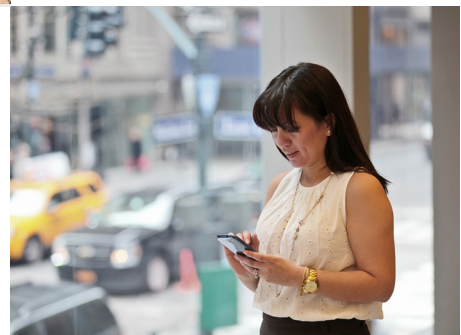

The highway to growth

Strategies for automotive innovation



Foreword

In our work with automotive clients, we see the critical impact of innovation up close every day. New advances have made driving safer and more fun. The industry is on its way to dramatically reducing fuel consumption. And trucking is getting more efficient too. The industry is fiercely competitive and consumer expectations are changing fast, so OEMs and suppliers alike need to keep up with the technological pace or risk losing market share.

If you're an automotive executive, chances are this isn't news to you. But when was the last time you took a close look at innovation in your company, starting with strategy? Customer needs are probably at the center of your marketing approach, but they need to shape innovation too. Advances in data technology are having a dramatic impact on what's possible in-vehicle and creating new service horizons outside of it.

We've found that the most successful innovators are targeting more breakthrough and radical innovation, and they're not just focused on products. Innovation approaches now also need to take into consideration megatrends like urbanisation, the shift of global wealth, and demographic changes. Innovating to improve business models and supply chains can help companies compete in a marketplace that's changing radically.

That means working together, both by promoting a strong innovation culture within your company and by collaborating with partners from across industry, academia and even government. This report is meant to be food for thought to help you sharpen the innovation focus at your company. We're looking forward to continuing the conversation.

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About this report

The highway to growth: strategies for automotive innovation is a companion paper to PwC's comprehensive survey report, *Breakthrough innovation and growth*, which explores three key questions:

- How are companies using innovation to drive growth and what is the return on this investment?
- How are approaches to innovation changing, particularly in light of a trend towards more disciplined innovation?
- What are the best practices and critical success factors that deliver tangible business results?

To answer these questions we draw on insights obtained from interviews with the 1,757 C-suite and executive-level respondents, across more than 25 countries and 30 sectors, who are responsible for overseeing innovation within their company. Our sample included 72 automotive industry respondents from 17 countries and from across the automotive value chain. Their responses form the basis of this companion piece.

1757

C-suite and executive-level respondents

25 From more than 25 countries

From across more than **30** sectors

The highway to growth shows why automotive executives should take a fresh look at their innovation strategy, balance their innovation efforts, enhance collaboration and look for meaningful ways to improve their innovation culture and attract the best talent, today and tomorrow, all over the world.



72

Automotive Industry respondents across the automotive value chain

17

Countries around the world



The big picture

Automotive companies have a tough balancing act

The automotive sector is facing an unprecedented need to manage an extremely broad innovation agenda. Balancing innovation will make the difference between moving ahead and falling behind the competition. Companies are juggling efforts to improve the efficiency of traditional combustion engines while at the same time researching electric and fuel-cell powered vehicles. Automotive OEMs now need to manage research on areas as diverse as advanced materials, networking, sensor technology, and batteries, and suppliers are deeply involved too. Nearly everyone agrees driverless cars will eventually become a commercial possibility, although opinions about when they will hit the road vary.

But autonomous driving vehicles aren't the only area where technology and software will have a huge impact. We are seeing big data and analytics start to transform the sector. A single plug-in electric vehicle generates about 25 gigabytes of data an hour.¹ Accurately capturing, interpreting and acting on it can be immensely powerful.

And if that weren't enough, consumer expectations around mobility itself are changing. That means new business models are becoming increasingly important too.

Keeping the focus firmly on the customer can help companies to set the right innovation priorities. And understanding the needs of drivers and passengers can help suppliers, not just OEMs, place the right bets. For example, some companies are creating systems that help drivers avoid collisions. That can help if you're targeting aging drivers who want to stay mobile. And while some OEMs have already developed systems to help drivers know when their cars need maintenance, in the future, products and supply chains might

be coordinated. When a vehicle signals a problem, dealers could be automatically notified and parts pre-ordered from supplier, saving the driver time when he or she comes in to make the repair. Not every company will have the same innovation agenda. But management at every company needs to define concrete innovation priorities and map out plans to execute them.

New approaches to partnering and collaboration can help

With so many technologies competing for attention, automotive companies will need to look outside for some of the answers. And while traditional partners like the chemicals and steel industries are still important, industry is also reaching out to new sectors, especially to technology and communications. It's also looking to open innovation and social media as useful tools to make collaboration happen.

And culture and strong leadership are key to future growth

Ten years ago, innovation was seen as important, but it wasn't yet the top priority for the C-suite. That's changed, with OEMs and suppliers alike adding new roles like Chief Innovation Officer or Chief Technology Officer. These executives have a seat in the boardroom. That's because automotive companies are increasingly recognising the need for strong leadership to set the tone for a strong innovative culture. Board-level leaders also make sure that innovation can be scaled and repeated across the organisation. In our view, innovation is far more cookery than alchemy; companies that actively manage it as they do other critical business functions will have a competitive edge.

¹ <https://media.ford.com/content/fordmedia/fna/us/en/news/2013/10/25/ford-embracing-analytics-and-big-data-to-inform-eco-conscious-de.html>.

Success starts with strategy

In our research across industries, we've found a clear correlation between innovation and success in growing revenues. In *Breakthrough innovation and growth*, PwC reports that over the past three years, the most innovative companies in our study grew at a rate 16% higher than the least innovative.² And in the space of only five years, these top innovators forecast that their rate of growth will further increase to almost double the global average, and over three times higher than the least innovative group.

