How Valeo is creating major change as a result of digital technology

by

Jacques Aschenbroich
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Overview

How does a French automotive supplier become one of the world's leading manufacturers of the 'connected car' in this digital age when there are another thirty thousand new companies also trying to reinvent products, practices and markets in the automobile industry? This is a part of history which is taking place at Valeo: it is accompanied by its unfailing industrial excellence and enthusiastic R&D (research and development) investments which today have made the former subcontractor the leading patent filer in France. Valeo sees the digital challenge as an opportunity to improve industrial performance, but above all to extend the company's activity to new types of products, new clients and new business models. As far as Valeo is concerned, this digital transformation is based on an unusual marketing position which includes having expert knowledge of both the hardware and the software and data.

Report by Sophie Jacolin • Translation by Rachel Marlin

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Even though the outcome of the upheavals which are currently sweeping through the automobile sector is still uncertain, these changes are forcing all those in the industry to rethink their market position and to consider strategic scenarios. Digital technology figures prominently in these evolutions, bringing with it a variety of newcomers who want to be part of a value chain undergoing change. It is the opportunity for Valeo to make the most of its unique know-how, largely acquired from R&D, which intrinsically blends both mechanical and digital dimensions.

Paradoxical misgivings about innovation

Current changes in the automobile sector are not without paradoxes. We should instantly rule out any idea that they are exclusively related to digital technology, as Valeo's latest presentation at the Consumer Electronic Show in Las Vegas (the annual world trade show which presents products in the consumer electronics industry) demonstrated. Of the twelve car prototypes which we presented there, eleven were strongly based on digital technology, one of which was driverless, and another used artificial intelligence. Nonetheless, the strongest media interest was in our twelfth car prototype. This is a small, 48-volt electric model jointly developed with a team from Shanghai's Jiao-tong University. It has low running costs, has a maximum speed of 100 kilometres per hour, and when fully charged, a maximum range of 100 kilometres. We need to be careful not to concentrate solely on digital products, yet this is the word on every politician's lips. For some, digital technology represents a solution to the economic crisis, but for others, it represents the loss of jobs.

The reaction of public authorities faced with new companies in the digital sector is paradoxical. Governments have taken steps to regulate the markets in which two of the giants of the digital revolution – Airbnb and Uber – are present, rather than address the tax problems they pose when depositing their profits in 'tax havens' or hiring self-employed workers. Uber has been banned in Germany. It will probably suffer the same fate in London, and its activity is being curbed in many American cities. Uber had to leave the Chinese market, but for different reasons. In my opinion, Uber's greatest innovation is not its mobile phone reservation app - any taxi company can have one of those - but its capacity to adjust the cost of a ride to suit the demand. Normal taxis are bound by absurd rules which impose a set price. And yet, it is Uber whom we are regulating. Airbnb is likely to suffer a similar fate, the pretext being that regulation is necessary to defend interests of the pre-existing accommodation situation (the hotel trade, for example) and to cope with the scarcity of real estate. Rather than support the digital revolution, governments choose to protect economic models which are already obsolete.

In a similar way, the electric car illustrates our governments' paradoxical concern about current changes. The boom in this form of transport requires a simultaneous development of infrastructure. Electric car owners have to make sure that they will be able to recharge their batteries easily in order to drive long distances. However, today 90% of charging stations are located in China, and only 10% in Europe, despite the fact that the market potential is the same in these two markets. What are the reasons behind Europe's reluctance to promote electric cars in a climate where combustion vehicles are increasingly stigmatised?

Three revolutions in the automobile industry

The automobile industry has had three revolutions which are different, but also complementary. They could bring about profound transformation in transport, especially in urban areas. Without knowing their speed or the end result, Valeo is spending more than 2 billion Euros every year on R&D in order to be prepared for these revolutions.

Diesel cars: chronicle of a death foretold?

