

The innovation race Whitepaper

European automotive industry:
Overcoming the hurdles of Innovation Race



Introduction

The European automotive industry is going through a period of unprecedented change. Legislation is driving technology in electric vehicles and changing customer demand is requiring increased levels of personalisation in what has traditionally been a mass produced product. See our report [The Innovation Race](#).

This initial report was based on a survey of 300 senior executives from across Europe about the innovation challenges facing the automotive industry. It was then followed up with a webinar attended by over 100 senior executives from across the European automotive sector. The webinar featured a series of interactive polls taken to get the participants' views on the innovation challenges that their companies face and how these may be overcome.

This whitepaper is based on the findings of that webinar, which you can listen to [here](#), and some analysis of those polls.

Much of the commentary in the whitepaper is based on discussions between Dean Johnson, President Elect for the Chartered Society of Designers, BBC technology pundit, and innovation consultant; and Peter Richards and Nicky Davies from Protolabs. Together they provided insight and analysis about the challenges facing the automotive industry and on the polling results that were taken during the webinar.

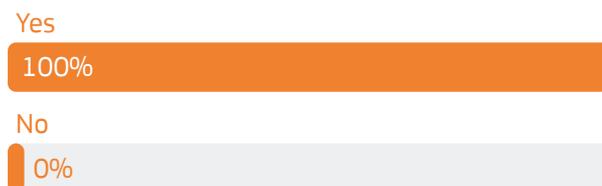


Electrification and the pace of change

The internal combustion engine has had more than a century to evolve and improve. Consumers know that the technology works and that there is an infrastructure that enables them to get from A to B easily and reliably.

Now with the pressures of climate change and legislation, the automotive industry has universally accepted that it needs to develop electrically powered vehicles that can match this convenience and reliability in just ten years (see poll 1). It is not so much evolution, as a revolution.

1) Do you personally feel that there is an increase in the level of focus in electrification?



While the uptake of electric cars is still low, it is rising rapidly. To build upon this, the consumer must know that the infrastructure is in place and that an electric car is as simple to use as its petrol cousin. At some point in the near future there will only be an electric range available, and legislation driving this pace of change has set a tight deadline.

This change affects far more than the electric vehicle itself as manufacturers also seek to drive forwards their own sustainability agenda to meet both increasingly strict industry standards and the demand from a more climate aware general public – their customer base.

There are other options and technologies available to eliminate exhaust emissions, notably hydrogen fuel cells feeding an electric battery, as an alternative to charging. Sadly, there is simply not enough time to explore all the different technologies. The industry must choose one course of action and the weight of support is behind electrical charging.

There are, however, still several obstacles to overcome if the customer is to be as comfortable with this option as they are with their current petrol and diesel models. Clearly there needs to be a charging infrastructure in place and beyond that both the speed of charging and the range possible from a single charge need to improve.

People need to be happy to switch to electric vehicles, which means that their experience cannot be worse than it is now, and the internal combustion engine has been evolving for decades, rather than the increasingly tight deadline that electric vehicles have.

Clearly the technology needs to improve and the investment to achieve this in such a tight timescale is huge. Whether this investment comes from historic brands, with established expertise in today's technology, or from a new start up that has the vision and disruptive nature to break through current barriers is open to debate (see poll 2).

2) Who do you think should lead on electrification?



Of the start-ups the most noticeable is TESLA. There are a lot of others, but quite a few are failing because they are not working with the rest of the industry. There is a proven methodology in allowing the supply chain to do what they do best, so chassis and battery manufacturers for example will work in partnership with the car manufacturer, rather than the latter keeping everything in house.

This allows the supply chain to do the bits that they do best and spread the research and developmental load.

We must not underestimate the scale of the challenge facing the current brands, however. The transition will be

painful for traditional carmakers and suppliers, and for some potentially catastrophic. Electric cars have about 25 percent fewer parts than conventional vehicles and companies that make engine parts like pistons, fuel injection systems or spark plugs will have to find new products to sell, or they will die.

For start-ups the challenge is different. While they don't have the same legacy infrastructures as traditional brands, they still need to forge key relationships so that they can share the developmental load with suppliers. They also need huge injections of cash, without the revenue streams that the more traditional brands enjoy. Notably, even those electric car manufacturers that have been in the industry for a long time, such as TESLA, still act like a start up in that they are constantly adding to their range.

There also needs to be a recognition of a common goal among all the participants involved. The biggest challenge that the industry faces is not one of whether to buy brand A or brand B in the short or medium term, but how can it switch the customer to a whole new means of travelling.

