OLIVER WYMAN

AUTOMOTIVE INDUSTRY AT THE CROSSROADS

Automotive Manager 2020

HOW TO TAKE A LEAP INTO THE FUTURE

Dear Readers,

Despite the coronavirus and its economic fallout, automakers should not persuade themselves that most of their troubles stem from the pandemic. It has of course been a major blow for all industries, and vehicle manufacturers had to halt production for several weeks to protect their employees from infection. Furthermore, the economic crisis is expected to cause double-digit falls in 2020 sales in most markets.

However, the big lesson of the crisis for the auto industry has been the fragility of its current model. This year's *Automotive Manager* looks at what changes are needed — and, more importantly, provides concrete suggestions for how to set these in motion.

One problem shown up by the crisis is that major automakers' current business model is not resilient. Manufacturers have come to rely on high volumes, which imply high fixed costs — but their profit margins are low, and as soon as the volumes decline, profits collapse.

But even without external shocks, the products and success pattern that have served the industry for decades are not suitable for the future. In just a few years, powertrains will be electric; driving will be digitally aided; manufacturing and procurement may approach carbon neutrality; and much of the sales process will be online. These transformations imply completely different ways of working, from manufacturing to research and from relationships with suppliers to relationships with customers.

Automakers mostly have a good idea of the future of their industry. Their problem has been implementing change in a fast and sustainable manner. We have identified several starting points. Of these, inhouse, "greenfield" projects are an especially good way to set a new model in motion. They allow a company to set up and test a new model, without it being held back by "legacy" units — and without the need to completely resize those older units, so long as they remain profitable.

The COVID-19 pandemic will end at some point in the future, albeit leaving severe economic repercussions in its wake. But the other crisis and transformation challenge — the automotive industry's own — will remain, until manufacturers resolve it themselves.

Yours sincerely,

August Joas
Partner, Head of Automotive Sector

CONTENTS

4 **COVER STORY:** Time to Leap Forward

11 **INTERVIEW:** Bernhard Maier
Škoda Auto CEO

R&D AND PRODUCTION

15 Auto's Road To Carbon-Neutrality Post-COVID

19 **INTERVIEW:** Markus Schäfer
Member of the Board of Management of Daimler AG,
Group Research and Mercedes-Benz Cars Chief Operating Officer

22 Rebooting Automotive R&D

27 Debugging The Car Hardware And Software Disconnect

CUSTOMERS, SALES, AND SERVICES

33 How Car Ownership May Become A Relic

37 Decreased Investments In Mobility Startups

40 Confronting Crippling Complexity

45 Asia's Lead In Next Generation Mobility

49 Why China's Passenger Car Sales Stalled

53 Fixing The Car Industry's Sales System

57 What's A Car For, Anyway?

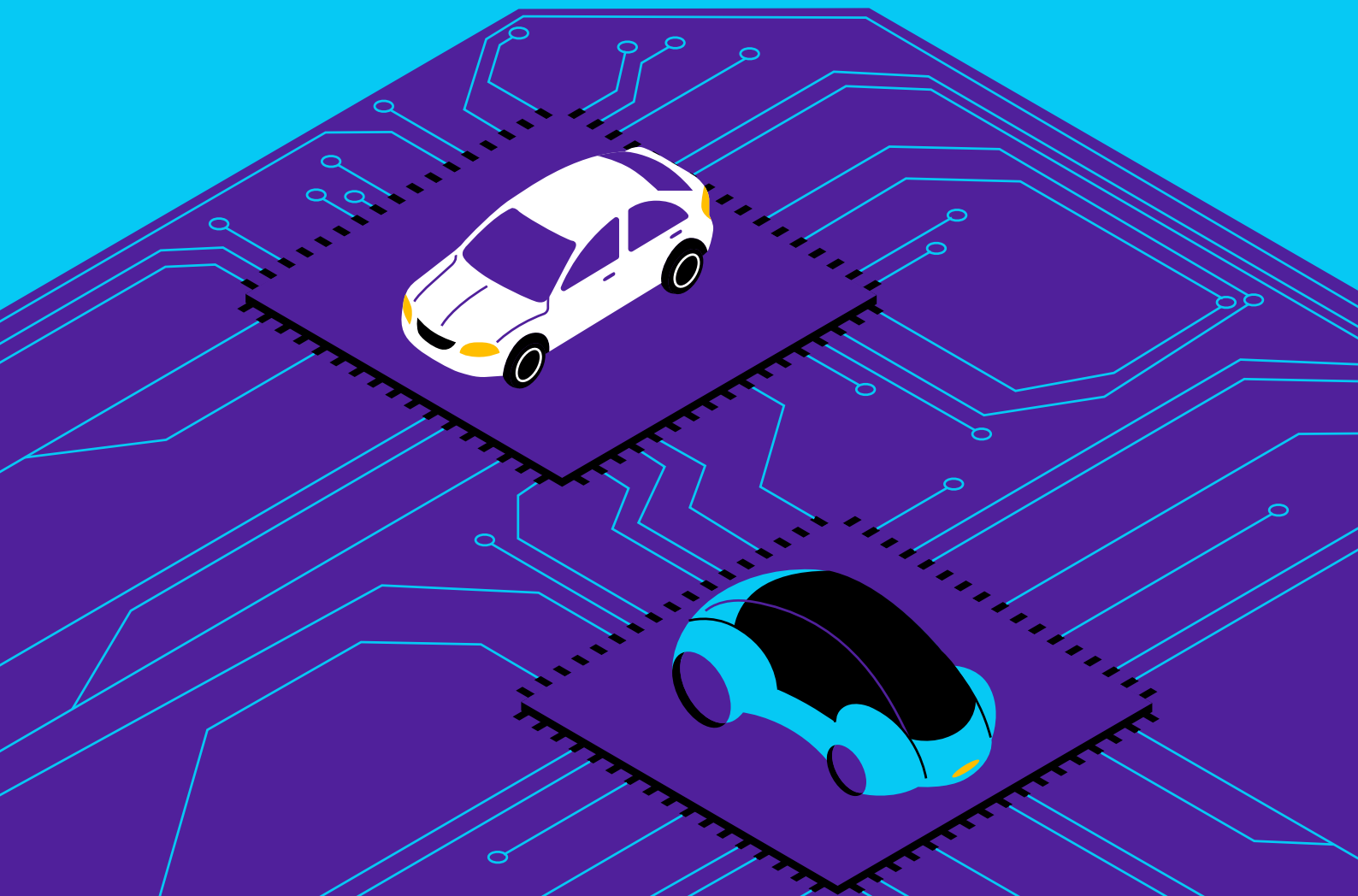
SUPPLIERS AND PROCUREMENT

62 Trust Or Bust

66 Don't Be Turned Into Roadkill

TIME TO LEAP FORWARD

August Joas
Matthias Bentenrieder
Simon Schnurrer
Fabian Brandt



For automakers, the future is clear: It will be electric or at least hybrid, autonomous, and digitalized. Yet, despite these certainties in the direction in which public sentiment and regulation are taking the industry, car companies seem in no hurry to get there.

While key players worldwide are saying the right thing about where they intend to take their companies, they are not following through with enough enthusiasm. For instance, every top manufacturer is adding new electric vehicle (EV) models, but they still promote and rely on the profit from traditional cars and sport utility vehicles (SUVs). Automakers are also investing in autonomous systems, recognizing that the future of driving will be digitally aided. Still, the bulk of research and development (R&D) money is being spent on hardware for traditional vehicles, not software for EVs or autonomous vehicles (AVs).

The reluctance can also be seen in the digitalization of the sales process. While automotive websites and technology that allows customers to configure their car choice are now commonplace, the final purchase still must be completed for the most part at a traditional, independent dealership.

As a result, the world's biggest automakers risk losing large parts of the market to faster-moving newcomers willing to experiment with more radical business models. They will be cast in the role of followers, not leaders — likely to come late or miss out entirely on new market opportunities.

INCREMENTAL VERSUS FUNDAMENTAL

The problem: Most manufacturers are sticking with making only incremental improvements — an approach to change that served them well over the decades. The reality is this approach no longer works. Right now, the industry is in upheaval and only a more radical approach to change will suffice.

Long-term strategy and fundamental change may not seem urgent right now, as the world economy reels from the coronavirus pandemic. Automotive production was brought to a halt in many plants around the world, and we expect contracting gross domestic product in global economies and consumer uncertainty will lead to double-digit revenue declines in most markets in 2020. Some markets could shrink by as much as one-third.

The COVID-19 crisis has made one thing very obvious: The current business model of the automotive industry is not resilient. It is focused on volume; it has high fixed costs, and it is inflexible. That makes the industry extremely vulnerable to external shocks, such as the coronavirus crisis, which has hit both demand and supply chains.

Once the immediate crisis has passed, automakers will have to act decisively to follow new mega trends and leave behind legacy thinking that is pushing down returns on their traditional businesses. The new automotive era requires greater emphasis on bolstering the profit per vehicle, cutting significantly fixed costs, and encouraging more partnerships — both within the industry and outside. The industry needs to reinvent itself starting today, not tomorrow.

FROM THE GROUND UP

The most effective way to reinvent a company is to build a new, greenfield business next door to the established one. Instead of adding digital experts to an existing R&D center, set up a new software center. To reduce costs, create a single platform for EVs and then move all models to this same basic architecture. Rather than only enhancing dealerships with new, costly features, set up an online-only sales channel and integrate the dealerships by giving them a new role in the new paradigm.

To design cars for an era of electrification and digitalization, automakers also need to start managing projects like digital natives. That means working in quick sprints to reinvent different aspects of their business, rather than today's preoccupation with fully validating incremental product improvements. It also requires rapid decisions instead of cascading alignment meetings over months.

But for now, auto profits come out of conventional car sales — and particularly from SUVs. To finance the push into the future, car manufacturers must get the most value possible out of current lines of business. To make sure they have enough money to finance their transformation, automakers need to reduce costs in traditional product lines by another 10 to 20 percent through efficiency and structural measures.

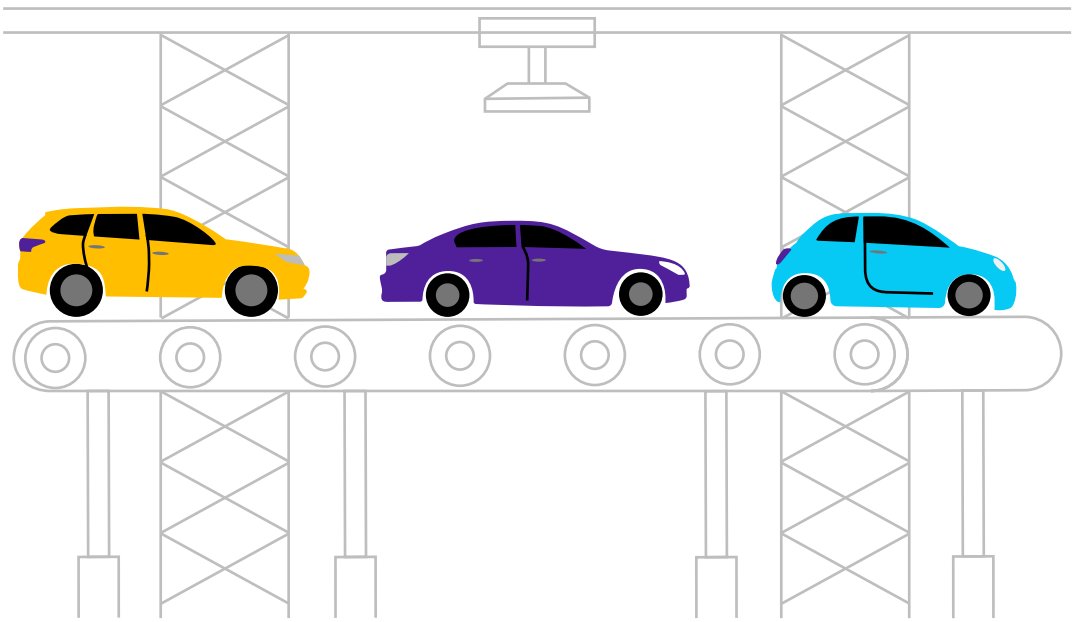
THREE PATHS TO CHANGE

If automakers execute radical change, they once again have the potential to achieve the kind of profitability they knew in the past — or perhaps even better levels. But their companies will not look like they used to. Here are three ways they can apply the greenfield principle to speed forward into the digital, electric age:

1. Create a single platform for conventional cars

Traditionally, large automakers have different platforms tailored to each main product group, based on size. These platforms help to design the best possible conventional internal-combustion autos, but they often lead to technical compromises if used for hybrids or EVs of the same size. As the race heats up to provide the best value for customers, car companies need to push for standardization in platforms for internal combustion vehicles. Like in technology, standardizing cuts production costs and subsequently increases value. Given the need to invest sizable sums in new technologies, increasing profitability per unit must be a high priority for automakers.

Standardizing the internal combustion platform allows companies to focus on creating platforms designed to fully reap the benefits of EVs and hybrids. Automakers deploying bespoke EV platforms claim that they can help reduce product cost by as much as 20 percent if target volumes are achieved. That cost advantage will come with additional customer benefits such as more space and increased freedom in styling and proportions. In the future, a range of EVs could run off modular, scalable platforms. Another advantage of standardization is the ability to use the same microprocessors, electronic controls, and a single kind of driver-assistance technology can be used for all brands built on that platform. Production protocols can also be similar for all models in factories worldwide.