The first revolution is the combustion engine power revolution. Europe is witnessing the death of the diesel engine in which it had invested a great deal. Petrol-powered and electric vehicles will benefit from the death of diesel cars, depending on choices made by consumers and regulators alike. Those who make the regulations are no longer the same as those who were present in the beginning. Until now, the rules were made by the European Commission, the Chinese government, and even the American federal government, all of whom are concerned about reducing vehicles' carbon dioxide emissions. The standards laid down – 95 grams of CO_2 per kilometre in Europe – are likely to be reinforced in order to achieve extremely ambitious objectives. Governments and industry negotiate these standards. Cities are now taking an active part. Firstly, they decided to ban certain vehicles (such as old vehicles or diesel vehicles) during peak periods of air pollution. Today, they fully intend to regulate vehicle traffic and implement a form of car tax. The city of Paris has stated that diesel vehicles in Paris will be phased out by 2024, and petrol-powered vehicles by 2030. For the first time, the regulator has not fixed a timeline, but imposed a solution. Is this really credible? 70% of all French cars are diesel, and diesel cars represent nearly 47% of car traffic. It is impossible to imagine that there will be no diesel cars in Paris in six years' time. On the other hand, this sort of statement is very likely to have a significant impact on purchasing behaviour and will affect sales of diesel cars negatively.

Soon diesel vehicles will no longer exist. Will they be replaced by petrol-powered or electric vehicles? This decision will not be in the hands of manufacturers, but consumers. Will they buy electric vehicles, complete with their advantages (the pleasant driving experience, excellent acceleration) and disadvantages (a maximum range of only 400 kilometres, a battery-charging time of forty minutes)? Industrialists are currently making huge investments to commercialise electric cars in two or three years' time. If they do not manage to convince consumers, they will have to pay considerable fines to European governments for any emissions in excess of the CO_2 emissions standards (95 grams per kilometre). It is therefore in their interest to promote electric vehicles. This first revolution is taking place principally in Europe and China. It will extend indirectly to Korea and Japan, but probably to a lesser extent.

At this point in time, it is very difficult to anticipate the balance between the different types of fuels (petrol, diesel, gas, hydrogen, electric). In my opinion, the use of diesel will certainly decrease even more quickly than we are currently predicting. Petrol-powered and electric vehicles are likely to share the market for several decades. It is unlikely that manufacturers will manage to find viable, competitive solutions based on hydrogen in the next ten to fifteen years, especially since electric batteries will have become so sophisticated that there will be no need for them to be replaced by hydrogen models.

Valeo is making itself the leading global supplier of electric vehicles, in terms of motors and power electronics. In other words, we have prepared ourselves very well for the decline in diesel. Our additional advantage is that we sell twice as many parts for hybrid vehicles than for traditional combustion models, and seven times more than for electric cars.

Autonomous vehicles

The second automobile revolution is the autonomous (or driverless) vehicle revolution, either in the form of private cars or robo-taxis. Full-scale trials have already taken place with robo-taxis. Valeo is a shareholder in Navya, a French start-up which has produced and put into service eighty electric and driverless shuttle minivans throughout the world. Waymo, a Google subsidiary, has a few hundred driverless minivans and will have several tens of thousands in two to three years' time.

Our traditional car-manufacturing clients are interested in the development of robo-taxis and also, eventually, autonomous cars. The cars they are manufacturing have increasing degrees of assistance. Drivers of some premium range models can already 'let the car do the driving' in certain situations. Future generations will have more autonomy, but they will keep the driving wheel and car pedals, unlike robo-taxis. Over time, the two situations will come to a compromise. Tens of thousands of robo-taxis will probably be in circulation throughout the world by 2020, but we will have to wait at least another ten years before a private individual can buy a car which is totally autonomous. An autonomous car multiplies Valeo's sales potential per vehicle ten or fifteen times, and thirty times

for the robo-taxi. We are the world leader in integrated sensors in cars, and we develop very complex software which includes ten million lines of code and uses artificial intelligence - which provides vehicles with information about their environment and enables them to drive correctly in it.