As Dean Johnson observes in the webinar discussion: ***“There is a real need for the customer to trust the technology.”***

In fairness the industry seems to realise that it must achieve this step change in a very short period (see poll 3) and that collaboration rather than competition is the order of the day. While the present remains largely powered by the combustion engine, where the confidence is largely brand led; the bigger question for the public with this new technology is *does it work*, rather than *who makes it*.

With the industry understanding the challenges of electrification and its tight deadline, we need to turn our minds on how to overcome the barriers, or hurdles to progress.

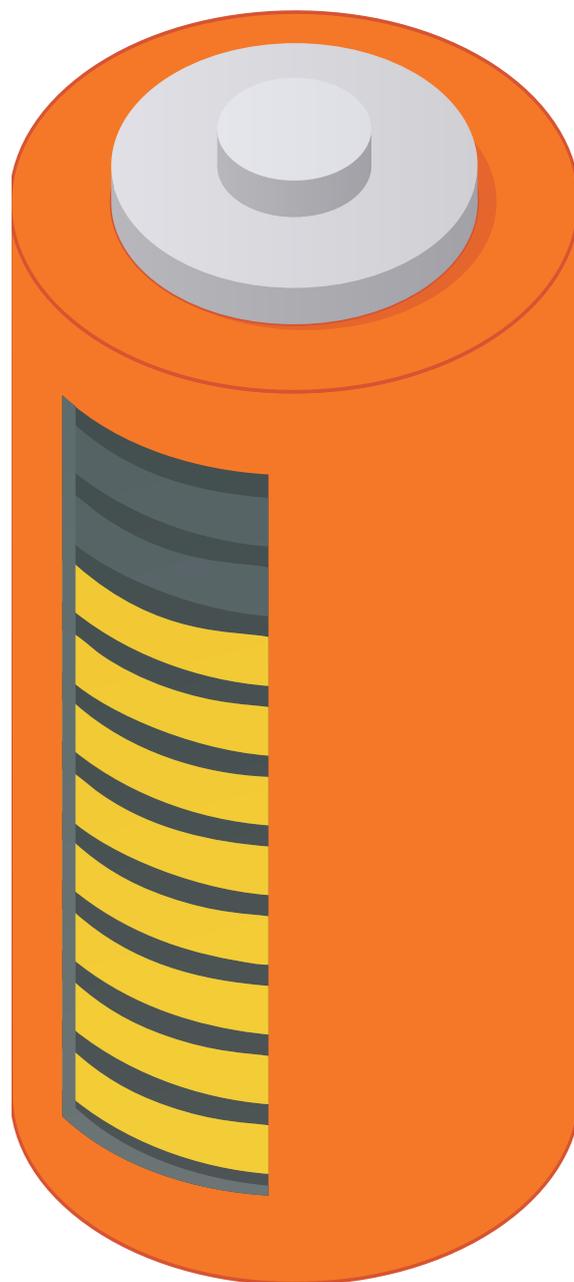
3) Who do you think leads with electrification?

Brand

32%

Technology

68%



The hurdles to electrification and how to clear them

These challenges pose some interesting questions about how the industry should tackle such a large task. Clearly innovation needs to sit centre stage but so does the process, so where should the priorities lie (See poll 4)?

4) Where do you place priority?

Innovation (creativity)