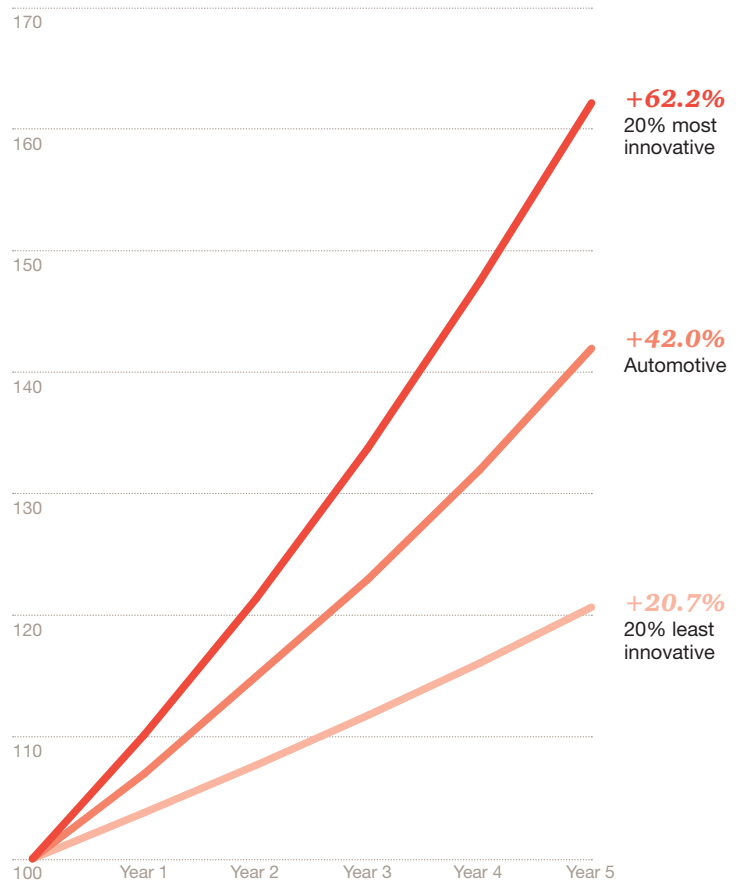
Automotive executives are optimistic about their prospects for revenue growth (see Figure 1). That's due in part to expected increased demand, as reflected by PwC Autofacts' forecasted growth in assembly of 26.7 million light vehicles - over 33% - from 2012 to 2019. (But even with demand increases on their side, their expectations are still lagging behind those of top innovators across industries). And since most automotive executives expect to rely much more heavily on organic than inorganic growth, buying R&D capacity won't be the answer.

² We defined the top innovators using a balanced scorecard approach based on six factors: the importance interviewees place on innovation, their appetite for innovation, the proportion of annual revenue from products or services launched in the last year, the proportion of annual revenue spent on innovation, the proportion of products and services co-developed with external partners and their project revenue growth over the next five years. For more details on our methodology, please see *Breakthrough innovation and growth*.

Figure 1: Top innovators expect to grow much faster

What is your company's annual revenue?

What do you forecast your annual revenue will be in five years' time?



Source: PwC, *Breakthrough innovation and growth*. Base: Automotive: 72; Top 20% of innovators across industries, 359; Bottom 20% of innovators across industries, 395.

Less than 2/3 of automotive executives say they have a well-defined innovation strategy, compared to 79% of the top innovators across industries.

So it's no surprise that the large majority of our automotive respondents say innovation is important to their business. And the urgency is growing, with 54% seeing it as a competitive necessity in 5 years' time (see Figure 2).

But less than two-thirds of automotive companies say they have a well-defined strategy. That's a serious problem for those without a clear vision, because execution starts with a sound strategy.

There's a lot at stake. Our research showed that automotive companies spend slightly more of their revenues on innovation than their peers do across the total sample. But our sample includes small players as well as large ones; overall the industry's total research budget is immense.

No matter how large or small your company, it's critical to clearly define your goals for innovation and understand what level of innovation you're shooting for. Too much innovation can be a drain on resources. Too little innovation and opportunities for growth are squandered. Even if you already have a clear roadmap, it's important to keep evaluating what's working and what's not – otherwise the competition may catch up faster than you think.

We've identified some fundamental questions automotive executives need to ask themselves when taking a closer look at their company's innovation vision:

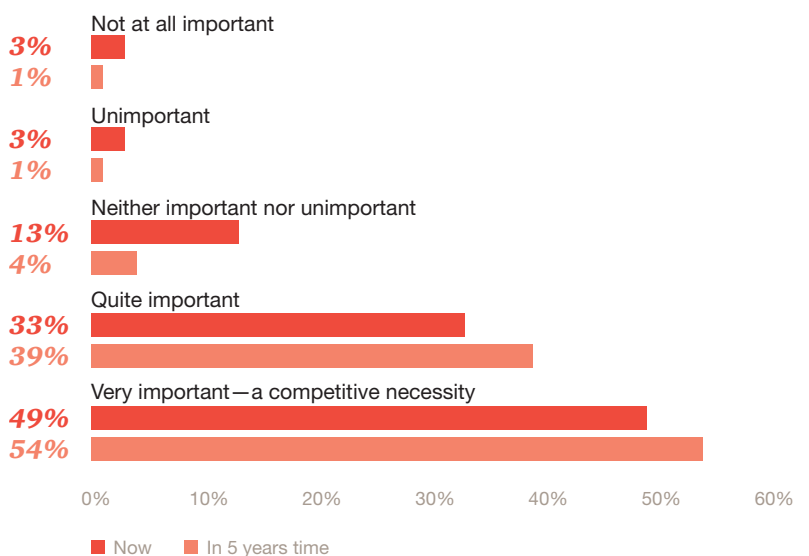
1. What balance of innovation do we need? What ratio of incremental, breakthrough and radical? Are we ready for the big data revolution? Does our innovation focus enough on customer needs? Have we looked at important areas like services, business models and the supply chain?

2. Are we collaborating enough and with the right partners? Do we have systems in place to evaluate the relevance of good ideas from other industries? How strong are our strategic partnerships? Are we making good use of open innovation or other strategies like corporate venturing to identify and develop new relationships and ideas?

3. Can we attract, keep and motivate innovation talent? Are we actively working to increase our candidate pool and position our company as a supportive environment for top talent? Will we be able to adequately support increasing research needs in Asia?

Figure 2: Auto executives view innovation as vital to future success

How important is innovation to the success of your company now?
In 5 years' time?