Digital mobility

Digital applications are revolutionising mobility as has been demonstrated by Uber (and its rival Lyft), Waymo, and also a variety of start-ups like Drivy (a rental system between private individuals), and BlaBlaCar, a car-sharing platform. The enthusiasm of start-ups for this last form of mobility is quite paradoxical because only one kilometre out of one thousand is driven by a car-sharing car in the United States. In this respect, predictions from the Cabinet Roland Berger management consultancy suggesting that car-sharing will lead to a decrease of 30% in the car market by 2030 seem far-fetched to me unless regulation is introduced which bans cars transporting just one passenger in cities.

In any event, digital mobility offers countless possibilities. For example, Valeo has developed a 'virtual key' system which greatly facilitates car rental. There is now no need to queue up at a crowded rental desk, sign numerous copies of rental contracts and then get lost in the car park trying to find one's rental car. The client can now order a car online, agree to the rental conditions by signing the contract virtually, get a text on one's mobile phone describing the location of the car, and have the virtual key appear on one's smartphone so one can drive off straightaway. This will cut nearly 45 minutes off the usual rental procedure time. A Spanish rental company is using our procedure for four thousand of its vehicles, and we have had very positive feedback. One can also understand how this solution can facilitate the management of fleets of lorries, and solve the eternal problem of how drivers hand over the keys to each other. These vehicles are also equipped with speed sensors and fuel-consumption sensors.

Digital technology: a springboard for mobility

In ten to fifteen years' time, it is very likely that vehicles will be more electrically powered, autonomous and shared. Will there still be cars in cities? The mayor of Paris is obviously aiming to ban them. Very few cities share this objective apart from specific, delimited areas. The Singapore government is carrying out an interesting study to determine the right balance between mass transportation and private transportation. Because this city has an affluent population, the government does not think that taxing vehicles will help reduce their number, but that the solution lies in reinforcing public transport services and taxis. In addition, the Singaporean government is well aware that economic development and mobility go hand in hand. Paris and its surrounding region account for more than 20% of France's GDP, and so one might be rightfully concerned about the possibility of 'fossilising' mobility. Instead, one should be making sure that synergies of different forms of mobility exist.

Uber says that when it began ten years ago, the turnover of taxis in Silicon Valley was 150 million dollars. Today, Uber's turnover there is 500 million dollars. Broadly speaking, the demand for personal transportation has grown fourfold. Over the same period of time, there is nothing which would suggest that the number of cars sold in this region has decreased or that traffic jams have lessened. Public mass transport has tended to grow. In other words, an idea which seemed insoluble has been solved. People still buy cars because they need them at certain times, especially weekends.

We use all forms of transport at the same time of day or week whereas the available surface area for traffic is limited. To help economic development, it will be necessary to optimise solutions of mobility, for example by greater use of public transport services and car-sharing schemes. Only digital technology can effectively deal with this challenge.

Combining the digital and mechanical

Faced with major changes with regard to mobility, what is important for Valeo is to determine where it should lie on the value chain. These sorts of choices are too strategic to be taken by people in charge of research centres. They have to be made by managers and directors, and questions related to where potential markets exist, how one

intends to be part of this market, which R&D resources one intends to use, and how to determine one's competitive advantage with regard to one's ecosystem must be discussed by the board of directors.

Strategic repositioning

Companies which appear to be similar may choose radically different strategies. For example, our American competitor Delphi split up into two separate business entities. The engine activity, which had little added value, was placed in a hived-off company, had debts and had to deal with important issues about diesel cars because these vehicles represented more than one-third of Delphi's turnover. The electronics activity was concentrated in a company called Aptiv. This company has no debt and is showing interesting growth potential. As far as Valeo was concerned, it kept its powertrain activity, but stopped making investments in diesel about ten years ago, and invested in electric cars instead.

