely disrupt the supply chain of spare parts, forcing current companies out of the market. As the spare parts are more specialized this also leaves less room for the grey market and for independent repair shops.

Personnel at the workshops should be re-educated to switch from mechanical engineers to become electrical engineers. This requires substantial efforts and investments from these repair shops. Moreover engineering education should already focus more on electrical engineering as the information acquired by students today can already be obsolete in 10 to 20 years' time.



Repair shops should also train personnel to safely handle electric vehicles. These systems work under high voltage and therefore safety is of the utmost importance. Engineers should be trained how to safely disconnect the system and how to determine that indeed the voltage is low. The same holds for on-the-road repair engineers and for emergency personnel in the case of a crash. Governments should help by translating current safety standards in the electrical engineering industry to be adjusted for the current practices in automobile repair.

Besides training their staff, auto repair shops should also invest in additional equipment such as: metering, insulation materials, protective equipment and safe storage of equipment. In general it is expected that electric vehicles require fewer visits to the repair shops and that the number of spare parts will be reduced. However, it is expected that the number of hours, because of increased difficulty, will remain stable. This increased difficulty will also mean that costumers are getting forced to repair their car at the dealership, leaving less room for the gray market and independent workshops.





*Image source:* Diez & Schreier (2013) Electromobility – implications for after sales. Presentation of preliminary study results. Obtained from [here](#).

## Battery warranty

So far our attention has been on the service of the moving parts of the vehicle. The new and more vulnerable part of the electric vehicle is, however, the battery. There have been many questions about the battery lifespan and how it compares to the average lifespan of a vehicle. In early electric vehicles the battery has been the most difficult part to maintain. However auto and battery makers are learning at a fast pace. Current batteries can easily last 200.000 km while only degrading 5% in capacity. At less than 85% capacity the vehicle battery is seen as written off, but is



still useful for other less capacity critical applications. The key feature is the battery management system. To ensure a decent lifespan of the battery many automakers provide a warranty for a period of 5 to 10 years. In case the battery breaks down, it will be replaced for free by the manufacturer.

Due to the rapid advancements in battery technologies, new vehicles on the road have longer ranges. Such developments are likely to continue in the coming years. Some of the automakers can offer battery upgrades for relatively low prices. This can provide additional work for the repair shops in the coming years.

## Connectivity

Besides the developments on the spare parts and batteries another significant change is disrupting the after sales market. Due to the electrification the control of many parts of the vehicles is no longer done through mechanical feedback but through software. The vehicles have more and more become like computers on wheels. This also allows the vehicles to become connected to the outside world. Besides updates on more obvious functions such as navigation the electrification also means that the performance of the car can be improved via over-the-air updates. This allows car manufacturers, within the limits of the hardware present, to improve the car during its lifetime. This can also reduce the number of recalls automakers have to make as some of the fixes can be made through the internet connection the car has. Such connections are however not free and this makes connectivity one of the fast growing segments within the auto market. Moreover, connectivity opens the door for more vehicle sharing and is the basis for Mobility



as a Service or Transport as a Service. New business models that over time replaces the ownership based sales – after sales model. A positive disruptive win-win business which creates added value for the service provider and cost reduction for the mobility user.