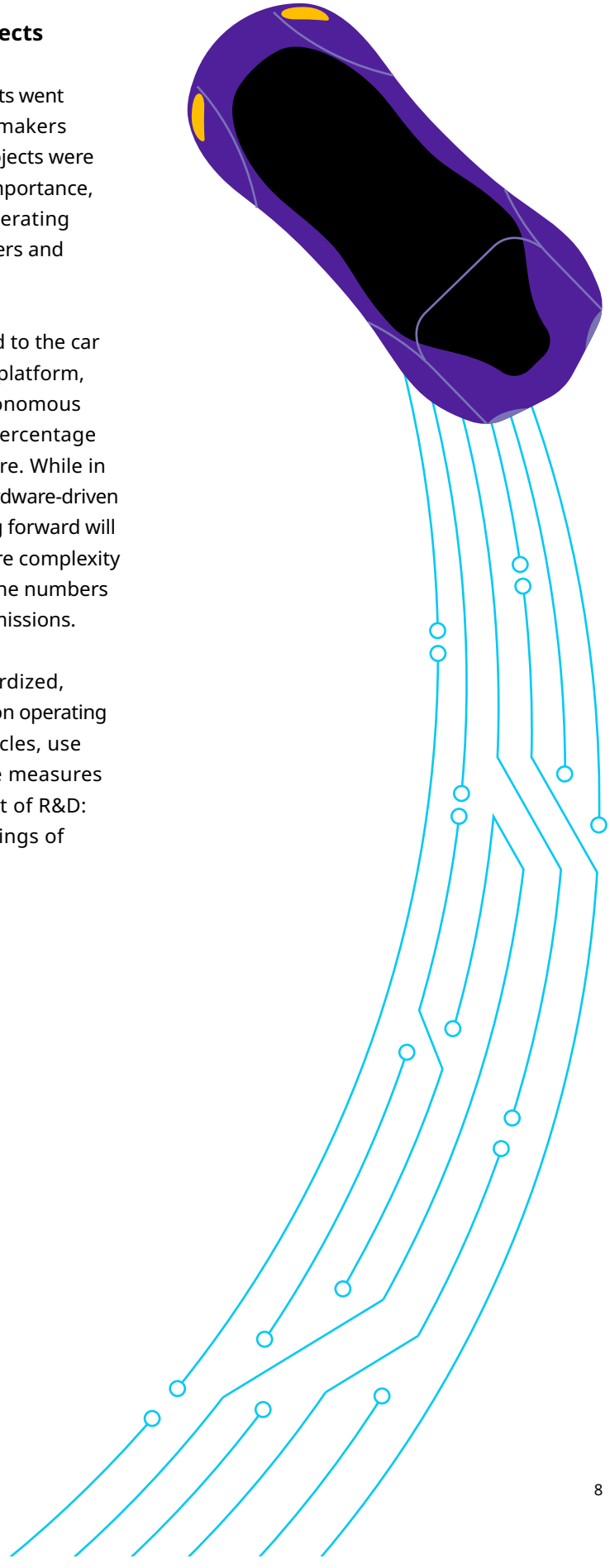


2. Emphasize software R&D and projects with the biggest long-term payout

Even before the COVID-19 crisis, R&D budgets went through a series of cuts, with many automakers reducing spending 20 percent or more. Projects were pushed back — even those of strategic importance, such as work on new powertrains and operating systems and the integration of new suppliers and development partners.

The R&D of the future needs to correspond to the car of the future — a vehicle based on a single platform, most often electrically powered, with autonomous driving capabilities, and a much higher percentage of value-added digital content and software. While in the past most R&D was working toward hardware-driven milestones, value in the automobile moving forward will be based on software solutions as hardware complexity is reduced with the gradual reduction in the numbers of internal combustion engines and transmissions.

Software will become much more standardized, as numerous manufacturers share a common operating system, and then adapt it to specific vehicles, use cases, and customer configurations. These measures have great potential for reducing the cost of R&D: Some recent programs suggest that savings of 30 percent or more could be achieved.



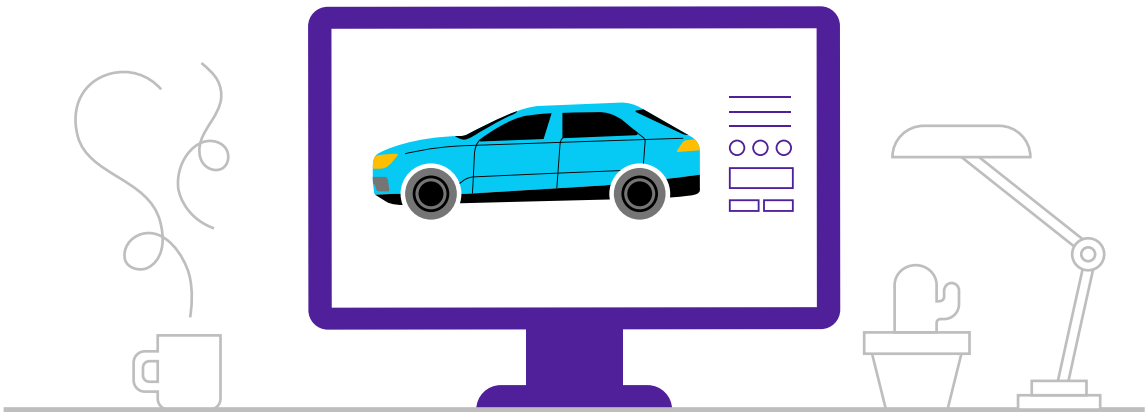
3. Digitalize sales

For the past several years, the size of dealer networks has been on the decline, dropping at a rate of about two percent per year. While digital content has been taking the place of dealers, it has not always been the right digital content. Instead of cutting costs, it has increased them.

The future of sales will be omnichannel with customers selecting their preferred touchpoints. Retail needs to digitalize, but that does not mean there will be no physical presence. Most likely we still have the emergence of brand stores that will showcase the latest models, similar to a retail approach pioneered successfully by Tesla. There will also be satellites that will offer servicing and handover points where customers can pick up their new or recently serviced autos. The specialization of these new outlets will yield a higher level of performance. They will also be digitally enabled, so that customers will be identified immediately on entering the outlet, and the staff will be aware of their preferences and existing portfolio.

Separately, we suggest automakers build up an online sales process from scratch. This will give customers the option of a seamless e-commerce journey, including a broad offering of information, a simple online offering and selection of vehicles that provides various options and the facility to configure a selection online. There would be the usual help from qualified call centers and online options for payment system. Strong, service-focused dealers can be important players in this process, offering such in-person experiences as test drives or showroom visits.

In the post-COVID era, digitalization is expected to cut the number of dealerships in half as the industry shifts to an online business model. Sales channels will prioritize client mix, segment allocation, efficiency of promotions, and price quality for different customer segments rather than volume.



TURNING THE TIDE

For large organizations like international automakers, with inculcated cultures and extensive bureaucracies, changing course is not always easy. For the past several years, revolutionary technologies like electrification and autonomous functions on the design and manufacturing side and car subscription and digitalization on the sales side have already been challenging the industry's old ways. And no doubt, COVID-19 is making the disruption sweeping automotive more complicated and urgent.

Given the scope of change, automakers need to stop pinning their hopes on incremental improvement, and instead set up new projects in areas that have a major impact on their businesses: a scalable electric-vehicle platform; R&D with a strong digital focus; and a digitalized sales system. This does not mean abandoning existing models and profit centers, but just a recognition that moving forward they will no longer be their primary source of growth and gains in market share. Nor should they be where automakers focus their energy and investment. Greenfield projects in these new areas of focus will be what kicks off a new era of profitability.

INTERVIEW
BERNHARD MAIER
ŠKODA AUTO CEO

What has been the key to ŠKODA's remarkable success in recent years?
It is an interaction of various aspects, starting with our clear brand Strategy 2025, which includes cross-functional strategies with 16 action fields. They have an impact on all our business areas like digital transformation or sustainability. Equally important is the transformation of ourselves — our thinking and acting, our attitude and behavior. This is also reflected in our three brand values: 'simplifying', 'human' and 'surprising'. All our products and services are based on these values. Customers understand and appreciate this. Another factor is our consistent product strategy, which is proving to be very successful around the world. Here is another example: Three years ago, we launched our SUV campaign with the KODIAQ. With the KAROQ and KAMIQ, we quickly expanded our product range. Today almost one in three ŠKODA's sold is an SUV. And although we are living in a highly digitalized world, it is the people that make the difference. So, the team that is implementing our Strategy 2025 is at least as important to our success. In ŠKODA's case, it is extraordinary: over 42,000 Škodians get to work with a great deal of passion, commitment and a 'clever together' attitude — as we call it. You get a sense of this special team spirit when you talk to Škodians. And last but not least, we listen very carefully to what our customers really want.

What does the average ŠKODA customer expect and appreciate the most?
Our customers expect us to deliver on a promise with every new product. I like to describe this as a "smart understatement". It is a set of values that all our models fulfill. These include superior roominess, maximum functionality, convincing value-for-money and a clear, characterful design. These qualities are exactly what our customers all over the world appreciate.

What are the key challenges for ŠKODA going forward?
We are certainly concerned with the effects of the Covid-19 pandemic. We expect the biggest impact in the second quarter, followed by a gradual recovery in the third quarter and possibly returning to the previous year's level in the fourth quarter. Prerequisite for this development is the fast execution of state subsidy programs in the various regions. On a positive note, we have posted record results in recent years and we currently have sufficient liquidity. Our company is strategically well-positioned, has an excellent foundation and an attractive, modern model portfolio. We are therefore sticking to our medium and long-term plans. This means we are systematically continuing the transformation process we embarked on as part of our Strategy 2025 — the transformation from the internal combustion engine to the electric car, from analogue to digital, towards agile processes with flat hierarchies and — if you like — the transformation from single products to holistic solutions.

How will ŠKODA's vehicle portfolio evolve over the next few years?
We are currently in the middle of the largest product campaign in ŠKODA's history. From the beginning of 2019 to the end of 2022, we are launching a total of 30 new models, derivatives, product upgrades and variants. These include ten partially or fully electric models. This year we are introducing the ENYAQ iV, our first all-electric car that was designed as such from the outset. We are making it the flagship of a new era for ŠKODA.

Are there any electric vehicles in the current portfolio?
Yes, of course. Last year we entered the electric age with two models, the all-electric CITGOe iV and the SUPERB iV, our first plug-in hybrid. This was a very special moment for us. Now we are quickly moving forward through the steps I described. We are convinced of the technology: In the foreseeable future, the e-drive will be the most effective way to sustainably reduce CO_2 emissions — alongside our highly efficient combustion engines that we are continuing to optimize and that are also helping to reduce our global CO_2 footprint.

And, of course, we are taking our employees along with us into the future: Around 20,000 Skodians have already received training in e-mobility. In the next two years alone, we will be investing 40 million euros annually in training and further education to get our workforce ready for the future.

Digitalization and software: What are the priorities for ŠKODA?
The car is increasingly becoming a highly intelligent mobile device, the "perfect third place" after the workplace and home. Our top priority is to offer our customers real, practical added value. The iV ecosystem we are building around our e-mobility portfolio is a good example of this. If you drive an iV model, you will receive, among other things, the MyŠKODA Powerpass, which allows you to charge your iV quickly and easily at public charging stations throughout Europe. This is where digitalization is helping us make e-mobility easy and convenient for our customers. In this way we are creating an authentic brand experience and sustainably expanding our added value in the digital area.

Could you give us a few more examples?
With services like CityMove, BeRider and HoppyGo, we already have a whole range of mobility and vehicle-on-demand solutions. With our DigiLabs in Prague, Pune, Beijing and Tel Aviv, we also have a global network through which we are collaborating with promising start-ups. Our aim is to forge links with the local start-up scene and develop tailor-made mobility solutions for our customers. When it comes to digitalization, in particular, our motto is: Partnering and speed are key! This is gradually bringing us closer to our target vision that we defined with our Strategy 2025: "ŠKODA — the Simply Clever Company for the Best Mobility Solutions".

In which field does the ŠKODA brand have to change the most in the next few years?
I think one thing is certain at the beginning of this new decade: the speed of transformation will continue to increase. Flexibility, adaptability and also resilience will become even more important — the Covid-19 pandemic shows this very clearly. Of course, our business and the general conditions are also constantly changing. This is why we are now heading to working intensively to cover our ŠKODA Strategy 2025+ till 2030, which involves systematically developing the core strategic topics. We are making adjustments wherever necessary: We continue to sharpen our focus on the customer, expand our value chain to include e-components, software development and connectivity services and we are making ŠKODA even more agile, faster and more diverse.

You have been the CEO of ŠKODA for the last 4.5 years. What is your leadership philosophy?
I can summarize it in three words: transparency, consistency and straightforwardness. For me as an entrepreneur, transparency means having as complete an overview of my business as possible. This is a fundamental prerequisite for making the right business decisions that are verifiable, valid and sustainable. Consistency describes the implementation of these decisions. And straightforwardness, for me, means standing behind the decisions we make and taking responsibility for them. And now, with Covid-19: Never take anything for granted. Business is change, there is nothing else.

R&D AND PRODUCTION

15 **Auto's Road To Carbon-Neutrality Post-COVID**
Marc Boilard

19 **INTERVIEW: Markus Schäfer**
Member of the Board of Management of Daimler AG,
Group Research and Mercedes-Benz Cars Chief Operating Officer

22 **Rebooting Automotive R&D**
Simon Schnurrer, Marc Boilard, and Srinath Rengarajan

27 **Debugging The Car Hardware And Software Disconnect**
Henri-Paul Missioux, David Thompson, and Richard Hell

AUTO'S ROAD TO CARBON-NEUTRALITY POST-COVID

From suppliers to buyers, there are more emission sources to control than just cars

Marc Boilard

Automakers face a stark reality when it comes to climate change: With road transportation accounting for almost one-fifth of the carbon dioxide (CO_2) released into the environment, they have no choice but to play a large part in any effort to reduce global emissions. But while they have tried to chip away at the total with electric vehicles, hybrids, and better fuel efficiency, auto emissions were still rising through 2019.