More importantly, Valeo decided to position itself on the sensors market. Sensors are the eyes and ears of the car. It also entered the software and artificial intelligence market. Far from being commodities, these technological products are becoming sophisticated at an extremely fast rate. We are the world leaders. For example, Valeo is one of the only automotive suppliers to offer two-megapixel cameras in a market where, generally speaking, cameras tend to have just one megapixel. We are even developing ten- and twenty-megapixel cameras for robo-taxis.

With Aptiv, Delphi is focussing on the top of the pyramid, in other words, the interface between sensors and the vehicle, and it intends to manage autonomous cars. Aptiv, therefore, might be able to compete with car manufacturers and companies such as Uber, Lyft and Google. Valeo, on the other hand, does not think that it can have a future in this field.

After Delphi split part of its activity into Aptiv, its share price soared by 30%, in other words it had a market capitalisation of 6 billion dollars, whereas Valeo's share price remained relatively stable. Time will tell, but I am not very confident about our competitor's market position.

Unlike others in this market, Valeo does not intend to be a digital mobility operator. It has neither the talent nor the competitive advantage. Uber is funnelling nearly 2 billion dollars every year into this sector. I cannot see myself announcing to my shareholders that Valeo needs similar amounts of money to take part in this market and compete with Uber. We have nothing in common with start-ups which are capable of convincing investors to consume cash in the hope of gaining a foothold in a hypothetical market. Our company conforms to a very different model. It generates cash and finances its growth.

Even though we do not intend to compete with digital mobility operators, we still want to offer them innovative products and ideas which will allow them to improve their activity. I hope that we will become a major supplier for Uber, Lyft and Google, whose cars need ears and eyes, virtual keys and many other solutions which we are working on. Our advantage, which is in our DNA, is to systematically combine the hard with the soft, and the mechanical with the software.

The future battle for data

Artificial intelligence embedded in our solutions needs algorithms, computing power, and above all, data. In the future, data will be the most coveted resource. Our traditional clients and players such as Google and Apple will fight tooth and nail in order to manage it. Having said that, the Big Four (Google, Apple, Facebook and Amazon) already have easy access to data: many drivers who have an iPhone and the navigation app Waze use both Google and Apple in their cars. Car manufacturers will struggle to compete with these giants' geo-localisation systems and GPS systems, and consequently will find it difficult to gain access to data linked to user mobility.

On the other hand, car manufacturers manage and control the data of the vehicles themselves. The more vehicles become increasingly autonomous, the more it will be crucial for them to remain impermeable to outside influences. Europe and the United States will probably not handle this situation in the same way. The Old Continent seems prepared to give over ownership of data linked to the functioning of the car and its security purely to the manufacturers, whereas Americans seem to be more open.

Apart from these security aspects, it is crucial for industrialists to get to know their consumers because of data, and thereby re-establish ties with them. Until recently, contact was very irregular and often linked to regrettable events (such as accidents). Reinventing the client relationship will require sophisticated solutions of treatment and analysis of data.

In other words, digital technology is everywhere. As Chairman and CEO of Valeo, I have no choice but to make use of it.

Discussion

What will the car of tomorrow look like?

Question: *Batteries in electric cars need lithium. Will industrialists have access to lithium on a large scale?*

Jacques Aschenbroich: Access to lithium, and to cobalt and rare earths, will be crucial. It will give rise to incredibly complex relationships. Europe should acquire them and try to find them within its own national boundaries.

As far as the manufacture of batteries is concerned, I think that the situation benefits Korea and China. I cannot really see how any other country can enter into this sector unless it makes an unexpected technological breakthrough.

Q.: *You have not alluded to the digital infrastructure which will be the interface with autonomous cars. Will this infrastructure be decisive?*

J. A.: This is an important question which we have discussed inside the company. I am not sure that an autonomous car should be connected permanently to an external infrastructure. Systems of artificial intelligence and embedded algorithms will allow autonomous cars to make good decisions.