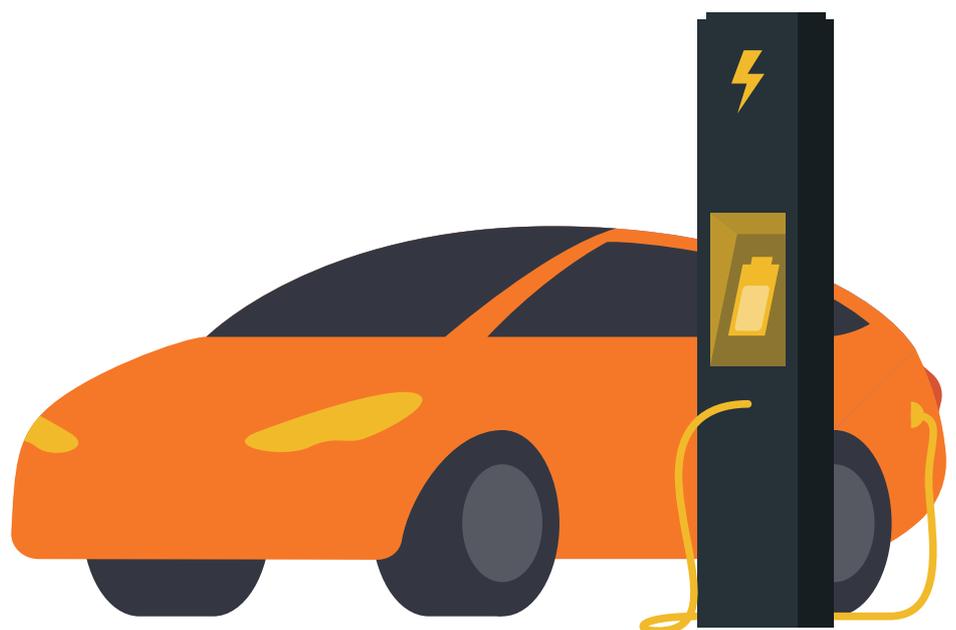
68%

Industrialisation (process)

32%

Manufacturers need to be lean and fast and act in a way that a start-up does. There is, however, the self-realisation that creative innovation comes from all parts of the business and needs to be part of its ethos.

So, for example beyond the production and engineering teams, marketing provides crucial customer insight. After all a customer must know why they want a product, if the product is good but they don't want it then the exercise is pointless. We need to ask ourselves *how does the product fit in with the needs of our customer as a human being?*



Disrupting the norm

For true innovation to happen one word is key: disruption. To up the pace of innovation, the business needs to either disrupt itself or be disrupted. We also need to accept that disruption often comes from outside the business or even the industry. It's worth learning the lessons from other industries such as TV and music.

You could argue that this is where start-ups without the long history of the traditional brands have a key advantage to enable such disruption. They face few of the barriers (see poll 5) to progress that the legacy businesses face, such as the realities of sales from existing technology vs the need to rapidly change.

5) What is the major challenge in adoption of innovation within your company?

Regulations

7%

Management

31%

Resource

62%

Another problem is that while everyone has a designated role within a business, that role does not include innovation. This could well be because there are simply not enough people.

It could also be that people are afraid to come forward with fresh thinking. In practice people are often too scared of the negative impact on their careers of suggesting a new approach or idea. This is a real challenge for management who may be inadvertently putting a brake on innovation.

Commenting on this in the webinar discussion Dean Johnson says:

“Most businesses think they innovate, whereas in reality they don’t. The challenge

is either to find ways of overcoming this fear barrier, perhaps the modern equivalent of an anonymous suggestion box, or to seek innovation from elsewhere.”

As much as we need to innovate in business, we must realise that the day to day business involves selling vehicles to consumers. People need to get on with their day jobs and don't necessarily see the opportunity for the sort of disruptive change that is needed.

Innovation happens when something is not good enough. A business needs to be brave and allow itself to be disrupted from within, and there are barriers that make this hard, or they need to look outside their bubble, see where it is being done better and bring people in from outside.

This disruption might be from the supply chain, who in the modern automotive industry are a key part of the process anyway, or even from outside the industry altogether.



Is the industry facing a talent crisis?

All of this begs the question of whether the car industry can still attract the right talent (see poll 6), with the brightest minds often seeking challenges in the more glamorous Technology companies.

6) What type of talent are you struggling to source?

Engineers

13%

Designers

13%

Creative

9%

Regulation Knowledge

13%

Innovation

52%

These companies actively encourage fresh thinking and disruption because if they don't evolve rapidly, they will soon be overtaken by the next big idea or platform from elsewhere. They also have their fingers on the pulse of what the consumer wants.

This is in contrast with the car industry where until recently changes have been incremental and gradual. We must remember however that the challenges facing the industry requires far more agility. It means that we must actively court the brightest minds who want to challenge the status quo then manage them in a culture that actively encourages disruption – something that is easier said than done in practice.

Talking about this in our report [The Innovation Race](#), a senior manufacturing engineer at Daimler AG points out **“... in Europe there are young people with**

innovative ideas, but there are also old people who have the power to block those ideas.”

This is not a universal point of view however and the very challenges facing the automotive industry should attract those eager to make a real difference to society and climate change. Indeed, according to Renato Bisignani at Formula E Holdings:

“Automotive companies have much more exciting products than technology companies.”



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Changing customer demand

We must also remember that people are used to disruption from other industries. Commenting on this Dean Johnson says:

“We need to remember that people do not only buy cars – they are used to disruption and change from other industries. If we examine where such innovation, or disruption, is happening, then we should be able to find people that can come up with new ideas.”