When it comes to controlling emissions, the fragmented nature of the automotive industry raises challenges to achieving carbon neutrality that often appear beyond the control of car companies. Like most heavy industries, automakers can attack the problem by increasing the efficiency of their manufacturing processes and ensuring that they use clean sources of energy to power their production from renewables. But most emissions related to their primary product are generated after the automobiles have left their possession or reside in the complex supply chains that provide the components to build automobiles, made up of independent companies around the globe.

France recently said it will support sales of lower-emission autos, like electric vehicles (EVs), using coronavirus corporate bailout money to make them more affordable for consumers. While stay-at-home orders, travel restrictions, and business closures put into effect because of COVID-19 decimated demand, it also dramatically produced double-digit reductions in CO_2 emissions. That is a temporary respite, and while economic activity is unlikely to come charging back, emissions will most certainly begin to climb as soon as the virus-related rules relax.

TURN CRISIS INTO OPPORTUNITY

Smart automakers could use this ramp-up period and the COVID-19 financial aid to incorporate technologies and strategies to reduce emissions. First, France is not expected to be the only nation to tie corporate coronavirus bailout money to pledges of reducing emissions and other efforts supporting carbon-neutrality. Second, many strategies adopted to mitigate the impact of COVID-19 can be applied to efforts to combat climate change.

Effective carbon-neutrality strategies must address the entire life cycle of the product. For instance, one primary reason automotive emissions have been on the rise is because more people are buying sport utility vehicles (SUVs). Between 2010 and 2018, SUVs — with lower fuel efficiency than sedans — were the second largest contributor to an increase in greenhouse gas emissions, according to the International Energy Agency, adding more CO_2 than heavy industry, trucks, aviation, and shipping. Other internal combustion vehicles like sedans saw a decline over the same period.

That means carbon neutrality may require either discouraging consumers from buying SUVs by producing fewer or making them more expensive or re-engineering SUVs to produce significantly fewer emissions. France's subsidies for EVs and other low-emission vehicles would support that effort. Designing SUV platforms that are lighter and more aerodynamic would also help. One manufacturer estimates that making a light truck like an SUV produces 0.6 tonnes of CO_2, while the SUV itself will release 34.5 tonnes over its lifetime. Given the switch to electric vehicles will probably not happen fast enough to prevent rising temperatures, automakers could focus on producing more hybrid SUVs to reduce lifetime emissions.

One of the easier aspects of going carbon-neutral for industry is controlling their own use of energy in production. Automakers can make sure that energy generated elsewhere comes from a clean source. That means, for example, purchasing wind power and putting pressure on utilities to discontinue use of coal. To support these efforts, automakers can engage certified environmental management systems. Some CO_2 emissions are unavoidable, and these can be offset by planting forests or carbon credits. But car companies can be more aggressive by incorporating more energy-efficient technologies at their own plants and even consider producing some of their own energy by installing solar panels as Tesla did in its Reno, Nevada, gigafactory.

SUPPLY CHAIN COMPLIANCE

It is also a juncture where automakers can use their additional leverage with struggling supply chain providers to get them to cut their emissions output. They can also consolidate suppliers, cherry-picking those with the best records on emissions and most willingness to share data and move toward carbon neutrality.

They also can select more domestic or nearby suppliers to reduce emissions from transporting parts. Addressing the supply issue is critical: The automaker that produced the 0.6 tonne emissions estimate for producing light vehicles also puts its supply chain emissions release to be 10 times that for each vehicle.

That said, supply chains are complex and often opaque. The lack of knowledge often becomes an excuse for inaction. One approach to working more closely with suppliers is a self-assessment questionnaire for suppliers on the sustainability of their operations. Some automakers are embracing the circular economy by recycling or remanufacturing vehicle parts. This reduces the carbon footprint and saves on the cost of raw materials. To capture as many old parts as possible, they are establishing vehicle-dismantling divisions and other salvage efforts.

RECYCLE PARTS

The spread of electric vehicles (EVs) makes the circular economy even more important. Battery production can be a major source of emissions, depending on the energy source used. Recycling EV batteries could help reduce the carbon footprint from their manufacture and reduce the amount of raw materials, such as lithium, needed.

Finally, automakers need to have the right governance structure in place to ensure that carbon-reduction initiatives are integrated into all parts of the business. Oversight of climate-related risks and opportunities needs to be made clear and in the hands of the board of directors and senior management. Key performance indicators need to be transparent internally and externally to establish accountability and measure progress, and automakers should disclose how they identify, assess, and manage climate-related risks and how these processes are integrated into their overall risk management.

Going carbon-neutral is a challenging process, and even more so for an industry in the spotlight. Automakers need to remain agile as regulation in the area is in flux and is likely to become more intense as we draw closer to the 12-year deadline the United Nations has suggested for when we reach a point of no return. COVID-19 is the industry's preoccupation today for obvious reasons, but climate change may end up being our next global crisis and being proactive now is likely to pay off a few years down the road.

This article first appeared in Forbes.

INTERVIEW
MARKUS SCHÄFER

Member of the Board of Management of Daimler AG,
Group Research and Mercedes-Benz Cars
Chief Operating Officer

What are the main initiatives of your strategy to decarbonize?
Sustainability is a central pillar of our corporate business strategy. One focus is our goal of climate-neutral mobility within the next 20 years. We are aware that we do have a huge responsibility here and do our best to make an important contribution slowing down climate change. We adhere to this plan also in the current situation and consistently pursue our vision of maximum fascinating mobility with the least possible negative impact on the planet.

Mercedes-Benz is the first premium automobile manufacturer to have had its climate protection objectives scientifically verified by the Science Based Targets Initiative (SBTI) to underline that we support the Paris World Climate Accord with these targets. Almost one year ago, we have defined concrete measures under the umbrella "Ambition 2039", considering the entire value chain of a vehicle in a holistic approach towards a circular economy.

Those measures stretch from development to the supplier network, our own production to the electrification of our products, goes beyond renewable energies for the use phase of electric vehicles, and closes the cycle with innovative recycling concepts. Just to name one example: We have just announced that as early as 2022, our own Mercedes-Benz car and van plants will produce CO_2-neutral worldwide, including more than 30 car and van factories worldwide.

What is your view on return on investments in the area of decarbonization, especially considering the (still limited) customer demand? Is that money well spent?
We as a company stand by our social, ecological and economic responsibility. For us, there is no question that the path towards a CO_2-neutral company and long-term economic success go hand in hand.

Even if we are aware that this transformation is a huge challenge, we are convinced of the necessary investments in the future.

We will therefore continue to invest in the necessary technologies, which we are convinced are crucial for the successful transformation of our company. Having a look in the very diverse markets and regulatory situations, there is still room and need to continue to work on several solutions. We continue to consistently pursue our three-lane drive strategy with an intelligent mix of the latest internal combustion engines including 48-volt technology, tailor-made plug-in hybrids and purely electric vehicles.

By the end of this year, the goal is to have five fully electric car models and 20 plug-in hybrid variants on the market. The plug-in hybrid portfolio extends from model variants of the A-Class to the S-Class, from the GLA to the GLE with electrical ranges of up to 100 kilometers. On the purely battery-electric side, our model offensive continues without a break. The fully electric Mercedes-Benz EQC models, the three smart EQ models and, soon, the EQV are already available. But also, purely electrical variants in the compact segment, like the purely electrical EQS for sustainable luxury in the premium segment, are already in the starting blocks. With this mix of drive types, we are convinced that we can offer our customers the right vehicle for a wide variety of needs and market scenarios.

Last but not least, this also includes green financing, for example with green bonds. Such measures create new opportunities to support future investments in CO_2-neutral technologies. At the same time, they allow environment-oriented investors to be directly involved in Daimler's ambitious sustainability projects. This way, Daimler supports the European Union's Green Deal, which, among other things, aims to motivate institutional investors to channel more capital into low-carbon and climate-neutral projects.

Where do you see the most promising potentials of digitization for the automotive industry?
There are two main streams in automotive from my side: On the one hand the digitization of the creation and manufacturing of a vehicle. My vision is to see in the beginning maybe only clay to witness stunning proportions and the beautiful exterior and interior of a vehicle. But after the design freeze, I could imagine a total digital process to develop and test a vehicle in cyber space. The process includes a digital production process and ends in hardware at the latest possible point. The company thinks and acts in end to end processes which are highly digitized.

On the other hand the vehicle itself gets digital including its own ecosystem. The Mercedes of the future will be developed inside out. A software driven architecture will be the core, including a Mercedes Operating System. Driver assistance in various levels based on ample computing power and artificial intelligence will be cutting edge. Infotainment on highest levels and powerful connectivity including cloud based backends provide an outstanding experience for the user. A massive transformation to digital and software orientation is a path we follow.

How do you transform Daimler's engineering to digital? How does this affect the required skillset of engineers?
As a company founded by engineers, we believe technology can also help to engineer a better future. Our way to sustainable mobility is innovation — in a holistic approach along the entire value chain. This is our main focus while transforming Daimler to digital and when we are looking for new talents. We are looking for professionals that are passionate about their ideas, that drive innovation — and that are team players. They should love to work on the future of tomorrow!

REBOOTING AUTOMOTIVE R&D

How manufacturers keep the pace in a resource-constrained future

Simon Schnurrer
Marc Boilard
Srinath Rengarajan

Traditional approaches are increasingly ill-suited and inefficient as automakers face the challenge of designing and developing digitally-enabled and alternatively propelled vehicles. Facing an industry downturn, the imperative is to slash costs and improve efficiencies at all levels. This necessitates a paradigm shift in their Research & Development (R&D) functions.

Automotive original equipment manufacturers (OEMs) built their R&D functions to serve complex hardware portfolios in times of a rather gradual technological evolution. Among the core competences in this context was the integration of technology and innovations sourced from major (Tier 1) suppliers specializing, on their side, in serving automotive OEM needs. This dovetailed with the OEMs' own value creation and differentiation through conventional hardware, such as powertrain technologies. The product cycles were long and static, within clearly defined waterfall processes and job splits.

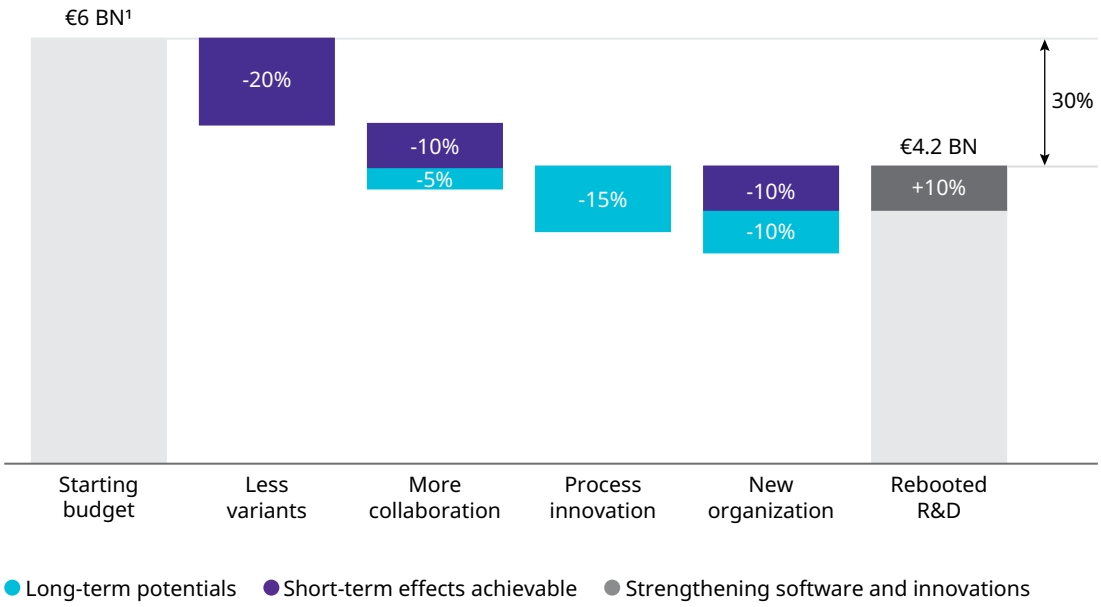
SPIRALLING CONCERNS

These structures and processes have been increasingly stressed by rapid changes in customer expectations and technology requirements in next-generation cars. These vehicles require R&D organizations to deliver functions and systems through integrated software and electronics content, and new "hardware" such as alternative propulsion architectures. Additionally, OEMs have had to reckon with an influx of new tech players pushing into the space. Focusing too much on hardware, they struggled to attract the limited young talent in many core markets offering the skills needed. The existing structures could not always ensure technical product compliance, especially in complex systems requiring know-how from other industries. As a result, even strategic product launches are now facing considerable delays, overwhelming organizations.