Source: PwC, Breakthrough innovation and growth. Base: Automotive: 72

Balancing the innovation portfolio



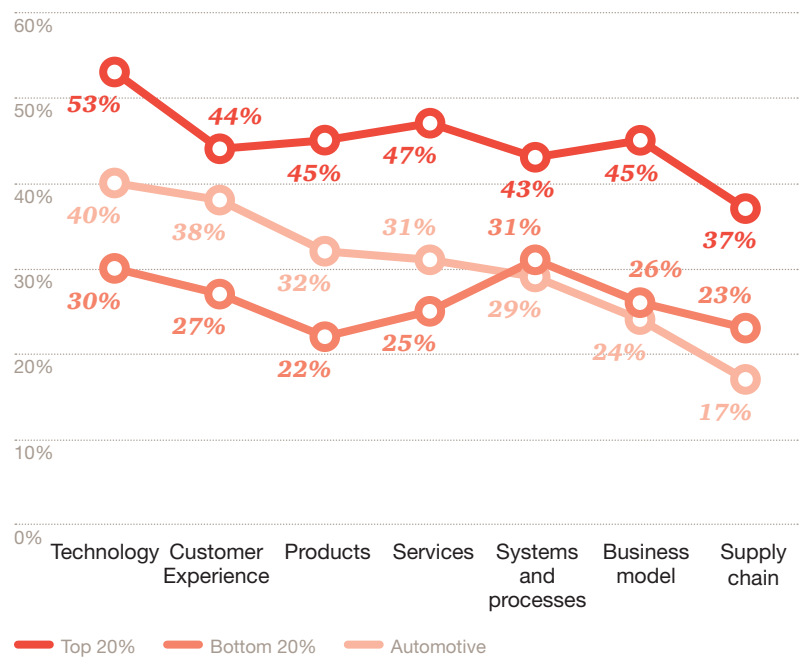
We've found that one of the keys to driving growth while still maintaining the health of established products and services is to focus on a balanced innovation portfolio. That means finding the right mix of investments in incremental, breakthrough and radical innovation in products, technology and processes. But that's not all. Reinventing business models, services, the customer experience and the supply chain is critical too.

For automotive companies, balancing innovation means setting priorities. Do we want to lead in electric vehicles? Create a financially viable car-sharing business to expand our business model? Co-develop driver assistance systems with a technology company or supplier? How many ideas can we share across platforms?

Automotive executives have the most ambitious plans in two areas – technology and the customer experience (see Figure 3) – where they expect 38-40% of innovation to break new ground. In other areas like products, services and systems and processes, the numbers for big advances hover around the 30% mark. And while these lag behind the top innovators in our study, they still represent a significant shift from the 10-20% level we've seen historically. In two areas—supply chain and business models – breakthrough and radical innovations are in the 20% range.

Figure 3: Auto executives are most ambitious about technology and customer experience innovation

How significant will your innovations in the following areas be over the next three years? Respondents expecting breakthrough or radical innovation.



Source: PwC, Breakthrough innovation and growth. Base: Automotive: 72; Top 20% of innovators across industries, 359; Bottom 20% of innovators across industries, 395.



Gearing up to use big data

Why such a strong focus on technology? There are many reasons, but two words stand out. Big data. The amount of information now available to the automotive sectors is immense, ranging from vehicle data to advances in machine-to-machine communication, the so-called “Internet of Things” driven by embedded sensor networks and radio frequency identification tags (RFID). The challenge lies in making sense of the patterns.

Vehicle information isn’t the only source that companies are drawing on. Some are also listening carefully to what customers are saying on social media. Facebook status updates and tweets can also be a source of up-to-the-minute feedback on customer satisfaction, or frustration.

And the techniques are already being used in the production setting. Some OEMs are cutting development time by using systems based on predictive analysis to monitor price and quality across the supply chain.

PwC Autofacts View: in-vehicle security a concern as connectivity evolves.

The average car has evolved into a complex labyrinth of as many as 70 independent electronic control units (ECUs) with dozens of microprocessors and several million lines of binary coding. Internal computer components have now proliferated into a complex, interconnected web of peripheral networks – all of which are susceptible to threats like viruses, malware and denial-of-service hacks. Theoretically a hacker that accesses a vehicle’s OnBoardDiagnostic port could also tamper with audio systems, cruise control, anti-lock brake systems, power steering and transmission functions. With remote access, a hacker could potentially tamper with GPS routing systems, steal sensitive/personal data, and even disable the vehicle entirely. OEMs and suppliers should consider developing built-in anti-hacking mechanisms to prevent cyber attacks.

Source: PwC Autofacts Analyst Note, June 2013

Recently, GM opened four IT innovation centers located in Austin, Texas; Roswell, Georgia; Phoenix, Arizona and Warren, Michigan. GM is looking to create and deliver IT services with new capabilities to help the company to improve its performance, drive down the cost of ongoing operations and increase the level of innovation delivered to GM customers.³ GM is moving to a more in-sourced IT business services model as part of its overall IT Transformation.

GM is also investing in two state-of-the-art data centers. The first is officially opened and located on the grounds of the company’s technical center in Warren, Michigan and another is planned for the company’s proving grounds in Milford, Michigan. According to GM, “The two centers will integrate and streamline all aspects of product development, manufacturing, marketing, sales and OnStar applications to speed access to any GM employee anywhere in the world.”⁴

Enhancing the customer experience

But as exciting as cloud computing is, it’s important to stay grounded too. Research into big data applications needs to stay firmly focused on customer needs.

Nearly a quarter of automotive sector respondents (23.7%) say that they are already co-developing products and services together with customers. That’s better than the overall average, although there’s still room to catch up with the top innovators.

When it comes to innovating on the customer experience, automotive companies are also looking beyond co-developing products and services – they want to engage customers in an interactive, ongoing dialogue.⁵ New car buyers are already using online information channels extensively to research different vehicles. The growing access to almost unlimited information and online communication channels has absolutely empowered the consumer. That creates a real opportunity for OEMs.

Consumers are hungry for real-time, ongoing information sharing and active collaboration. Customer and enthusiast communities are already emerging and beginning to have an impact on automotive innovation. These new and more engaged participants in the product development process are providing input into everything from design concepts and technical expertise to design drawings and technical specifications.