It means that electrification is not the only challenge facing the industry. The public is now so used to ordering from the internet and ticking boxes to get what they want, rather than what you want to sell to them, that the whole role of personalisation within a mass-produced environment must be addressed (see poll 7).

7) Is personalisation/customisation something you are trying to adopt in mass production?

Yes

79%

No

21%

There are some great examples where digital manufacturing technology has come to the fore. The Mini is a case in point. It all started with personalising colours, such as a Union Jack roof, but now you can even have a 3D printed dashboard with your name on it. It makes you feel as if it's your car, rather than a car that was given to you.

We can now do far more with a car that was not previously possible, so what is holding us back (see poll 8)?

Interestingly, this poll from our webinar (poll 8) suggests that an investment block on new technology may be preventing progress towards the personalisation that customers are coming to expect.

8) What is the largest barrier to the mass production of personalised vehicles?

Process change

29%

Skill shortage

6%

Supplier support

24%

Management restrictions

6%

Investment block

35%

Put bluntly, manufacturers need to put their money where their customers are, otherwise nimbler and forward-thinking competitors will win their business. People do not just want to buy a car; they want to buy their car.

This personalisation is already affecting the design of vehicles, but beyond that the industry needs to explore how people interact with their vehicles.

Other factors that are receiving press at the moment include self-driving cars and how to convince people that they work and are safe. Connectivity is another issue, how do we and other people in the vehicle use our time – do we work or seek entertainment for example, especially if the vehicle self-drives? It could even be that the surfaces in a vehicle become digitally personalised enabling passengers to read or watch something.

What is undeniably true is that the pace of change is accelerating rapidly, and the industry needs to find ways to reach the finish line before it is too late.

Getting to the finishing line in time

The industry has some big barriers to overcome if it is to reach its targets and ensure survival.

For electrification the first job is to deliver a reliable and convenient solution that the public can trust. This will require new thinking and there is a real danger that a misplaced competitive instinct could get in the way of such development (see poll 9).

9) Collaboration with competitors is something you are focused on?

Yes

31%

No

69%

While competition is healthy, a balance must be found. To achieve the tight deadlines for electric vehicles to become the norm requires a great deal of collaboration to both achieve the infrastructure needed and improve the technology for time of charging and to increase the range from a single charge.

In the webinar discussion Dean Johnson continued:

“The short to medium term needs of the industry is to ensure the survival of both the fittest and the fastest if we are to clear the technology barrier and prove that it is feasible for the customer. There is also a big job to convince the audience in general, and that is an industry-wide problem rather than one facing individual manufacturers.”

This cross-industry collaboration needs to work both horizontally with competitors and vertically through the supply chain.

As the industry changes, the role of the supply chain becomes even more important (see poll 10) in introducing new ideas and technologies such as additive

10) What is the biggest requirement from your supply chain?

Innovation

0%

Creativity

6%

Reaction time

22%

Reliability

17%

Quality

6%

All of the above

50%

manufacturing. It needs to become an even more integrated part of the process than it is already - an extension of the team, if you like.

This integration needs to become seamless and reaction time by suppliers needs to be rapid. In the past the industry has been used to long lead times with long product cycles, but this is getting ever shorter particularly with legislation driving the timetable for the next big thing – electrification.

There is a need to fail fast and from that to succeed fast as well. This will involve a lot of developmental work which needs both rapid prototyping and testing, leading to faster production.

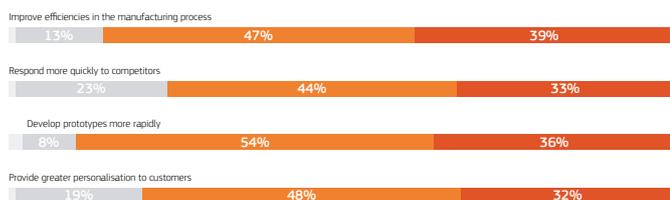
When you include other big disruptive changes filtering through, such as personalisation, then the role of the supply chain in innovation, development and production becomes even more vital.

Automotive manufacturers and their suppliers need to embrace new technology, such as 3D printing plus other additive manufacturing to prototype and test new ideas more rapidly, particularly as legacy infrastructures mean that many of them struggle with agility. Using new technologies to experiment with new approaches will become far more important and could have far reaching benefits.

As our report [The Innovation Race](#) highlights, additive manufacturing is helping automotive firms in four vital areas to meet innovation and customer needs.