These issues have been exacerbated by the COVID-19 pandemic. OEMs have severely restricted engineering capacity due to plant shutdowns and office closures. Initial obstacles in working remotely, or together with limited collaboration modes across functions and partners, are often resulting in efficiency losses. The low buffers, distributed responsibilities, and ongoing delays hinder adaptation of waterfall processes. Potential delays in missing physical parts and materials and lockdowns in offshoring centers are causing engineering chain disruptions. Overall, we assume that R&D throughput has been reduced initially by as much as 30 percent, with some programs completely stopped, and others boosted with additional resources to stick to timelines as much as possible. While some of these issues may be resolved soon, the impact is likely to be more mid-term, with demand uncertainties hindering project prioritization and causing product launch delays. The steep market decline is likely to push companies to contemplate drastic cost measures, trimming R&D budgets considerably while at the same time frantically trying to keep pace.

How should OEMs close innovation go-to-market gaps and effectively enable budget reductions at the same time? As Exhibit 1 shows, we believe that they will need to deploy a mix of short- and long-term levers. These include reducing variants, collaborating, reinventing product development processes, and rejigging R&D.

Exhibit 1. Road towards -30 percent R&D cost



1. Based on average R&D expenditure of major automotive OEMs in 2017-19
Source: Company annual reports, Oliver Wyman

LESS VARIANTS

The past few years have seen an explosive increase in variants and derivatives as OEMs have tried to capture market niches and profit per vehicle. This has led to a bloated and complex product portfolio, with associated engineering demands for future facelifts and successor models. Trimming the product portfolio is critical in reducing variants and managing development complexity.

More than ever, OEMs now need to review their existing program portfolios critically. With a sharp focus on forecasted demand and strategic importance, they must reprioritize these projects. Now is the time to also question traditional automotive industry rules, such as the seven-years lifecycle: Are there hardware/platform or powertrain elements that can be upgraded to serve longer times?

From derivatives planning down to powertrains, options, and features, we expect that the more aggressive OEMs will cut down variant development programs by as much as 30-50 percent. Only a radical move will enable R&D functions to shift critical capacity to the disruptive technologies they will need in coming years.

MORE COLLABORATION

OEMs will continue to rely on supplier product innovation to create a large part of the value, but now they may need to refocus these partnerships towards saving cost. This could entail collaborating with key suppliers to jointly identify process innovation and cost reduction potential, master a set of capabilities which are hard to master alone, or even develop bundles to meet changing customer needs. We find that such collaborations could lead to approximately 30 percent more ideas and create an approximately 20 percent higher margin potential. However, this also requires OEMs to proactively manage potential pitfalls like legal issues, limited willingness to make changes, misalignments, poor execution, inadequate processes/tools, and “old school” purchasing habits.

At the same time, many OEMs will increase collaboration with other OEMs, even in strategic areas such as electric vehicles and software. This could be in the form of tech alliances and sharing platforms for emerging technologies. On the other end of the spectrum, OEMs will need to bundle efforts in mature or declining technologies.

In the short term, the expected drop in engineering and R&D activity could be 30 percent.

PROCESS INNOVATION

In addition to looking into portfolio and collaboration, OEMs must also adapt their processes. The starting point at any OEM R&D function is typically a detailed waterfall-driven product development process (with industrialization elements at OEM and suppliers in parallel), defining the daily work of a large proportion of the developers and engineering towards key milestones.

Though hardware and software development cycles are vastly different, OEMs need to deliver on both in new vehicles. System engineering principles offer one potential solution to blend hardware and software development and deployment capabilities. The following article written by Oliver Wyman Engineers dives deeper into how OEMs can adapt their product development processes to achieve this.

At the same time, other parts of the organization work in largely unstructured ways as there is no clear “technology development process” defined yet. Here, a completely new working model, based on benchmarks from the tech sector, may have to be developed as OEMs increasingly refocus and mature their inhouse innovation capabilities towards software and architecture.

THE NEW R&D ORGANIZATION

Finally, OEMs must rejig their R&D to capitalize on changes to activities and processes in the long term. In the short term, this requires OEMs to reinforce workforce planning and program prioritization to enable frequent and dynamic resource reallocation. Further, researchers and engineers are typically efficient and intrinsically passionate in program crises. In that sense, the existing concerns surrounding R&D functions offer an opportunity to mobilize research and engineering capabilities to overcome the current overstretch.

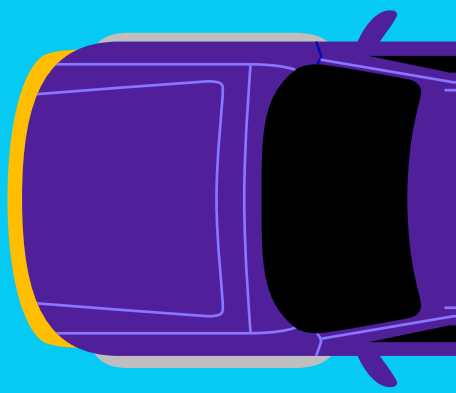
These changes to R&D merit additional modifications to how the function is managed and run. In a sense, OEMs need to run R&D like a factory in the future. This requires undertaking a systematic benchmarking of the organization and orienting towards key performance indicators (KPIs). It is important to note here that the traditional KPIs used in the past for R&D functions are limited in what they measure and benchmark, given the changing nature of the activities, processes, and organization. Thus, there is a need for alternate KPIs aligned with the new realities under which revamped R&D organizations must operate.

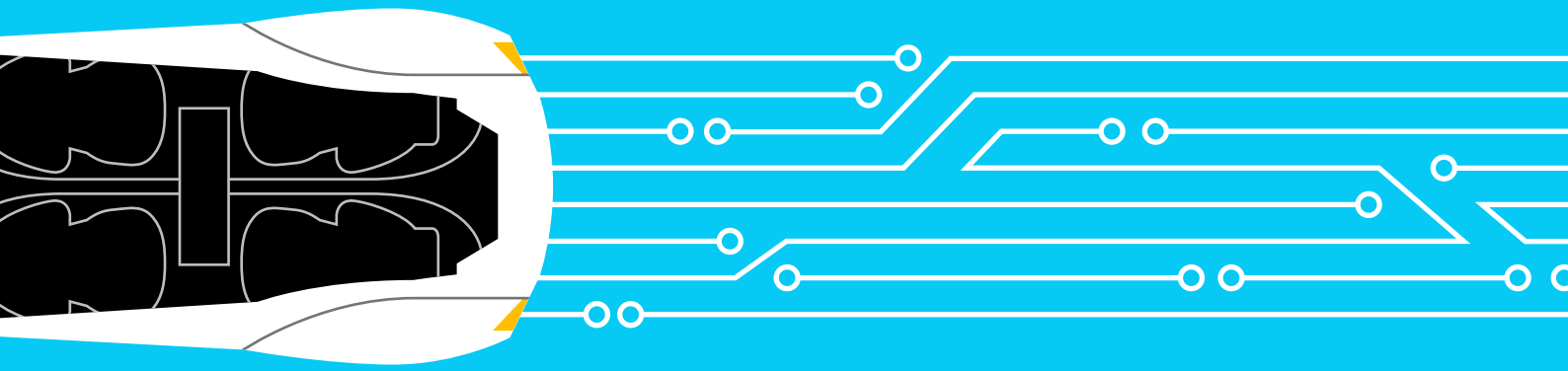
By pulling these four levers aggressively, OEM R&D functions will be able to cut down cost dramatically, even beyond the overall efficiency targets imposed on them. This will create headroom to build-up new in-house competences, which will be an essential pre-requisite to close the gaps to tech players pushing into vehicles and mobility ecosystems.

DEBUGGING THE CAR HARDWARE AND SOFTWARE DISCONNECT

Helping product developers meld software with hardware

Henri-Paul Missioux
David Thompson
Richard Hell





Software and electronics have dominated cars for the past decade. To stay competitive, automakers must do more than cling to product development's hardware-centered past.

Electronic systems and software form a significant part of a car's systems today, up from about 20 percent in the past. Now, trends in connectivity, autonomous vehicles, shared mobility, and electrification (CASE) have led the industry into a new development space that is beyond the comfort zones of many incumbents. These traditional companies need to reinvent themselves in a new environment and ecosystem to develop the vehicles of the future. The mandate is disrupting the entire value chain, compelling many automakers and tier-1 suppliers to work with unfamiliar new partners.

This new "software plus hardware" construct affects everything from the way customers buy and use cars to the shape of the value chain that produces them to the automakers' role within the automotive business system. In turn, these game changers are creating a major shift in design processes, work methodologies and interactions across the product development and industrialization cycles, and in vehicle launch phases. They create more complexity by multiplying process cycles and stakeholder interfaces; all in shorter periods of time.

Product developers thus need to achieve an integrated, hybrid cycle that accommodates hardware and software development. They also need external support and benchmarking, since many top management teams remain unsure the new approach will create the quality products customers demand. Given these complications, automakers need to blend hardware and software development cycles using agile and traditional methods to minimize production risk. Four suggested focus areas include requirements, validation, stage gates and the organization.

MEETING TOUGHER REQUIREMENT SPECIFICATIONS

The way automakers define and manage product requirements continues to evolve significantly across the value chain, both internally and among suppliers. Projects once simply set requirement specifications at the system level — something everyone involved readily understood. Now, projects feature more embedded elements and must cover far-flung systems that "talk" to each other. Non-incumbent suppliers now provide sub-systems, presenting automakers with two new sets of difficulties. The first consists of writing highly detailed requirements because some vendor systems are "black boxes." The second involves anticipating the requirements for all the interfaces that communicate between systems.

In some cases, technology is blurring the lines between systems. In the past, the requirements for the steering and braking systems were straightforward. Now, as these systems become digitized and integrated with autonomous driving technologies and others, specifying their requirements becomes more complex. Many automakers lack experience in dealing with these levels of complexity.

To overcome this hurdle, car companies must detail their requirement specifications at the software performance level as opposed to the functional performance level. That requires a new structure that can expose the requirement necessities as early as possible in the development process. In turn, this typically mandates new links within the organization to integrate the right people and identify needed relationships as soon as possible.

AUTOMATING THE VALIDATION PROCESS

With more interfaces to consider, integrating full systems with sub-systems becomes a greater challenge, which increases the complexity of test validation. Originally a simple “go/no-go” process with basic specifications, automakers now need good validation levels for every element of the car and its environment. That means checking whether codes or code levels are functioning or not, which often requires new methodologies like rapid prototype software validation using analog devices. Since suppliers own some parts of this process, car makers must define good control levels to validate the right integration within the subsystems. That means more steps in the process, more elements to integrate, and more levels within the requirements. Furthermore, the validation criteria must then pass from one step to the next.

To minimize risks, automakers must check the compatibility and interfaces of each sub-system before integrating it. They should run a risk assessment to help identify missing requirements or customer inputs across systems. They need to create a robust validation timeline and schedule between base software and features, then between features and subsystems, and finally between subsystems and full integration. Automakers must also establish clear software capabilities based on the defined requirements and develop visualization tools and methods to prove out software functionalities.

ADAPTING STAGE GATES FOR SOFTWARE

Overall product development timing continues to shrink each year. The growing importance of software development within this shrinking cycle is expanding the number of interfaces between hardware and software, generating more interaction loops and validation issues within a constantly diminishing time allocation. With more time and effort devoted to software, automakers have less to spend on the hardware and electrical/electronic development stages, given the scarce resources available.

Likewise, new diversified suppliers continue to join the global process, with some unprepared for automotive requirements. Simultaneously, automakers are asking their traditional suppliers to do more in terms of requirements and validation process steps.

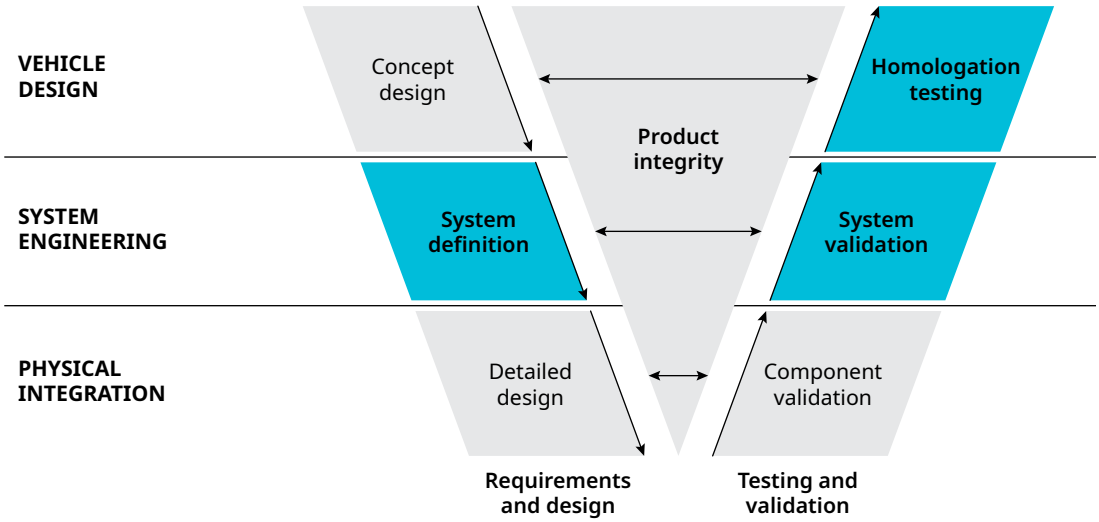
To adapt their stage gate processes to current product development realities, automakers must reinforce the robustness of existing gates by introducing new criteria for passing validation steps. Most must also add new gates during the design and validation phases to make sure everything is progressing according to plan. For example, parallel software gates should feed into the overall process gate. Early on, such modifications will enable hardware/software requirement integration. Later in the process, the intense new software focus will affect the entire validation review system.