But for the next generation, customer expectations are beginning to change radically. Today’s teenagers and young adults don’t have the same emotional associations with cars that their parents did. In 1970, having a car meant freedom. But now the younger generation is connecting more virtually, especially through social networks. Many are also looking for greater work-life balance and are worried about the environment – so they want to commute less. As automotive companies innovate, they’ll need to find ways to adapt in response.

3 http://media.gm.com/content/media/us/en/gm/news_detail.html/content/Pages/news/us/en/2012/Oct/1008_Warren.html

4 http://www.gm.com/article.content_pages_news_us_en_2013_may_0513-data-center.html

5 PwC, Looking ahead: Driving co-creation in the auto industry

Making vehicles a little bit – or a lot – better

One-third of automotive executives say that improving products is their top innovation priority and about the same number (32%) plan to generate radical or breakthrough innovations. That's an ambitious agenda which may be tough to achieve. Prof. Dr. Stefan Bratzel, director of the Center for Automotive Management (CAM), has been tracking automotive innovation globally for more than 9 years (see interview). He's observed that incremental advances currently dominate OEM's innovation output. While over time these improvements may add up to big changes, Prof. Dr. Bratzel points out that with technology advancing in so many different fields simultaneously, automotive innovation tends to happen mostly in small steps.

There's also a lot of cross-fertilisation of ideas across the industry. Earlier this year PwC and CAM took a close look at the state of product innovation globally in the AutomotiveINNOVATIONS Awards 2013. CAM rated innovations for quality as well as quantity, including an assessment of whether the innovation was a global first for the industry.⁶ Overall, CAM evaluated 791 innovations developed by 18 global automotive OEMs with 52 brands.

For the three top-ranked OEMs, global firsts made up 17% - 25% of innovations. And for the three top-ranked automotive brands, the range was 13% - 35%. The rest of

the innovations were either new to a particular OEM or to one of their brands. That suggests the importance of keeping up with the competition in terms of technology and of leveraging innovation output across different platforms. The country which stood out in the research? Germany, by a wide margin. Its automotive manufacturers generated 39% of all the tracked innovations. Japan had a strong showing too, with 23%.

This year's AutomotiveINNOVATIONS Awards also showed an outstanding commitment to increasing safety. With a total of 209 innovations in the category 'safety systems' CAM recorded 30% more innovations here than in the previous year. That's also more than four times as many as in 2006, when there was a total of just 52 innovations in this category.

Expanding the innovation focus

But innovation efforts shouldn't stop with technology, customer experience, and products. We've found that across industries, the top innovators are focusing more attention on areas like services, systems and processes, business models and the supply chain. Automotive respondents generally aren't as ambitious in these areas. And that could have serious consequences to competitiveness. Many of the changes we've already discussed have radical implications for automotive business models, yet less than a

quarter of automotive respondents (24%) expect breakthrough or radical innovations in this area over the next few years, compared to 35% of respondents across the sample, and 45% of top innovators across industries.

Those that are looking at business model innovation are strongly focused on customers (see Figure 4). In our experience, business models which use a combination of products and services to meet customer needs can be especially powerful. Take electric vehicles. Forecasts predict that sales should rise significantly in coming years. Drivers will need to feel confident that they can get where they need to go on the remaining charge in the vehicles, at least until charging infrastructure gets more widespread. So offering a "find-a-charge" service, where vehicles send information about their remaining power supplies and drivers can automatically navigate to the nearest charging station, could be a real edge.

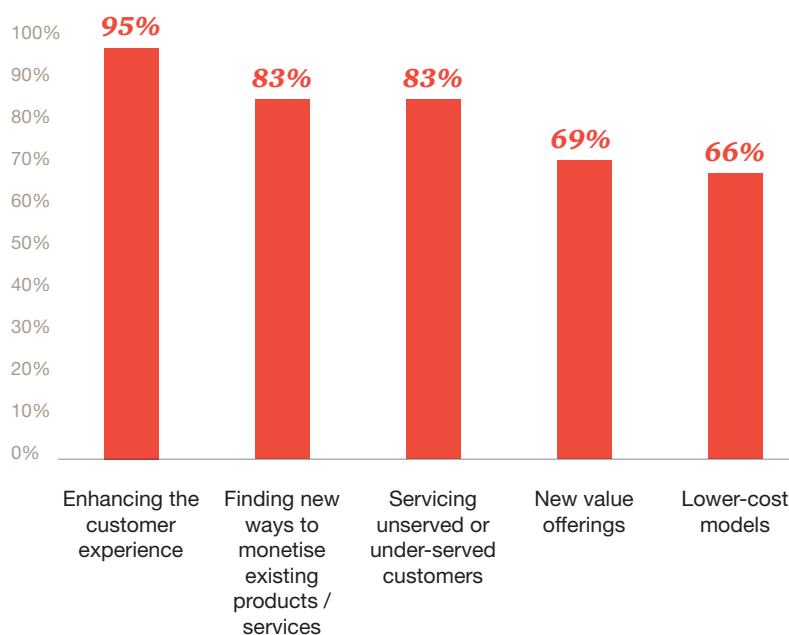
⁶ Methodological notes: Only changes that offer a noticeable additional benefit to the customer are classified as innovations. To be considered, innovations must already be available or have been submitted in the form of a developed prototype.

35%

Automotive executives who say they either have no plan in place for supply chain innovation, or just don't know.

Figure 4: Auto executives expect business models to change in response to customer needs

Which of the following types of business model innovation will be you implementing over the next three years?



Source: PwC, Breakthrough innovation and growth. Base: Automotive respondents planning business model innovation, 58

Supply chain innovation is getting even less attention, although it can be a powerful way to enhance efficiency and reduce costs. Only 17% of automotive executives say their companies will make major advances, compared to 37% of top innovators. Even more alarming, 22% of automotive executives admit they have no plan in place to innovate around the supply chain.

There's somewhat more interest in system and process innovation, although more than half of automotive respondents expect innovations in this area to be incremental. But since breakthrough or radical process innovation has the potential to add momentum to the customer experience, or help improve products, automotive companies may need to take a closer look.