Additive manufacturing is helping car-makers in four vital areas

■ No improvement at all ■ It's too early to say ■ Slight improvement ■ Significant improvement



As we have seen from the polls in our webinar and from the original report, the automotive industry is also facing a talent crisis. In the face of this and the need for rapid progress, one solution is to bring innovation in from outside. This has been discussed in this whitepaper, but surely it is also worthwhile tapping into an ecosystem that already exists – namely outsourcing innovation to suppliers or perhaps even forging new relationships and extending the supply chain to include other specialists.

According to Adam Kradjian, chief research engineer from Jaguar Landover:

“It’s critical to be well connected externally, building strong relationships with suppliers, strategic partners and institutions to leverage new technologies and innovation.”

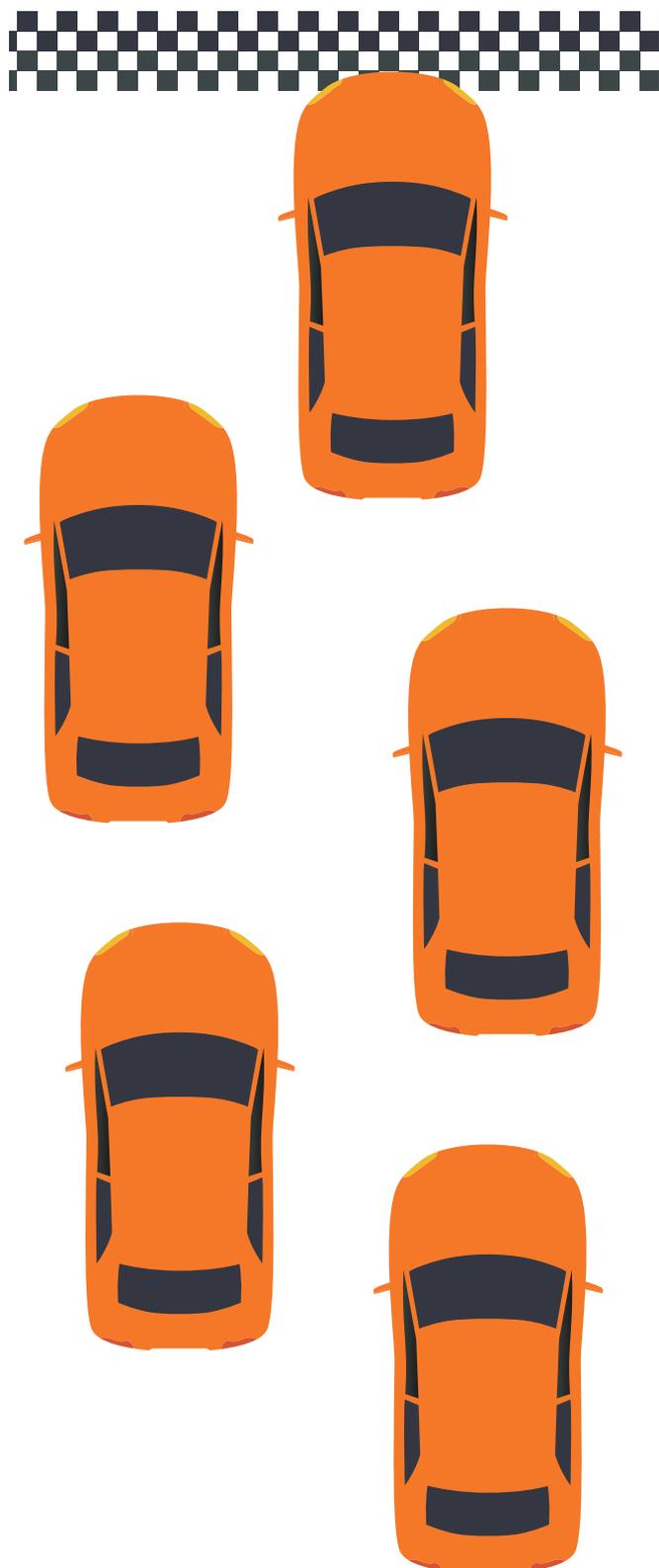
What is clear is that customer preferences are changing fast and the industry needs to go through a period of transformational change.

We think that collaboration between manufacturers and throughout the supply chain, bringing in new specialists and even disruptors from outside the industry, will be key to its future success.

There are both technological barriers to overcome such as electrification and new more sophisticated customers demanding personalisation so that they buy their car, instead of being sold what the industry can offer. Where exactly the winners will come from remains to be seen.

What you can be sure about however is that inaction is not an option and there will be casualties along the

way. The challenge is to make sure that your business is a winner and is still here making the most of future opportunities in ten years’ time.





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