RETOOLING THE ORGANIZATION

As the digital revolution drives more software (and hardware) into the vehicle platform, the product development process needs to involve more departments and players. All those new interfaces create more complexity, which requires new communication channels. Ideally, all R&D product value chain teams should have the ability to communicate seamlessly on an end-to-end basis.

To complete this connection, automakers need systems engineering teams. Creating designs that offer strong customer value requires the coordination and aligned performance of multiple systems. Building an organization with requirements for focused systems and a robust validation approach can deliver higher-level quality and performance at the final homologation stage. As represented in Exhibit 1, the systems engineering structure operates between vehicle design and physical integration, linking sub-systems to the final product. The effective development of this structure and organization (with sufficient strength in embedded software development strategies) enhances the chance for success.

Exhibit 1: Organizational structure impact on the V-Cycle



● Organizational structure to reinforce

Source: Oliver Wyman analysis

As the digital age transforms the automotive vehicle platform, companies need to address four key elements of their product development process: requirements, validation, stage gates and the organization. Other industries like gaming and aviation have already undergone this transformation, offering proven solutions automakers can embrace. By building this robust foundation, automakers can meld their hardware and software development processes into an effective, repeatable system.

CUSTOMERS, SALES, AND SERVICES

33 **How Car Ownership May Become A Relic**
Joern Buss, Leslie Chacko, and Robert Bauer

37 **Decreased Investments In Mobility Startups**
Matthias Bentenrieder and Andreas Nienhaus

40 **Confronting Crippling Complexity**
Roman Daffner, Simon Schnurrer, and Soeren Juckenack

45 **Asia's Lead In Next Generation Mobility**
Alexandre M. Bayen and Guillaume Thibault

49 **Why China's Passenger Car Sales Stalled**
Heiko Rauscher and Leo Li

53 **Fixing The Car Industry's Sales System**
Matthias Bentenrieder, Andreas Nienhaus, and Joachim Deinlein

57 **What's A Car For, Anyway?**
Dylan Stuart

HOW CAR OWNERSHIP MAY BECOME A RELIC

The future is slowly moving toward a subscription-based Netflix for automobiles

Joern Buss
Leslie Chacko
Robert Bauer

For the past 50 years, the symbol of mobility around the world has been the private car. In the United States where the automobile has dominated transportation since the 1950s, there are literally more cars than households — 1.88 per household to be exact.

Yet, in recent years — particularly with younger generations — the focus has been moving away from being a proud owner of a vehicle toward valuing the mobility cars provide. The question people began to ask is whether that mobility required ownership. The answer for an increasing number of consumers is “no”.

Mobility as a Service (MaaS), as this shift is called, takes many forms. In most large cities around the world, people can access a car, bike, or scooter without owning one, simply with the purchase of a subscription or download of an app.

As the coronavirus has for most businesses that involve moving people from one place to another, COVID-19 has slowed growth for many MaaS models, including car subscription, a kind of Netflix for automobiles that provides the user a wide variety of models to choose from. That is not true for MaaS when it applies to moving goods from one place to another. If anything, COVID-19 has made on-demand delivery for essentials far more important and expanded the need for the kind of seamless, digital platforms and networks that MaaS technologies are based on.

URBAN PHENOMENON

The on-demand aspect of MaaS makes it increasingly popular as urbanization makes owning a vehicle less convenient than it once was. Where there were only 10 megacities in 1990 — those metropolises with 10 million people or more — there will be 43 by 2030. Today, a little more than half of the world’s population live in cities; by 2050 seven out of 10 will. While many MaaS advocates contend that its offerings will ultimately reduce congestion and pollution, studies of their initial impact indicate they have only added to traffic.

MaaS is behind many new services available in cities today. There is ride-hailing, with Lyft, Uber, Didi, and Grab among the best-known examples: These allow people to secure a ride through a smartphone and an app. Tell the app where you are and where you want to go, and a car and driver show up to take you there.

There is also car, bike, and scooter-sharing, offered by the likes of Zipcar, Citibike, Bolt, and Bird, where an app gives you use of cars, scooters, or bikes scattered around a city. You simply pay for the hours of use and usually a membership fee.

WHY BUY?

Car subscription is another popular MaaS model that provides an alternative to owning or leasing. Most of these programs offer individuals access to a suite of cars, with maintenance, roadside assistance, and insurance included for one all-inclusive price. The main advantage of the subscription model is that it lowers the cost and commitment involved in owning a car. The consumer is no longer tied for years to one car and no longer forced to lay out a large amount of cash or take on substantial debt.

In theory, car subscriptions could operate similarly to gym memberships, that can be put on hold during periods when the subscriber does not need them. Or they could be like signing up for HBO to watch Game of Thrones and then cancelling the service when the series is over. Given the flexibility of the subscription model, experts expect car subscriptions to recover quickly after COVID-19.

Subscription lets people change their cars almost as often as they change their shoes. Some plans allow flipping a car every few days. You could drive a sensible sedan during the week and switch to a sports car or sports utility vehicle for weekend treks. Others limit exchanges to a certain number per month or per year. Some operate like a smartphone contract, letting users upgrade when new models become available. Currently, consumers can pay anywhere from $500 a month and up for subscriptions, based on the residual cost of the vehicle, garage location of the vehicle, additional insurance options, among other factors.

MORE CHOICE, LESS HASSLE

People choose subscription primarily for two reasons — either to expand their choices of cars to drive or to reduce the hassle of ownership of a depreciating asset. Still, in a survey of US and German consumers, Oliver Wyman found the vast majority still not ready to give up ownership — 86 percent in the US and 74 percent in Germany preferred ownership over subscription. Of those who were open to the idea, most in both countries chose the lowest monthly rate rather than one that opened up a selection of premium cars.

While subscription challenges the ownership model, several prominent brands, including Porsche, Volvo, Audi, Mercedes-Benz, Cadillac, and Lexus, have launched their own car subscription programs, which offer an array of choices across a brand's offering. Manufacturer-backed car subscription fleets are usually brand new and often accompanied by a suite of perks and other concierge services, including more attractive insurance coverages than consumers could get on their own or through car-share programs.

Large dealer networks, trying to tap into this new field, have tended to partner with platform-based technology startups to offer similar programs with expanded choices as far as brand. These platform-based programs act as one-stop shops, matching up customers with car choices and offering insurance packages. This approach benefits both the dealerships and any consumer looking for a hassle-free and paperless subscription service, especially one not tied to a single brand.

A new subscription model that we believe could grow is based on fleets of used vehicles. Their price points and insurance-related costs should prove to be even more attractive for consumers looking to save money. Another potential model could involve next-generation electric vehicles.

EARLY ADOPTERS

Millennials and members of Generation Z — already among the biggest users of MaaS offerings — are showing the most interest in this unconventional approach to automobiles. They like the flexibility and lack of commitment, given that their needs are probably changing regularly as they buy homes, get married, have babies, and change jobs. Car subscription also often fits better into personal budgets for these demographics — which are already familiar and comfortable with the idea of monthly subscription services, given their heavy mobile phone use and adoption of entertainment and gaming services.

Subscription is a disruptive concept for the automotive industry, particularly for dealers who in general have viewed it as a direct threat — and one that is apt to grow over the next decade. The goal of one-stop, seamless MaaS transportation ecosystems could be particularly challenging to legacy brands once autonomous vehicles are widely available, unless of course they dive in with offerings of their own.

Transportation in general is going through a mobility revolution, and car subscription is just another one of the newer options available for the right users.

This article first appeared in Automotive World.

DECREASED INVESTMENTS IN MOBILITY STARTUPS

COVID-19 pushes investors to withdraw from ride-hailing and other mobility startups

Matthias Bentenrieder
Andreas Nienhaus

Once the darlings of venture capital and private equity, mobility and automotive startups are falling on hard times in 2020, thanks to the coronavirus pandemic. With people stuck at home and travel almost eliminated, mobility was not a particularly exciting theme for investors in the first few months of the year, and the money for these startups has been evaporating. The expectation is for the various mobility segments to continue to suffer in the second quarter because of the global recession anticipated in the wake of COVID-19.

In the first quarter of this year, the pool of funds invested in mobility and automotive enterprises — particularly those in ride-hailing, ride-sharing, and micromobility services — shrank 16 percent as people were no longer willing to get into the same car or share the same bicycle or scooter as strangers who could be infected. Global funding to private companies only attracted $77 billion in Q1 2020, down from $92 billion in the last three months of 2019, according to CB Insights market analyses.

One of the biggest losers was China — a reaction to the country's nationwide lockdown that went into effect in the second half of January. From December 2019 through February 2020, the number of Series A deals fell 74 percent, according to numbers from incubator Startup Genome published on nextweb.com. When indexed to the decline in the rest of the world, China's numbers were down as much as 57 percent. China and the United States have been the top two destinations for mobility and automotive startup capital for the past several years, reflecting not only the sheer number of enterprises, but also the number of already large and successful startups in both of those countries.

Moving forward, in a coronavirus-driven economy, we expect to see connected and self-driving technologies attract a larger share of the sector's startup money as the need for autonomous vehicles rises in situations where social distancing is the norm. The other area attracting investment is last-mile delivery, which has become an attractive opportunity with so many consumers ordering online to avoid shopping in stores with other people. Here, investment is flowing into logistics technologies and services. For instance, several e-scooter startups switched to delivering groceries and other staples after stay-at-home orders eliminated much of their scooter-sharing business.

VICTIM OF A SLOWING GLOBAL ECONOMY

But even before the pandemic struck, mobility and automotive startups fell victim to slowing growth in major economies. Where in 2018 the automotive and mobility sector attracted $395 billion, the startup category in 2019 only saw $354 billion invested — a 10.4 percent drop. Investments in the top 10 most promising mobility services startups dropped from $6.9 billion in 2018 to only $3.6 billion in 2019.

In 2019 the US attracted the most mobility and automotive startup investment — $16.5 billion versus $10 billion for China. The next two biggest destinations for startup investment was Singapore with $2.5 billion and India with $1.7 billion. The total for Europe was $2.7 billion, $1 billion of which was invested in German startups.

One of the big winners in 2019 was the green vehicle category, including investments in electric vehicles (EVs) and battery development. Investors were swayed by mounting public concerns over climate change and increasing emission regulation by European governments. Investment in the top 10 most promising green vehicle startups totaled $6.9 billion, rising 163 percent between 2018 and 2019. In the US, 10 times more was invested in green vehicle startups versus mobility services startups in 2019.

That said, in the first quarter of 2020, green vehicles saw a drop-off in support because of the disruption in the automotive supply chain, which particularly hurt lithium-ion batteries used in EVs. Six out of 10 lithium-ion batteries are produced in China, where production was shuttered for most of the first quarter. The sector also may be hurt in 2020 by depressed oil prices, which make internal combustion cars less expensive to operate.

AUTONOMOUS VEHICLES

The other big winner in 2019 was connected and self-driving technologies, where the top 10 attracted $4.6 billion — nearly 10 times more money than in the prior year. Of that global total, $4.3 billion was invested in startups in the US.

Another trend: Liquidity and business success continue to be crucial to attract investment. In the last two years, startup funding has increasingly gone to winners in various categories, making the average size of the funding rounds larger and creating behemoths in areas like ride-hailing. Car manufacturers and large technology companies have also been injecting new capital into the sector by acquiring startups involved in digital software and connected and self-driving technologies. That is unlikely to continue in 2020, given the financial hit automakers have taken because of COVID-19.

The top 10 startups that offer online sales platforms or innovative customer services received financing of $2.7 billion in 2019, a slight decrease from 2018. Given that car sales will suffer in the wake of double-digit unemployment in some major economies like the US, the sales and aftersales startup category is expected to suffer.

Now more than ever, it has become imperative for automakers and those operating in the sector to define a long-term mobility strategy and set a course to get there. With most startups in survival mode, there may be an opportunity for forward-thinking car companies to form partnerships or acquire the most promising of these young enterprises. More than any crisis of recent years, the coronavirus and the global recession it caused will separate the winners from those that will simply not be in business when the smoke clears.

This article first appeared in Forbes.

CONFRONTING CRIPPLING COMPLEXITY

Simplifying the automotive portfolio

Roman Daffner
Simon Schnurrer
Soeren Juckenack

The complexity wars within many automakers are heating up. On one side, advocates for complexity reduction want to simplify and streamline product development, delivering the exact content customers desire while improving the brand's cost competitiveness. On the other side, proponents of closing every possible sale see complexity as a necessary complication on the way to business success. Devising a truce between these two sides requires fact-based analysis backed by board-level clout.

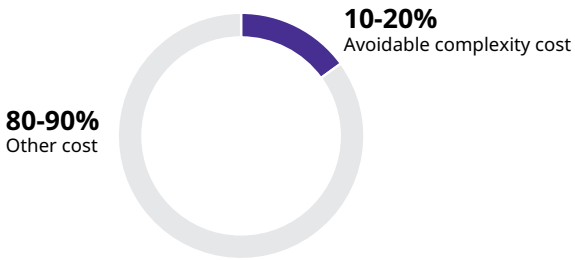
The appreciation of issues created by the vast complexity of current automakers' offer variants has increased over the last years. Development and management capacities, among others, are needed to transform original equipment manufacturers (OEMs) towards a decarbonized and digital future. Adding up to this, the complexity of must-have functions is still increasing rapidly, for example electric/electronic (E/E)-architectures with hardware/software (HW/SW) interaction to realize autonomous driving features are getting much more complex. On the customer side, many customers feel overwhelmed by the current product offer — especially considering premium OEMs. Delayed launches and recalls make it clear that the current complexity levels at many OEMs are too high to be sustainable: Managing complexity is not enough, and reducing complexity is inevitable. Cutting complexity costs can be beneficial for all functions along the value chain. (See Exhibit 1.)