One example is additive manufacturing. These '3D' printing processes are already being used to make prototypes without the need for tools or machines. But the possibilities of the technology are only just beginning. It can create structures with geometric shapes not previously possible, which could have radical design implications. One small start-up has even already produced a complete car, the 'Urbee', using additive manufacturing. The company is crowd-sourcing funding for the Urbee2, planned for 2014.⁷ And if parts can be generated on-demand, there are massive implications for the after-sales supply chain.

⁷ <http://korecologic.files.wordpress.com/2013/03/2013-03-06-red-eye-on-demand-kor-ecologic-collaborate-for-urbee-2-car.pdf>.

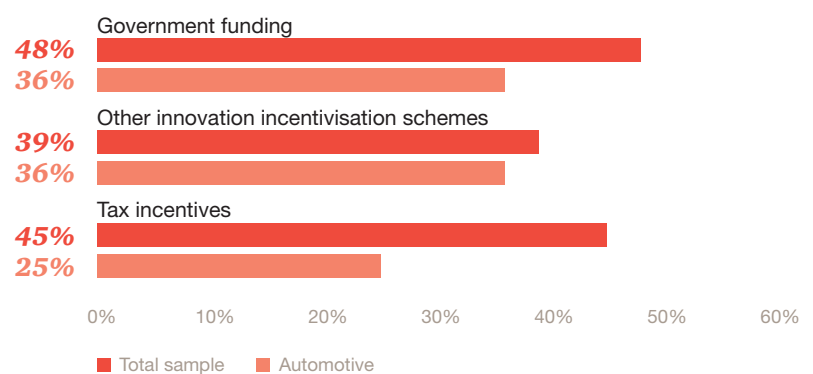
That's true for many industries, not just automotive. So it's not surprising that government-supported research facilities are cropping up. In the US the National Additive Manufacturing Innovation Institute, or NAMII, is piloting a model of public-private collaboration that President Obama plans to expand to promote other types of manufacturing innovation. The UK government is supporting research in the technology too, and Germany's Fraunhofer Institute also has expertise.

Government programmes may not yet have made a big impact though. Far fewer automotive executives say their companies are planning to use tax breaks or government funds for innovation, compared to the overall sample (see Figure 5). But as governments look to promote advanced manufacturing and decrease the carbon impact, government funding may become more important.

And automotive executives aren't completely confident of the ability of their government to protect their innovations either. Only 40% believe that laws and regulations around contracts and protection of intellectual property are enforceable, compared to 50% of the total sample.

Figure 5: Automotive companies are less likely to take advantage of government funding or tax incentives

Does your organisation take advantage of any of the following to support your innovations?



Source: PwC, Breakthrough innovation and growth. Base: Automotive: 72

Megatrends with mega implications

Automotive companies will need to work together with governments in other ways too. The world is becoming more urban. That creates a lot of challenges around mobility. Some of the technologies that automotive companies are working on, like autonomous driving, are expected to reduce congestion. But the government will need to play its part too. For example, while OEMs can develop electric vehicles, they'll need to work together with governments and utilities to create charging infrastructure.

Automotive companies can respond in other ways too, like by developing new service offerings around parking and navigation. We're seeing some automotive companies exploring entirely new business models, for example around car sharing or even mobility as a service. While these are generally very small projects at the moment, their importance is growing.





Interview with Prof. Dr. Stefan Bratzel

Prof. Dr. Bratzel leads the Center of Automotive Management (CAM), an independent institute for empirical automotive research and strategic consultation based in Germany. CAM has been tracking innovation within the global automotive industry for more than 9 years. Its databases now include more than 5,000 individually evaluated innovations from car manufacturers and automotive suppliers around the world. CAM presents the AutomotiveINNOVATIONS Award annually, now in cooperation with PwC.

PwC: Our survey found that around a third of automotive executives don't yet have a well-defined innovation strategy. Why is a clear vision important?

Prof. Dr. Bratzel: We're seeing major technological upheaval happening in the automotive industry. As just two examples, the advent of connected cars and the development of new types of power trains will both have a dramatic impact. That creates challenges for OEMs and suppliers, especially since it is not yet clear which technologies will become dominant. So it's very important to have a well-defined vision of where you want your company to be in five or ten years and how it will get there.

PwC: The automotive executives we interviewed have ambitious plans for radical and breakthrough innovation around technology over the next three years. What areas do you see as most important?

Prof. Dr. Bratzel: Vehicle connectivity stands out as an area that will have a very big impact. That affects a whole range of technologies, like driver assistance, car-to-car communication, autonomous driving and more. These advances will change how customers think about mobility and how they use their vehicles in radical ways.

PwC: Our survey respondents are also focusing on innovation around the customer experience. How do you see automotive companies responding to customers?

Prof. Dr. Bratzel: We actually see customer experience as intimately linked to all product innovation. Every advance that we at CAM rate as an innovation has to demonstrate a customer benefit compared to the status quo. The bigger the benefit to the customer, the more relevant and important the innovation is. So the customer experience is very important in nearly every area.

Take power train as an example. Some of the innovations in this area are having a dramatic impact on fuel efficiency which is very important to car buyers. And when you get into the area of alternative powertrains, whether full electric or hybrid variations, you can see even more clearly the importance of connecting customer experience to product innovation. OEMs still need to come to grips with many elements of the customer experience as it relates to electromobility. They need to understand the range consumers need or expect what kind of charging options are important to them and many other questions about consumer behavior. These factors will all have a big impact on the approach automotive OEMs decide to take in developing electric vehicles.

In general, OEMs are often very good at automotive engineering, but they sometimes falls short in really connecting product innovations to customer experience.

PwC: Your research focuses primarily on product innovation. About a third of our respondents say they expect radical or breakthrough innovations in products over the next three years. Do you think that's realistic? How often do you think product innovations impact on other areas like the supply chain, business models, or systems and processes?

Prof. Dr. Bratzel: That's an ambitious goal. We're seeing a very small percentage of really radical innovations making it to the market – probably in the single digits. It's important to remember that the more radical an innovation is, the higher the chances are of failure. But the industry needs to take some chances to keep moving forward.