Q.: *Will the autonomous car be protected from computer bugs which could result in fatal accidents?*

J. A.: This will not happen because automobile companies have great technological and financial strength. All the companies in this sector have made massive investments in algorithms and software architecture, and they are making enormous strides.

More than a million people are killed every year on the roads throughout the world. Most experts think that driver assistance and the use of autonomous cars could reduce this figure by 90%, but this figure should be taken with great caution. We must also take into account danger from cyber-attacks.

Q.: *What do you think is the future of the electric car in China and India?*

J. A.: China has the infrastructure to recharge cars, and has made many achievements in the digital sector. Therefore, the conditions are in place for electric cars to develop. India will follow a similar path, but probably in a more chaotic way. It does not have any other choice because its cities are so polluted and congested. Its vehicles are still far from sophisticated, but we are seeing initial, qualitative progress as we did in China fifteen years ago. India is also making huge strides in the digital sector. Until recently, it shared the title with Europe as being the region with the highest percentage of diesel cars in the world. Today, India is taking measures which are similar to ours, and, as a result, the number of diesel cars in circulation is decreasing rapidly. It is hoping to have a higher

percentage of electric cars by 2030. Valeo's turnover in India is the equivalent to the turnover we had in China twelve years ago and the growth rate is the same as well.

Q.: *Do you not think that you will come into competition from Google or other giants in the sector once they realise that the sensor strategy is ingenuous?*

J. A.: I do not think that Google will invest in the industrial production of sensors, but the supplier Google chooses is important. On the other hand, it is clear that Google, Alibaba and even Tencent are already active in the car sector, and when cars have the capacity to be autonomous, this will mean that passengers will have even more time to spend on their smartphones.

There will certainly be a confrontation between Waymo and others such as Uber regarding autonomous cars. Waymo will certainly offer mobility services. It will be the company whose vehicles have driven the most autonomous miles in the world and will develop the operating system. Car manufacturers who have not already made the effort to invest in this sector will use Waymo's operating system. Fiat Chrysler appears to be taking this path by supplying minivans to Waymo for fitting self-driving technology.

Regulatory inconsistencies

Q.: *How can regulation take into account the problems of car pollution and the scarcity of space in cities more effectively and agreeably?*

J. A.: Governments are obsessed with efforts to combat global warming, and in particular the reduction in CO_2 emissions. They favoured diesel engines which produce less CO_2. However, in so doing, they have not handled related subjects such as particle emissions and nitrogen oxides present in air pollution. Cities which are concerned about public health intend to reduce concentrations of these emissions, for example by limiting access of light-duty vehicles. Despite the fact that traffic measures and measures regarding the concentration of nitrogen oxides in urban environments are uncertain and empirical, cities still take decisions which will have an impact on an entire industry.

Regulation would be more appropriate if it was based on rational discussion. I doubt that this will take place as long as cities still use laws which they put in place themselves and governments struggle to establish the link between global warming and public health. Ultimately, it is industry which will create the electric car which the regulator wants. However, I am not convinced that it is necessarily the best solution. I would rather the regulator gives clear guidelines, and let industrialists find the best way individually to respond to the problem. Today, unfortunately, the regulator provides the answer instantaneously.

Is the digital sector following a straight line or turning a corner?

Q.: *Was investment in sensors a radical change for Valeo or the continuance of a strategy which was already in place? How did you convince investors that this was the correct direction to take, given the fact that Delphi made a completely different choice?*

J. A.: This was not a radical turning point. It was part of the continued growth in our know-how which we had already developed when positioning ourselves in the sector which was bested suited to our skills. In 1998, Valeo bought the electronic systems activity of ITT, including one unit specialising in ultrasonic sensors. This enabled us to understand the sensor sector. We then made a joint venture with Raytheon in the United States in order to develop radar for cars. After that, Valeo bought Connaught Electronics, an Irish start-up specialising in embedded cameras. We subsequently developed laser scanners. Today our collection of sensors is unique throughout the world.