The first step toward sustainable complexity reduction involves an unbiased analysis of the issue. This includes examining the targeted cost structures, take-rates, profit contributors, and complexity drivers. It also involves working up an initial cost analysis and prioritizing the scope of the initiative. This analysis needs to start at the highest level: the platforms. It should then become more detailed to include derivatives and product lines, before drilling down into system-level and more granular concerns like bumpers, door panels, seat covers, components, and even parts.

83 percent of customers say that getting the configuration of a new car right is too complex

The analysis is valuable at both sides: While on the platform-level the impact of a decision is huge, with billions of dollars to be wasted or gained, on more granular levels, every little bit of monetary saving helps. Especially now, given the industry is transforming into a decarbonized and software-heavy future, platform decisions should be discussed first. While many automakers have taken decisions in favor of one drivetrain technology ('battery-electric vehicle (BEV)-first' in most cases), others struggle to make clear decisions now. Failing to get the platform lineup right now may cause automakers to fail in five to ten years. The complexity implied by fully modular and flexible platforms will be unprecedented, and an OEM offering (and developing) multiple drivetrains and working with too many platforms at the same time will not be able to compete with more streamlined competitors. We will also see even more platform sharing across OEMs over the next years, reflecting OEM strategies to invest less and become nimbler and more efficient.

Exhibit 1: Potentials of complexity reduction



Complexity reduction benefits along value chain

Complexity cost driver		Potential medium term (~5 years, in percent)	
Research and development	Engineering of systems and components Validation and testing Additional variants in related components	Personnel Other costs	5-10 5-8
Sourcing	Less suppliers Lower complexity at suppliers (and thus lower prices) Lower inventory levels More purchasing discounts due to higher volumes	Personnel Material	5-10 3-5
Production	Higher setup costs Production planning and steering Lower assembly line time variations Less assembly quality issues	Personnel Other cost	15-20 5-8
Logistics	Less complex planning and steeling Less complex JIS/ JIT Significantly reduced logistic spaces	Personnel Other cost	5 5-8
Sales	Less sales materials Lower levels of dealer and sales agents training Higher product coverage with available stock vehicles	Personnel, HQ and NSC*	5
After Sales	Streamlined spare parts management Lower inventory levels and less storage costs Lower training needs in service	Personnel, HQ and NSC*	5

* HQ = Headquarters, NSC = National Sales Company
Source: Oliver Wyman IC and project results

After setting the scope of the analysis, it is vitally important to quantify complexity costs at customer and product variant levels to construct a reliable cost and revenue migration model. The model needs to track savings and top-line changes over time and concentrate on the analysis of cost drivers, including purchasing effects and the detailed cost of variants. Integrated as part of the product development process, the model should be updated continuously to obtain full transparency on the true costs of a variant. The inherent complexity lies in the dependencies of multiple variants: Step changes in costs often occur only if associated processes can be taken to another level — process changes need more radical reductions than the discontinuation of one out of many variants.

Finally, companies need to establish proactive rules and reactive measures to determine net savings and achieve alignment on measures. Especially in the traditional OEM development organizational architecture, consistency across models is key both to managing complexity internally, and to presenting a compelling offer towards dealers and customers.

To succeed, these initiatives require support from the organization's most influential stakeholders, given the wide variety of core company functions involved, from product development to procurement to retailing and beyond. Strong board-level champions that have a broad view on the OEM's profitability should also be involved — making CEOs and CFOs the most attractive candidates for owning the complexity reduction program.

ADDING UP THE SAVINGS

With the approach outlined above, an automaker was able to identify a savings potential of about €350 per vehicle. In this scenario, key elements of the plan involved cutting the number of engine and gearbox variants, optimizing entry-level variants, and reducing the variety of available rims. The analysis also identified about €130 million in extra savings from other components.

Creating this transparency required a rigid steering of the analysis depth: Not all implications of creating a new variant (or deprecating an existing one) can be modeled and assessed upfront. However, a detailed assessment along the entire value chain is crucial to derive valuable insights. In many cases, the true costs of additional variants were significantly underestimated, because only the readily available cost information for that variant was considered. To name an example: The development costs of a new engine is often transparent (at least to a certain amount), so is the allocation of this development costs to various models, according to a controlling allocation. Assessing the true costs of that variant, however, requires a much broader look — if that engine variant, for example, represents the extension towards the upper end, not only the drivetrain-associated costs need to be taken into account, but also the implications on the chassis development.

In another case example, an OEM introduced a top-line engine for a mid-segment model based on an incomplete view. Taking a deeper look, the analysis showed that about 75 percent of costs for that additional variant were omitted in considerations, including items such as prototypes, pre-series, logistics, and production spaces.

The profit contribution analysis highlighted the earnings differences across product lines. As anticipated, due to its low sales volumes and small margins, the entry-level offering contributed the least to total profits. Due to their significant larger production volumes and higher content levels, the medium and high offerings contributed the greatest profit — more than even the luxury and special editions, which, while high-margin, saw lower production numbers.

These insights led to discontinuing the entry-level model and emphasizing "detuned" medium-segment offerings in its place. Further analysis revealed that only the migration of large numbers of current customers to competing brands would result in a negative profit contribution. The average cost per variant of optimizing the new entry-level offering over its lifetime would total about €30 million across the value chain, contributing to a net impact of about €45 million for the transition.

ENDING COMPLEXITY WARS THE SUSTAINABLE WAY

This comprehensive complexity reduction approach can deliver savings across an automaker's product portfolio on a continuous basis. It can end the complexity wars by delivering results now, while also enabling organizations to identify rules they can follow to simplify their line-ups in the future.

To maintain lower complexity level in the offer portfolio, some automakers have established rule-sets for target — or more precisely — maximum variants in options and variants. Creating a consistent approach for binding maximum variants yielded interesting results at one premium OEM: The typical organizational structure of an auto OEM with responsibility for one or multiple model lines in 'project organizations' ended up in an astonishing level of heterogeneity across models. Smaller and less expensive models showed much more variants of certain options, such as rims and trims, than larger and more expensive models. These complexity levels were clearly identified as 'organically grown' and not reasonable or optimal. Developing and applying consistent rules for all models made the offer more stringent and much less complex, saving a vast amount of engineering, among other capacities.

ASIA'S LEAD IN NEXT GENERATION MOBILITY

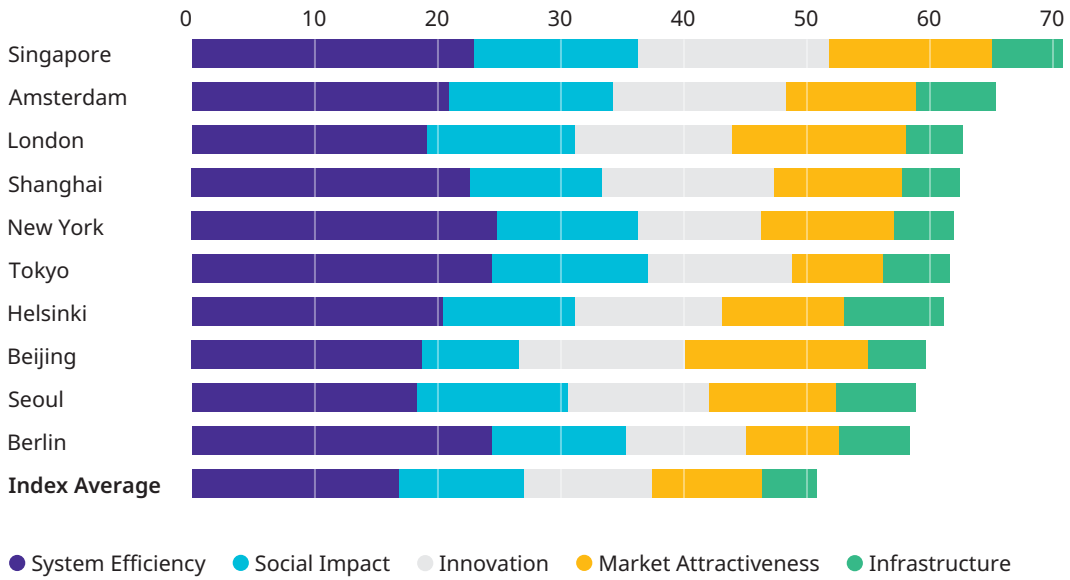
Why five Asian cities may beat the West on next-generation mobility

Alexandre M. Bayen
Guillaume Thibault

In the 20th century, Asian economies slowly took over the manufacture of clothing, toys, and electronics and used them to grow their economies. Now, they are setting their sites on 21st century mobility technology as an engine of growth for their largest urban economic epicenters. In Asia, many of the region's biggest cities are betting on advanced mobility technologies to help them attract business, grow economically, and solve two persistent problems — pollution and congestion.

In the Urban Mobility Readiness Index from Oliver Wyman Forum and the Institute of Transportation Studies at the University of California Berkeley, five Asian cities finished among the top 10 because of their commitment to advanced technologies and infrastructure investment. The index, which focuses on how prepared cities are to incorporate and benefit from new mobility technology, ranked Singapore first for being a mobility model from its traffic management and electronic road pricing system to its autonomous vehicle research. Among the other Asian cities in the top 10: Shanghai — number four, Tokyo — number six, Beijing — number eight, and Seoul — number nine. (See Exhibit 1.) To view the entire index of 30 cities, please click here.

Exhibit 1: The top 10 cities on the Urban Mobility Readiness Index
Cities are ranked on a scale of 1 to 100, based on how well they meet five core criteria



Source: Oliver Wyman Forum analysis

Why did Asia perform so well? A look at Singapore and Shanghai provide some answers.

One of the secrets to Asian competitiveness in mobility lies in the determination of municipalities to be either among the first to debut the latest technologies and solutions — or at least leaders in their adoption moving forward. From autonomous cars and ride-hailing, to electric vehicles (EVs) and high-speed rail, Asian cities — particularly Chinese cities — are in the forefront.

CENTERPIECE FOR GROWTH

For good reason, they need these new, cleaner technologies to overcome the congestion and pollution that hold back economic growth and hurt their livability. Early on, they recognized that new transportation technologies, such as electrification and digitizing the current transportation network, could help relieve the pressures by reducing the number of internal combustion vehicles and making urban mobility a more seamless, less aggravating experience.

More so than many European cities in the index and much more so than all of the North American cities, these leading Asian cities provided regulation and investment in infrastructure aimed at promoting the new mobility technologies. In the case of Singapore and Shanghai — both major port cities heavily dependent on trade — government policymakers recognized these technologies as potential economic game changers. For both cities, as well as the nations they are in, mobility became a centerpiece of economic growth strategies.

In the case of Singapore, the government's Smart Nation Initiative early on identified mobility technologies as key levers for progress. It supported development of world-class facilities for autonomous vehicle testing, collaboration with industry and academia on mobility solutions, smart traffic management, and a nurturing environment for mobility startups. For instance, Singapore is home to Grab — a popular on-demand transportation network and app. Identified by Crunchbase as one of the best-funded mobility startups globally in 2018, Grab transports people, delivers food and other goods, offers a cashless payment system, sells tickets, and books hotels, among other things. Singapore also was the birthplace of nuTonomy, which launched one of the world's first robotaxi services in 2016.

CHINA'S EV DRIVE

Meanwhile, China for the past decade has been providing substantial subsidies to Chinese consumers to buy electric vehicles and limiting the number of license plates available for internal combustion cars. It also embarked on an initiative known as Made for China 2025, which supplied support for EV startups and others working in mobility technologies and business models. Thanks to both efforts, China has become not only the largest market for electric vehicles on the planet, but also the largest producer of them.

The adoption rate of electric vehicles in China far exceeds that of most other countries. Of the more than five million electric cars on Earth in 2018, more than one million of them were on Chinese roads. China operates more than 420,000 electric buses versus a few hundred in the United States. China also controls 60 percent of the lithium-ion battery market, the primary engine for electric vehicles. Shanghai's and China's EV-friendly policies no doubt contributed to the decision by Tesla to build its Gigafactory nearby. And while recent moves to pull back on subsidies may slow growth, the expectation is for China to continue its leadership in EV technology and of the EV marketplace for years to come.

These mobility-centric policies proved to be significant boons to cities like Shanghai and Beijing in their fight to address congestion and pollution. Shanghai and other Chinese cities were able to prioritize increasing the number of miles covered by subway over the past decade. Today, Shanghai has around 400 miles of subway and 16 lines, even though its metro only opened in 1993. Beijing is not far behind with more than 380 miles and 22 lines.

THE RACE TO GO AUTONOMOUS

While US companies are keeping up and even surpassing Asian companies on road-testing autonomous vehicles, Asian municipalities have been actively supporting and funding public and private sector research efforts in autonomy. As the first city in China to test autonomous vehicles, Shanghai is home to the National Intelligent Connected Vehicle (Shanghai) Pilot Zone and has close to 25 miles of roadway where self-driving vehicles can be driven and evaluated.

Singapore is home to Nanyang Technological University, the National University of Singapore, and the Singapore-MIT Alliance for Research and Technology — leaders in connected autonomous vehicle research — as well as several fast-growing startups focused on self-driving technology. And while not always friendly to privately owned automobiles — a ban on new sales was imposed in 2018 — Singapore encourages researchers to use the city and surrounding area as a laboratory for autonomous vehicle testing.