Breakthrough innovations tend to be somewhat less risky and also more common. We've found that really strong product improvements are often linked to other types of innovation, especially around services and the business model. For example, a product innovation around driver assistance could lead to a change in the business model where an OEM partners with an insurance company to reduce insurance costs based on the reduced chance of an accident.

Product innovation is also almost always linked with process and supply chain innovation. OEMs (and suppliers) need to make sure that product innovation is affordable and that often means improving processes. It is part of what is often called the democratisation of innovation which I think is really changing the face of the automotive industry.

PwC: This year the first time that CAM has awarded prizes to the most innovative suppliers as well as to OEMs. Are OEMs and suppliers working together on innovation?

Prof. Dr. Bratzel: When OEMs are looking to make really radical changes to technology they tend to look more to suppliers for their input. I see trust as one of the most important success factors. OEMs and suppliers working together on a breakthrough or radical innovation need to be able to rely on their partner.

PwC: Are you seeing any other trends in how OEMs are collaborating on innovation?

Prof. Dr. Bratzel: The more that OEMs strive for breakthrough or even radical innovation, the more we see new players from other industries coming in and beginning to make an impact. One example would be partnerships with technology and communications companies around the connected car. These companies bring a different, new perspective on the customer experience. Strategic partners from other industries may also use different innovation operating models. Ultimately these types of collaborations will probably increase the pace of innovation in the industry.

PwC: Automotive respondents are very concerned about talent and developing a strong innovation culture. What factors do you think are most important to attract key innovators and create an environment that fosters innovation?

Prof. Dr. Bratzel: For me a culture which is able to tolerate some failure is absolutely vital. As I've said, radical innovation is inherently risky, so companies need to be open to new ideas that don't necessarily pan out.

I also think it's important to keep an open mind when it comes to hiring candidates with more diverse backgrounds. The industry tends to stick to mechanical engineers, with maybe some computer scientists and a few business administration grads thrown into the mix. Bringing staff on board from other areas like the humanities can help bring in new perspectives that shake up the traditional thinking. Having more diverse people in the company also helps when it comes to understanding what customers are looking for.



Expanding collaboration

Automotive suppliers and OEMs have long been strong collaborators. Cooperation ranges from just-in-time or even just-in-sequence manufacturing arrangements to co-developing key technologies. Still, our research suggests there is room for improvement. Automotive executives say they co-created 18.3% of products and services with external partners. That's below the overall average and well below the rate of collaboration we're seeing from top innovators.

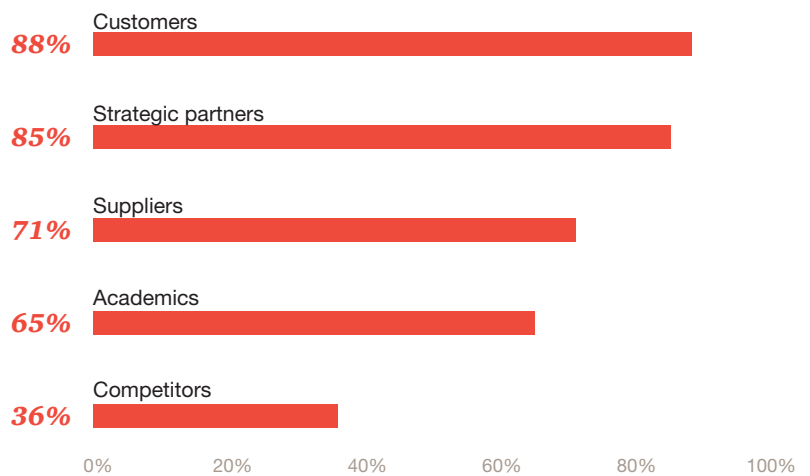
Most automotive executives told us they have plans to collaborate with external partners to develop innovative products and services over the next three years.

Most automotive executives told us they have plans to collaborate with external partners to develop innovative products and services over the next three years. That should help them catch up. After customers, the most popular choice for upcoming collaborations are strategic partners (see Figure 6). Innovation leaders are partnering far more than the laggards, and they're working to become the 'Partner of Choice' in their innovation ecosystem. That helps them attract the best ideas from strategic partners and suppliers alike, giving them access to faster, better, and cheaper innovations—a major competitive advantage.

Technology and communications companies are becoming increasingly important as potential collaborators. And the number of suitable partners is limited, so automotive executives can't afford to wait too long.

Figure 6: Customers, strategic partners beat out suppliers as auto executives' favourite innovation partners

With which of the following do you have a plan in place to collaborate over the next three years to deliver innovative products and services?



Source: PwC, Breakthrough innovation and growth. Base: Automotive: 72

Some OEMs are also partnering with local infrastructure vendors in order to allow drivers, passengers and the car to connect to services available in the cloud. In Japan, Toyota has launched a new Big Data Traffic Information Service that draws on telematics users and vehicle data to help users get traffic and other information.⁸ The system was developed together with Microsoft, using the company's Azure platform.

And suppliers are working directly with technology companies too. In September 2013 German Tier One supplier Continental AG announced a collaboration agreement with IBM. The two companies plan to develop

a new cloud platform that will let automotive manufacturers deliver new mobile in-car services.⁹ They'll also work on systems that let vehicles with embedded sensors send and receive data. Vehicles will be able to transmit information such as position, speed or deceleration to the Cloud where data will be processed, analysed and acted upon. The result will be a real-time map that will enable a vehicle to literally 'look around the corner'. Continental is also working together with communications company Cisco.¹⁰

8 <http://www2.toyota.co.jp/en/news/13/05/0529.html>.

9 <http://www-03.ibm.com/press/us/en/pressrelease/41922.wss>

10 http://www.continental-corporation.com/www/presseportal_com_de/themen/pressemitteilungen/3_automotive_group/interior/press_releases/pr_2013_08_06_cisco_coop_de.html

Working with suppliers on new material options

Advanced materials are a big area of interest too. Carbon fibre, now widely used in aerospace, has only made minimal inroads in the automotive sector. But a whole range of co-development projects may soon change that.