Unlike our German competitors (Bosch and Continental) who specialise in high-speed assisted driving on motorways, we have targeted a field which has been traditionally discredited: driving assistance in urban environments at low speed. We have a 45% market share in the global market for parking assistance sensors. Because of this, we have developed quite a unique know-how about assisted and autonomous driving in cities.

Our German competitors are progressively edging into our market, and we are starting to impinge on their market, which is speed.

We have not made public the financial elements of our sensor activity, but I have let all our investors know that our turnover is greater than Continental's and we are also growing more rapidly than they are. On top of that, we are one step ahead of Delphi.

Until very recently our shareholders were concerned about the next phase of the consolidation of the automobile and automotive suppliers market. However, there have never been as many manufacturers and suppliers as there are today, and the number of start-ups is growing very rapidly.

In fact, the market is in the process of deconsolidation. Delphi, Autoliv, GKN and even Honeywell have all split up into different entities for similar reasons, namely strategic stalemate on one part of the business and the influence of activist shareholders. Valeo is not faced with either of these problems.

Our shareholders agree with our strategy and see no advantage in splitting up our businesses, especially since we have generated 4 billion Euros of market capitalisation whereas Autoliv, Continental and GKN have hardly generated any. In the long term, the only way to convince shareholders is obviously to create growth, profitability and cash.

Q.: *How have you led the company's internal revolution from humble beginnings to the digital sector?*

J. A.: You may be overestimating the proportion of digital activity in our company business. When Valeo started in 1923, it first manufactured brake linings and clutch facings under the Ferodo licence. Subsequently it diversified into mechanics and plastics management before adding an electronics activity in the late 1990s. For the past seven or eight years, software has been an increasing part of our electronics and mechanical businesses. In conclusion, Valeo has progressed from being a group specialised in mechanics to one specialised in mechatronics, and then to a developer of software embedded in the products which it manufactures. However, Valeo will never be a digital company. Our added value can be found in our ability to combine mechanics, electronics and software.

Q.: *Has daily management been transformed by digital technology?*

J. A.: When I arrived at Valeo in 2009, I analysed projects including R&D projects, and I understood almost everything. Subjects have changed so quickly that I cannot keep up today. Our organisation now needs 'translators' who can make these subjects understandable. We should employ managers who know these subjects perfectly and can make well thought out technological choices, hire the right people for the job and train teams. This is a fundamental change in technological decision-making. It has become established gradually over a relatively long period of time.

When a subcontractor becomes an R&D pioneer

Q.: *Companies in the digital sector think it is very important to know their clients well. I am surprised that you have not mentioned this. Your vision of the car of the future seems even to be in advance of clients' visions, which is unusual for a subcontractor. Is a change in the power balance underway?*

J. A.: Our situation has nothing in common with a company which has millions of clients. In our company, six clients account for 70 % of our turnover, and our entire turnover is generated by about twelve clients. In this sort of a situation, it is a good idea to get to know them!

Some emblematic vehicles in the automobile industry would not have got off the ground if our developments had not succeeded. I do not think that we are faced with a power balance with respect to the car manufacturers, any more so than I consider Valeo to be their subcontractor, a term which tends to allude to an unbalanced relationship between an order-giver and an order-executor. It is more of a partnership. Today, no car manufacturer can design and manufacture cars without an extremely complex network of partners. No partners would know how to design and produce a car by themselves. We are therefore 'forced' to work together.

Over the past decade, R&D investments from the car manufacturers' major partners were disproportionate compared to their own, in percentage terms or even in absolute value. It is vital that we develop innovative products

and concepts for car manufacturers. Our order book is increasing by 15 % every year, and half of our orders are for innovations which did not exist three years ago. We must avoid leaning towards commodity products at all costs, as this would very quickly affect our profitability, and we would become part of an untenable vicious circle. Therefore, we must keep investing in R&D.