Ultimately, Oliver Wyman Forum's Urban Mobility Readiness Index indicates a potential changing of the guard when it comes to transportation and urban mobility. The lesson for European and North American cities may be a simple one: It can make a difference for their future growth to have government policies and investment in urban mobility more aligned to the needs of the latest technologies and challenges.

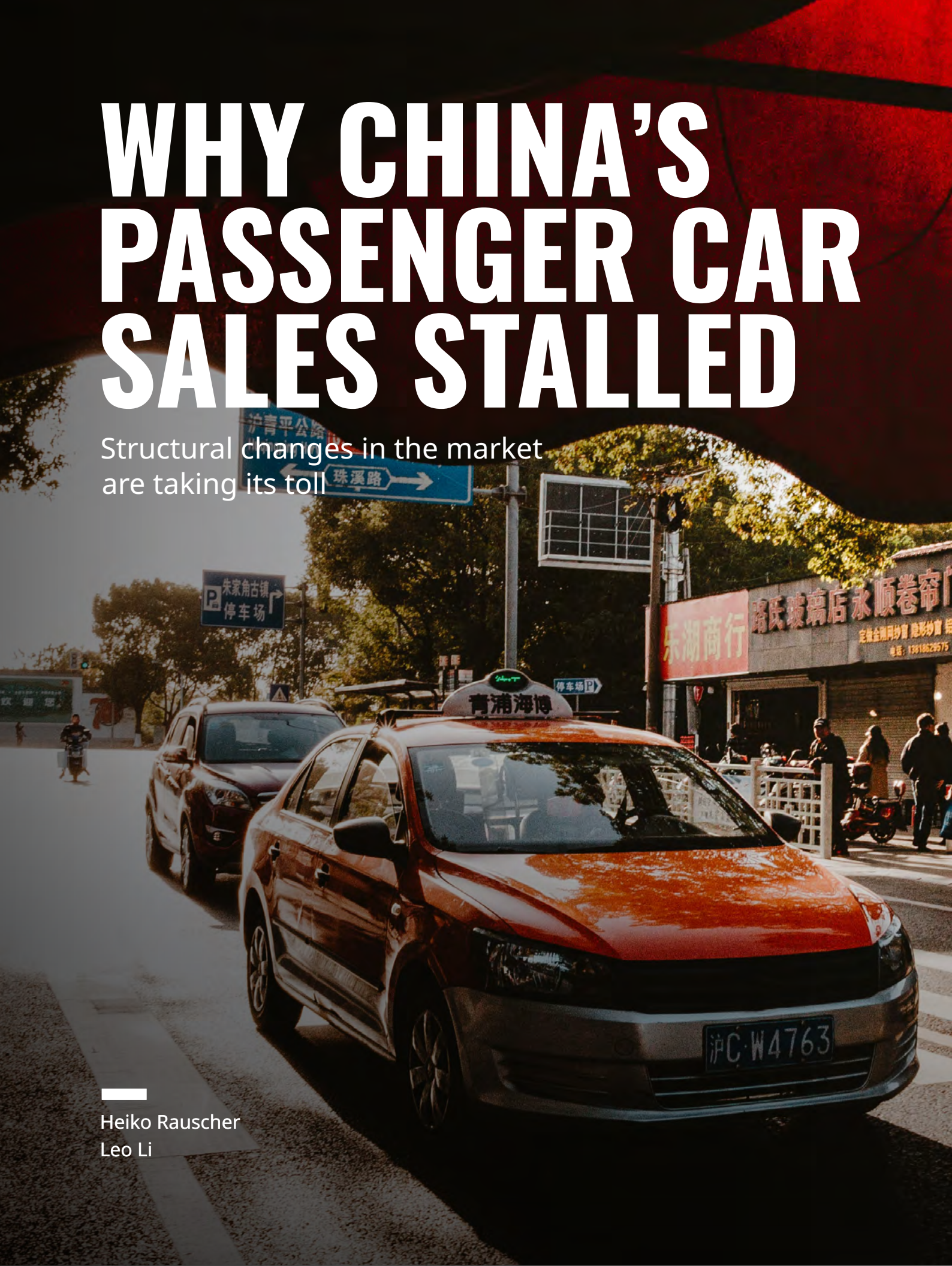
About The Oliver Wyman Forum: The Oliver Wyman Forum is committed to bringing together business, public policy, and social enterprise leaders to help solve the world's toughest problems. The Oliver Wyman Forum strives to discover and develop innovative solutions by conducting research, convening leading thinkers, analyzing options, and inspiring action on three fronts: Reframing Industry, Business in Society, and Global Economic and Political Change.

Alexandre M. Bayen is the Director of the Institute for Transportation Studies at UC Berkeley
Guillaume Thibault is a Paris-based partner with Oliver Wyman's Transportation and Services Practice and the Oliver Wyman Forum

This article first appeared in Forbes.

WHY CHINA'S PASSENGER CAR SALES STALLED

Structural changes in the market are taking its toll



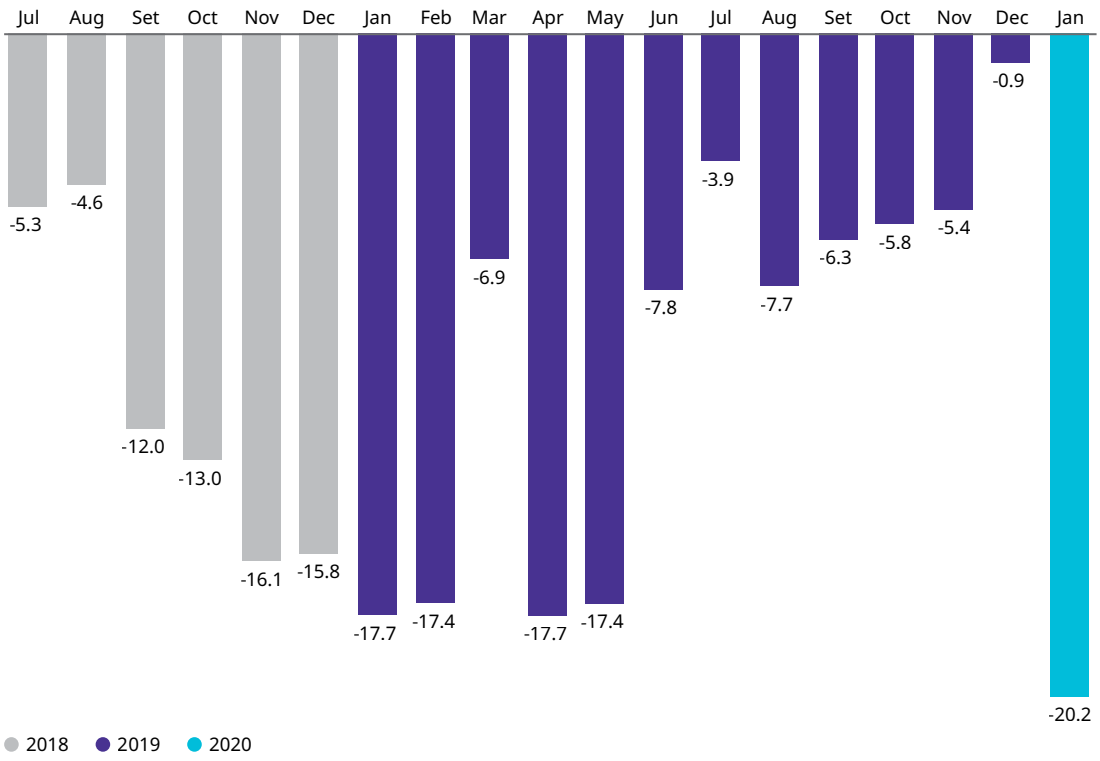
Heiko Rauscher
Leo Li

Even before the coronavirus shut down countless factories and forced millions to shelter in their homes to avoid infection, consumer demand for new passenger cars in China had been on the wane. After years of non-stop growth, car sales were down in 2018 — the first dip in the world's largest market for passenger cars since the 1990s — and then down again in 2019. With the outbreak, 2020 passenger car sales — which were already expected to be sluggish — are likely to end up significantly lower than 2019 sales of 21.4 million because of the near-suspension of commerce in China for most of the first quarter.

But China's decline in cars sales go much deeper than the coronavirus or even the slowing economy and trade tensions with the United States. China is likely to see below-expectation sales of new passenger vehicles for several more years at least — a consequence of several structural changes in the market. The once-accepted vision for 2025 of hitting 28 million cars sold annually may have to wait until the end of the decade to be realized. New passenger vehicle sales in 2025 could come in as low as 20 million, under our simulation model's most pessimistic scenario, or as high as 24 million.

Exhibit 1. New passenger vehicle sales in China are declining

Year-over-year comparisons of factory shipments (in percent)



Source: CAAM, Marklines

The weakness in sales has come as a shock to the global market, which until recently expected to see nothing but rapid growth in China's car-buying future. Even now, just looking at the numbers, there would seem to be plenty of room to expand passenger car sales long-term: Where 811 out of 1,000 people own cars in the United States, only 192 out of 1,000 own an automobile in China. Many of those living outside the major metropolitan areas do not own one, and the expectation has always been that eventually — as the nation's standard of living continues to rise — more would buy. But there are elements beyond income at play.

STRUCTURAL CHANGES

One pivotal element in weaker car sales has been the huge expansion of urban mass transit within China over the past decade. As a result of the hundreds of billions of dollars that the government has poured into public transportation, high-speed rail between metropolitan areas and subway networks within big cities have now become quicker, more efficient ways of moving around. Today, more than 30 cities have subway lines covering 3,000-plus miles. Among the longest and youngest subway lines in the world, Beijing alone has more than 430 miles of subway, and Shanghai has more than 420 miles of track. The Shanghai total does not include the city's close to 20-mile-long magnetic levitation line, considered among the fastest in the world.

China has the world largest population and still growing. While the total population is believed to reach peak around 2032, potential car buying population (age 18-60) is already in a deceasing trend. In the past 3 years, we see a 0.5 percent decrease of this age group.

Another change in mobility in China has been the explosion of ride-hailing services, which claim more than 330 million users annually. Far more interconnected than most Western offerings, China's ride-hailing market now is organized around a couple of major shared apps that allow potential riders to choose among various ride-hailing services — not to mention a host of other consumer offerings. While there has been a decline in usage in recent months because of a shortage of drivers, ride-hailing still represents an attractive alternative to owning a car in China — at least in metropolitan areas.

As the automotive market has matured, an expanding used-car trade has emerged — something that only played a minor role until now. Although Chinese consumers still prefer to buy new, low prices, online convenience, and a slowing economy are allowing second-hand vehicle sales to cut into the new car market for the first time. While new cars sales declined, used car sales in 2019 were expected to rise almost six percent, after rising more than 11 percent in 2018.

Finally, especially in the big cities, there are signs that the new-car market may be saturated for the moment with those Chinese able to buy new cars having purchased one in recent years. In smaller cities and in the countryside, there is still a strong demand for cars but often insufficient funds to buy a new vehicle.

NEGATIVES OF CAR OWNERSHIP

Road congestion also makes the prospect of owning a car less attractive. Even with government regulation that limit when drivers can use their cars and complex registration and licensing procedures that make car ownership expensive and difficult, road systems around most Chinese cities suffer frequent traffic jams and gridlock.

Then, the high level of air pollution and emissions discourages car ownership. New vehicle emissions standards — considered among the toughest in the world — began to take effect in mid-2019 in many provinces, further stifling a declining market.

For several years, the Chinese government had offered lucrative subsidies to car buyers who go electric, helping to explain why China has more electric vehicles — well over two million on the road — than any other country. But in June 2019, the government cut subsidies, and sales of new energy vehicles dropped 27 percent between July and October. In 2019 electric vehicle (EV) sales were down four percent to 1.21 million.

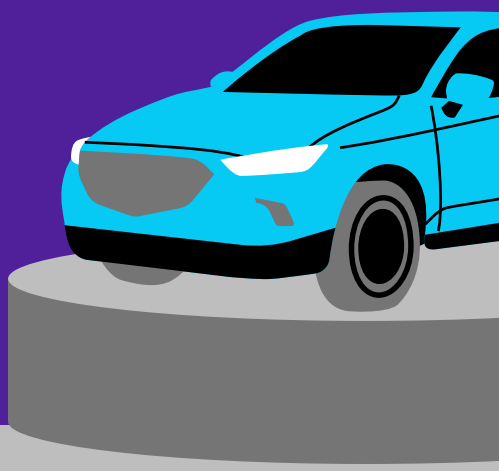
China's government remains a wild card in how fast domestic new-car sales will recover. In 2015, the government made becoming a global automaker a top priority in a pivotal economic development plan named Made in China 2025, and it is unlikely it will abandon that goal. At this juncture, however, the government seems to be choosing expansion of infrastructure — adding, for instance, additional charging stations — rather than subsidization of car buying.