BMW Group is leading the way with SGL Automotive Carbon Fibers (ACF), a joint venture (JV) of SGL Group and the BMW Group. The company produces carbon fibres for the manufacture of ultra lightweight carbon fibre reinforced structures. These are then processed into carbon fibre fabrics, which ultimately become carbon fibre reinforced plastic parts and components used in the passenger compartment of the new BMW i series. The JV is positioning the BMW Group to be the first automotive manufacturer to use carbon fibre reinforced plastic (CFRP) in series production.¹¹

The steel and aluminium industries aren't going to give up automotive market share without a fight. They're developing lighter, stronger metals too (see *How NanoSteel is collaborating with automotive OEMs*).

How NanoSteel is collaborating with automotive OEMs

NanoSteel is a small start-up that's using nanotechnology to develop high-end steel. NanoSteel is commercialising research originally begun at a national lab. And it's working closely with automotive partners to co-develop products. But the company isn't only focused on product improvements.

"One of our most significant innovations," says David Paratore, CEO of NanoSteel, "has been the change in our royalty business model." This innovation was driven by the desire to unlock more value from the products NanoSteel is producing. "In order to maximise the value of our technology, it was deemed best to generate royalties for those companies reaping the benefit, which in our case are the tier one automotive companies," says Paratore. "We explored what worked in other companies and the model used by Dolby seemed to resonate. So we tested it with some of the auto OEMs who were receptive to the idea, before rolling out the model to the industry."

¹¹ http://www.sglgroup.com/cms/international/press-lounge/news/2013/10/10302013_p.html?__locale=en.

Learning from the competition

Only 36% of automotive executives say they plan to innovate together with competitors, but there are some high-profile examples. In January 2013 Toyota signed a broad-based, long-term agreement to co-develop a range of green technologies with BMW, including fuel-cell systems, post-lithium-ion battery technology, and vehicle weight-reduction programmes.¹²



¹² https://www.press.bmwgroup.com/pressclub/p/pcgl/pressDetail.html;jsessionid=nVtvS5DTZBLvQFNrhk.JJS3bSv10QPqFT59cmTxlffBj241nQjph6!2139190307?title=bmw-group-and-toyota-motor-corporation-deepen-collaboration-by-signing-binding-agreements&outputChannelId=6&id=T0136503EN&left_menu_item=node__804

New ways to charge up innovation through more collaboration

We’ve found that companies across all industries are dramatically changing the way they innovate. Automotive executives see the biggest future potential from open innovation, although many are sold on design thinking too.

Many of the industry’s OEMs and Tier One suppliers believe they are already using such approaches successfully. PeugeotCitroen calls open innovation “a successful cultural revolution at the Group.”¹³ Its approach includes an internal innovation contest, Connected Users, as well as partnerships with universities, businesses and institutions. The group also sponsors the Citroën Créative Awards, open to all design, technology and car enthusiasts.

Suppliers are getting into the game too. Nematik Europe GmbH’s R&D manager told us that his company “has started an open innovation cluster for new materials and process technologies, together with other industrial players and institutes of the University of Aachen. The goal is to bring different faculty members together with diverse companies in order to take advantage of synergies.”

Automotive companies are also already starting to use social media in a big way. Open, unstructured forums are popular. That’s not unusual. But two-thirds of automotive companies planning technology innovation are also already conducting campaigns around specific problems to create innovative solutions. And nearly half of them have added structure and discipline to their use of social media.

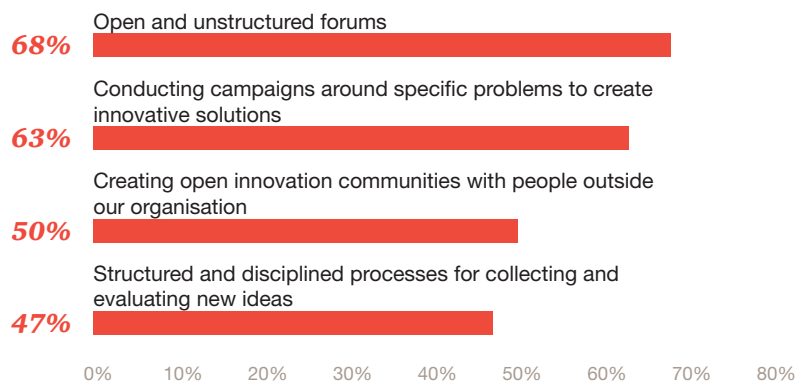
That includes using social media as a powerful source of consumer feedback. Consumers trust peer feedback when making purchasing decisions, so

what gets said about vehicles really matters. OEMs are paying attention and changing marketing strategy and product design in response. And some are developing a complete ‘digital ecosystem’, that offers customers the chance to discover information about their brand online, engage with the company and with friend and peers about its products, and even complete the transaction digitally.¹⁴

Far fewer automotive executives are looking at corporate venturing or incubators. But these can be valuable tools too.

Figure 7: Automotive companies are already using social media

Does your company leverage social media to support innovation efforts in any of these ways?



Source: PwC, Breakthrough innovation and growth. Base: Automotive: 60

¹³ <http://www.psa-peugeot-citroen.com/en/inside-our-industrial-environment/innovation-and-rd/open-innovation-a-performance-booster-for-the-group-article>

¹⁴ PwC, Social selling: A Digital Blueprint for the Automotive Industry, 2013.



Developing a strong innovation culture

Talent and culture are two of the top challenges automotive executives say they face when it comes time to execute on innovation. They're facing both head on, starting with culture. How are they doing it?