At the same time, we are trying to standardise processes and components. This was the key to our success in the past few years, and is a means of being indispensable. Our clients will never have sufficient volumes to manage to do this by themselves. In any case, this is not their field of expertise and they do not want it to be. We manufacture one-third of all the alternators in the world, half the ultrasonic sensors, and 40% of non-frontal cameras. As a result, our costs are unbeatable as long as we standardise the processes and components.

Our relationship with automobile manufacturers is therefore quite well-balanced. They appreciate our innovations, and we must convince them to maintain our investment capacity.

Q.: *Do you have any problems recruiting researchers?*

J. A.: We had four thousand researchers nine years ago, and we have twenty thousand today. There will be more than thirty thousand in five years' time (one-third of whom will be working exclusively on software) out of a total of one hundred and fifty thousand employees. Our greatest problem is recruiting complex software architects and even more so, artificial intelligence managers. There are eighty people in the artificial intelligence team, a number which we have nothing to be ashamed of in comparison with the Big Four.

As a French company, it was important for me to establish our centre for artificial intelligence in France despite economic calculations which consistently favoured a foreign location in Eastern Europe or China. Continental, which more or less copied our strategy, chose Budapest for the location of its artificial intelligence department.

One may well question whether Valeo is indeed a French company since 85% of its clients, 85% of its employees and 85% of its shareholders are not French. The answer may lie in the fact that our French sites have survived the economic crisis. When I arrived, twenty of our twenty-six French sites had been consistently losing money for fifteen years. If Valeo's management had been American or if an activist shareholder had taken control, Valeo would have left France. Our workforce in France increased from fifteen thousand employees before the crisis to seventeen thousand today, after a slight drop during the more difficult years. We invested 135% of our amortisations during this period, and now we are making money on all of our sites apart from two, and we are beginning to recuperate our deferred loss. Company nationality is therefore an important subject. As long as I am in charge of Valeo, we will not move our headquarters abroad.

Q.: *How does your company integrate new ideas from outside the company? Do you practise open innovation?*

J. A.: When I arrived, quite a remarkable process of technological development plans was already in place. Once a year, each business spent a day presenting its analysis of the technical changes in the coming five, ten or fifteen years based on client feedback and market analysis. I decided that this should take place twice a year, and that there should also be weekly focusses on very specific subjects related to technology or the business model. We now move forward more quickly.

In terms of external growth, we have made agreements with Cisco ('Cyber Valet Parking'), Capgemini and Gemalto (to develop the virtual key), and Safran. We estimate that there are about thirty thousand start-ups in our sector. We do not have the means to analyse all of them, so we invest in funds designed to analyse and invest in them. Additionally, we test out our ideas on these funds, specifically to assess the viability of business models in the digital sector. We feel the need for outside opinions.

Therefore, we try to remain open to start-ups, even if collaborations with them are occasionally erratic. Sometimes they may get bought by a competitor soon after we have started working with them on concepts and development. They may also back out of a commercial deal involving one of our clients unexpectedly. I have no intention of being part of the current fad of buying start-ups as I think this is just a bubble. Some start-ups which did not even have any particular know-how were bought for 40 or 50 million dollars per engineer. Aptiv bought nuTonomy for 450 million dollars. It has about one hundred employees. You can imagine that this is not Valeo's game plan at all.

Presentation of the speaker

Jacques Aschenbroich: Engineering graduate (Corps des Mines, Ecole des Mines). He had an industrial career in the Saint-Gobain Group between 1988 and 2008, having previously held various positions in public administration. In 2009, he became a board member and CEO at Valeo. He has been the Chairman and CEO since 2016. He chairs the board of directors at MINES ParisTech and is a member of the board at Veolia Environnement and BNP Paribas.

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