79%

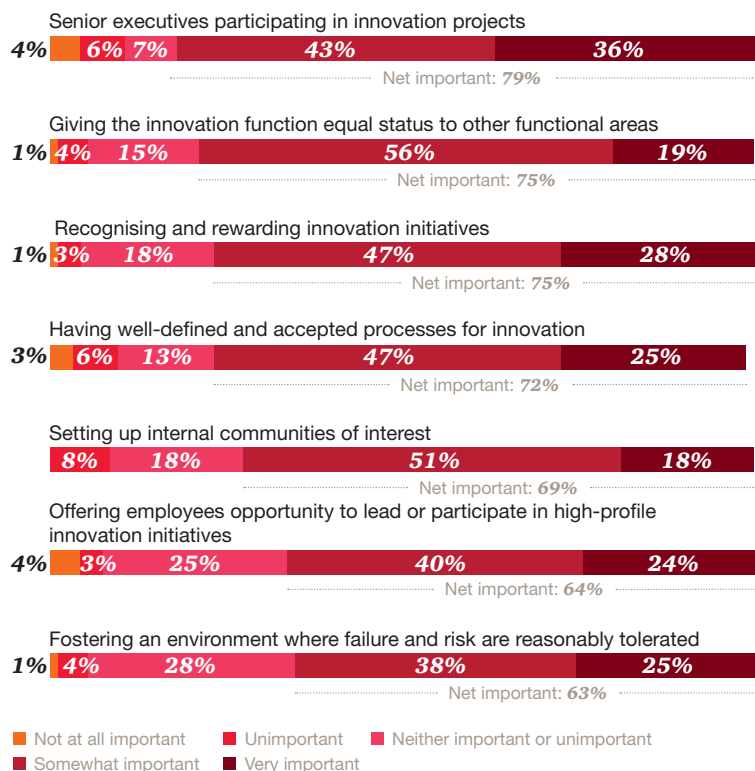
Automotive executives say senior executive participation in innovation projects is important.

For automotive CEOs, the most important way to create and foster innovation culture is to set the right 'tone from the top'. More than three-quarters of automotive executives (79%) say that senior executive participation in innovation projects is important (see Figure 8). Speeches by automotive executives frequently reference innovation and R&D. And OEMs and suppliers alike have been

making innovation an explicit C-suite priority, under the leadership of a Chief Innovation Officer or Chief Technology Officer, and a growing number of these posts are executive-level management positions in the boardroom. This is the importance of developing that area of its business.

Figure 8: Automotive executives say 'tone from the top', recognition and rewards and giving equal status to the innovation function are the most important ways to build a solid innovation culture

In your organisation, how important are each of the following to creating and fostering an innovative culture?



Source: PwC, Breakthrough innovation and growth. Base: Automotive: 72

Three-quarters of executives say that recognizing and rewarding their people's efforts is important. That's true for most other industries as well.

But one area where automotive executives are placing a lot more emphasis is around the innovation function itself. Three-quarters say giving it equal status with other areas is important, compared to 62% of respondents overall. And nearly as many say that having well-defined and accepted processes are important too.

The item at the bottom of the list for automotive executives is developing a healthy tolerance for risk and failure. But 63% still see it as important, and so do we. 'Failures' – experiments that don't provide the expected results – are a natural part of the innovation process. Sometimes unexpected results can help show the way to bigger and better outcomes. Taking risks is especially important when it comes to ideas that may lead to breakthrough or radical change. It's an important part of an 'intrapreneurial' culture--entrepreneurial zeal and speed coupled with the ability to leverage the assets of the large company.

A strong innovation culture helps motivate employees, and it helps attract them too. In our experience, the best breakthrough innovators want to be recognised as somebody who makes a difference – to their profession, to the company, and sometimes to the world. That gives automotive companies with a strong innovation culture and commitment to corporate sustainability an edge when it comes to hiring top talent.

That will become increasingly important as some markets face skills gaps. There's a current generation of researchers and engineering getting ready to retire – and not enough new graduates in math and sciences coming to take their places. In Michigan, engineers have been in short supply after the industry's cutbacks in 2008 and 2009.

And it's tough to recruit in China too, now the world's biggest automotive market. The situation is most severe for the highly skilled workers who drive innovation.

Conclusions and key takeaways

What's next for your business?

The vehicle of the future may look very different from today's cars, trucks and SUVs. Companies with an innovation edge will have a strong competitive advantage. What can you do to make sure your company is a leader and not a laggard?

- **Know where you want to go and how you'll get there.** Innovation in the automotive industry requires careful planning and a clearly defined strategy. According to our survey, fewer automotive companies have a well-developed roadmap for innovation. That needs to change, and even executives who are comfortable with their strategy should make sure they're keeping up with tomorrow's tools and trends.
- **Work together with the right partners.** With so many priorities to cover, collaboration makes good business sense. Companies that are able to become the 'Partner of Choice' will attract partners with great ideas of their own. That helps make innovation faster, cheaper, and more effective.
- **Look beyond R&D.** Investing in research and development is an important part of innovation, but it's far from the whole story. The automotive sector is leading when it comes to innovating around the customer experience, but automotive companies need to make sure that they're paying attention to fostering innovation in areas like business models, services, and the supply chain too. New operating models, like incubators, co-creation and corporate venturing can help, because how you innovate determines what you innovate.
- **Inspire your people.** Strong leadership can help your automotive company motivate and attract great talent. When you pay attention to fostering a strong innovation culture, it can pay big dividends.

Want to find out more?

For help and advice with your innovation strategy and process, please contact one of our innovation leaders.

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<http://www.pwc.com/innovationsurvey>

We look forward to speaking to you.



Breakthrough innovation and growth

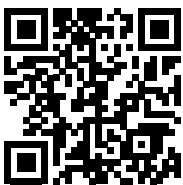
The results of our survey of 1,757 executives couldn't be clearer: innovation today is a key driver of organic growth for all companies—regardless of sector or geography. Meanwhile, innovation leaders are breaking away from their cohorts, expecting a revenue boost of a quarter-trillion US dollars over the next five years alone.



Looking ahead: Driving co-creation in the auto industry

The report “Looking forward: Driving co-creation in the auto industry” is only an introduction of our insights and observations. We can help our clients give stakeholders more active and direct reasonability in planning, innovation, operations, and delivery. PwC’s Management Consulting group can work with your organisation to explore how co-creation can propel your business to the next level in various ways:

- Enterprise Co-Creation Assessment
- Customer Experience Co-Creation
- Supply Chain Co-Creation
- Product and service Co-Creation
- Public-Sector and Multi-Stakeholder Policy Co-Creation
- New Business, Ecosystem, and Business Model Co-Creation
- Business Interaction Redesign



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