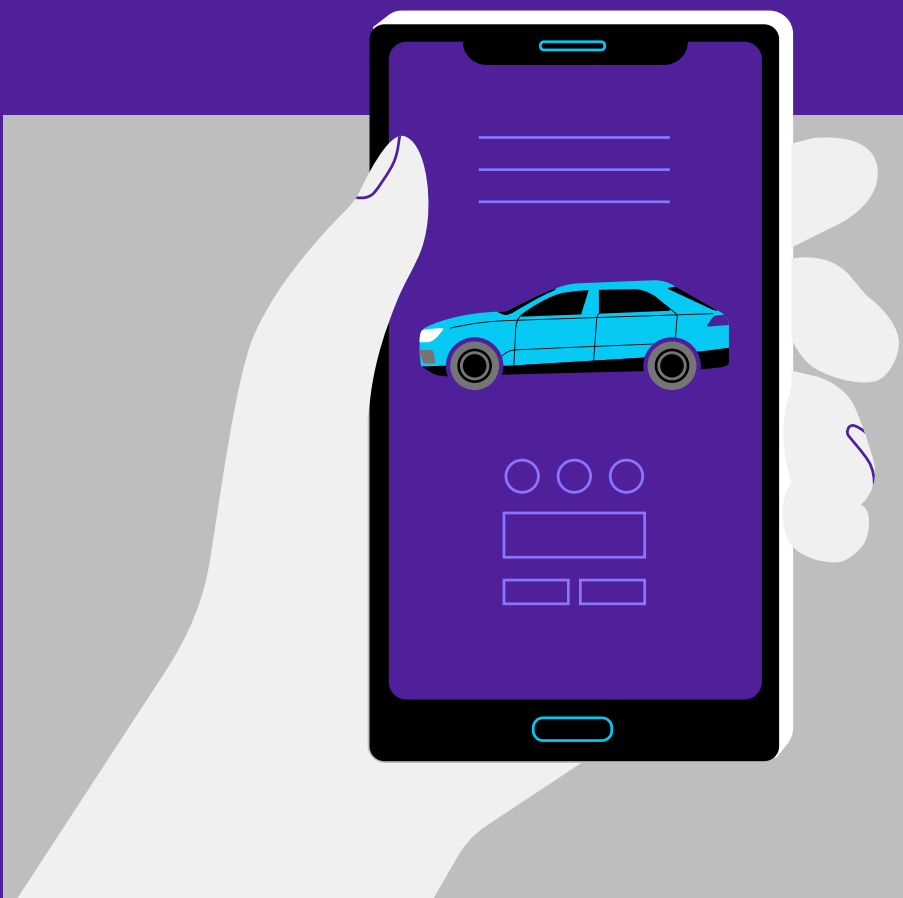
The same Made in China initiative also helped fuel the nation's innovation in other new mobility technologies, including autonomous vehicles and high-end rail, as well as next-generation information technology, advanced robotics, and artificial intelligence. Many of the biggest Chinese companies have invested heavily in these areas and ride-hailing. While the Chinese government can be expected to step in at some point to prevent too much deterioration in car sales, it is also likely to balance that desire with its commitment to sustainability and the newest mobility technologies.

A version of this article first appeared in Forbes.

FIXING THE CAR INDUSTRY'S SALES SYSTEM

Online and offline need to work — and be linked — better together





Matthias Bentenrieder
Andreas Nienhaus
Joachim Deinlein

Even now that online configurators, independent car platforms, and personal research have largely replaced countless visits to a showroom, most customers still have to physically go to a traditional dealership to actually get their hands on a car. There, sales staff have only a final vehicle configuration as a guide to the customer's needs — and usually no idea about the customer's budget, dislikes, and other details of the decision-making process.

The vast majority of customers do not like this system and would be inclined to complete the sale online: Less than one percent rate the automotive sales process as satisfactory. On the other side, automakers know the way they sell their products is expensive and inefficient. Many manufacturers have a picture of an improved, future set-up, including comprehensive online service, dealerships that play specialized roles in sales and marketing, and better connections between the two. But getting there is not straightforward, in particular because of automakers' current reliance on brick and mortar dealer networks, which makes it hard to take radical action.

THE ONLINE PROCESS

Artificial intelligence is already used widely in online retail, where it helps to predict a customer's preferences, make purchasing suggestions, and even initiate the right action at the right point in time. Automakers could benefit from greater use of such features to help guide customers to products they are likely to want, streamlining the customer journey and thereby boosting profitability while increasing stock turnover. It could even push customers to move toward models with lower carbon dioxide emissions.

With every additional step of the process moved online comes the potential for increased savings within the traditionally large portion of sales costs of an automaker. Perhaps more importantly, website behavior provides direct feedback on marketing investment, as it can indicate which of an automaker's sales and marketing activities have had the most impact. Additional customer analytics can then be used to optimize marketing efforts by focusing on the buyer personas that are most likely to purchase.

DEALERSHIPS

As much of the sales process shifts online, dealerships can move away from their traditional, general role in the sales process and focus on specialized, customer-centric tasks. Some, in downtown locations, will play the role of showrooms or brand flagships. Others will function as delivery centers. An additional group will carry out aftersales services. Automakers will need to determine which of their existing dealerships and locations are best suited to each role.

Restructuring dealerships in this way will not, however, be easy. It is costly for automakers to set up their own retail networks, so they depend on independent dealership networks for sales. Being separate legal entities, automakers have limited control over these networks. If automakers fail to manage the dealerships properly, they could lose sales. Automakers should look for opportunities to push dealerships into particular roles — whether that be by altering sales margins when contracts are renewed or offering tailored incentives. Manufacturers will need to reconcile aggressive restructuring of the sales networks while maintaining good relations by offering dealerships attractive roles in the new delivery process.

CONNECTING THE PARTS

A customer walking into a dealership to buy a car has to essentially restart the process of choosing models and features, even if they have already completed an online builder. The dealer can often see the customer's preferred configuration — but their visibility is limited to just the end result and not the decision-making process the customer went through to reach it. Without being able to see the customer's starting budget, decisions, and myriad preferences, the dealer has only a limited understanding of the customer.

Automakers can narrow the gap between the online builder and dealerships sales staff by offering a configuration ID that can be sent to the dealership. Until now, however, there have been limits: Because dealerships and automakers are separate companies, they typically have separate IT systems, and the customer has to opt in to sending data to the dealer, which can be an impediment. This shared data does not necessarily reflect the various decisions made along the way but simply resembles the end-result, i.e. final vehicle configuration.

So, automakers should first create a system that runs the length of the whole purchasing journey and provides dealerships with access to information at all stages. The online builder, the dealer sales system, and the ordering system should all make up a single, smooth journey. Doing this requires integrating customer data so that it is consistent and accessible at all points in the sales and aftersales process — from a prospective customer's initial sign-in to an online builder, all the way to aftersales services. The sales network should be incentivized to take customer's online preferences into account, focusing on customer satisfaction and vehicle profitability as much as volumes. The sales system should also be standardized, so that it is the same for all dealers across markets. Otherwise, complexity and corresponding cost will quickly evaporate the desired cost and efficiency savings. While various customer data-driven use cases already exist, an effective implementation will rely on end-to-end transparency of customer choices along the entire journey. Online recommendations can only provide true value if the salesman in the dealership knows how the customer initially reacted to them.

CAR SALES OF THE FUTURE

Buying a car is much easier than it used to be, thanks to the wide range of online resources now available to the consumer — from manufacturers' websites to community forums. For the average buyer, though, the experience is still far from pleasurable, not to mention expensive: Around 30 percent of automakers' costs come from sales and marketing, making for one of the costliest sales systems across industries.

To fix the system, automakers need to upgrade their online services, restructure their relationships with dealerships, and better connect the online and offline experience. Some newer competitors are showing the way, with well-integrated interfaces that allow them to better understand their customers. Major automakers need to act fast so as not to be left behind.

WHAT'S A CAR FOR, ANYWAY?

How automotive brands can navigate the shifts in customer expectations

Dylan Stuart

2020 will be remembered as the year a pandemic swept across the globe and caused unprecedented disruption, with its short- and long-term effects set to fundamentally change how we live our lives in the future. The automotive industry will not escape this shift.

Even prior to the pandemic, automakers were under pressure from shifting customer expectations and new technology driving toward a radical pivot. Now, expectations are changing once again, as people and companies take stock of a changed reality. Our research has found that those brands that create meaning in people's lives are the most likely to navigate this shift successfully.

A Lippincott survey of 30,000 consumers spanning 500 brands in four countries, found that for automotive brands to be truly meaningful, they need to deliver both "connection" and "progress" for customers. When connection (an emotional bond that powers lifetime value) and progress (helping customers do something they were not able to do before) reinforce each other, a brand becomes significantly more resilient, with greater customer willingness to follow it into adjacent offerings or forgive it for any missteps.

Brands that succeed in doing this are called Go-to Brands, and they are likely to see five times more revenue growth, in good times and bad, than brands that fall short in delivering connection and progress. So, using these core dimensions, how can automotive brands navigate the inevitable shifts in customer behavior and demand?

THREE KEY BEHAVIORAL SHIFTS

Shift one: Permanent remote working

Aside from essential workers, many people will spend the pandemic working from their homes. And while many are itching for a return to the normalcy of their daily routine, we may see more people prefer the teleworking lifestyle even after social distancing restrictions have eased.

For the automotive industry, this more permanent increase in remote working means that cars may be called upon to play a more selective role in people's lives. Suddenly the car is needed less for mundane daily commutes and can be optimized around performing other tasks: taking weekend trips, enjoying sports and recreational activities, and spending time with family. This could mean offerings that traditionally appealed to niche audiences will have the opportunity to swing into mainstream appeal.

Shift two: A preference for privacy

Prior to COVID-19, ride-sharing and mobility services were rapidly reducing the practical need for car ownership in an urban context. However, in the future we may see an increasing reluctance to use shared public transportation. People are going to want solutions that are private, cost-effective alternatives.

For automakers, this may mean that the connection their brand has with customers may need to be built within the construct of a different kind of relationship. Consumers will be looking for mobility options that do not require travel via mass transit — ride-sharing, autonomous vehicles, and other mobility services will be met with people hungrier than ever for these solutions.

Shift three: Comfort with virtual retail

Even the most technologically challenged among us have been thrust into the arms of the digital world. We have all become more comfortable communicating via video call and instant messaging apps, while completely replacing brick and mortar retail visits with online experiences.

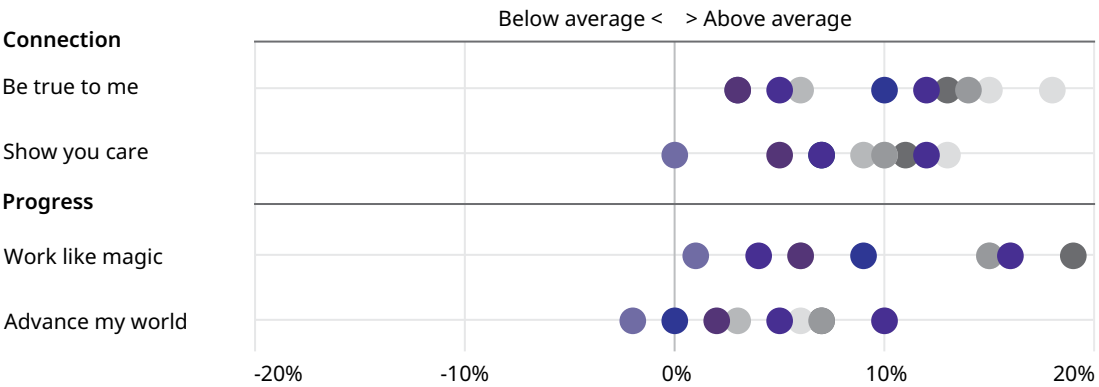
Automotive retail has traditionally been built on the in-person experience of visiting a dealership to experience the product and seal the deal. However, this is likely to change as customers become more comfortable transacting entirely online. As customer demand turns towards a smooth online purchase process; automotive brands will increasingly need to meet customers where they are and establish trust in the digital retail process.

HOW TO STAY MEANINGFUL

People are looking for a more personal connection with brands that champion their values and show they care. Equally important is a brand's ability to enable progress for customers, whether by solving a larger societal problem or making a smaller quest in daily life easier. According to our research, automotive brands included in our study scored well on the drivers of connection and progress. (See Exhibit 1.)

Exhibit 1. Brand performance across drivers of connection and progress

T2B% delta vs. average brand across statements; brand users; US consumers



Circles each represent an automotive brand and how it scores on the key drivers of connection and progress
Percentages represent weighted average of T2B% among statements within dimension. Does not imply strength in every statement

Source: Lippincott Brand Aperture®, June 2019, US consumers

In the time of COVID-19 and its aftermath, doubling down on these dimensions can provide a roadmap for brands to create meaning for customers in a new reality. To drive both connection and progress, the following principles will help navigate a new customer landscape:

Lean into your brand purpose: With the role of the car in customers' lives poised to change, whether through becoming a vehicle optimized for leisure or a mass mobility solution, connection to a brand is more important than ever. A strong brand purpose will help drive this connection. Ask yourself: As a customer, in my new situation, what could I want or expect from a company promising whatever your purpose says? What unique assets do you have to bring in service of customers' new needs and circumstances? What role do you have customers' permission to play?

Put customers at ease in unfamiliar territory: COVID-19 will leave unfamiliarity in its wake. From concerns about hygiene to privacy to reliability, connection will come from an automotive brand's ability to mitigate customer stress and uncertainty. Additionally, customers are going to look for flexibility; they may be reluctant to make financial commitments that do not allow them to respond to the unexpected. This is an opportunity for brands to both drive connection with customers while helping them make progress in their lives. What solutions can your brand put forward that ease anxiety and give customers new flexibility when it comes to car ownership and mobility?

Go-to Brands achieve five times more revenue growth than brands who fail to deliver connection and progress to customers.

Be a part of the broader societal solution: Help make further progress for customers by accelerating the roll-out of mobility solutions that do not require travel via mass transit. At the same time, help people connect to their local communities. Are there ways you can connect your customers meaningfully to others who are looking for the same mobility solution?

Analyze the moments that matter: Whether enabling progress for customers through new mobility solutions or making the path to purchase entirely digital, analyze which brand touchpoints need to be created or reimagined. Think about how your brand purpose and experience can be expressed powerfully in the digital realm beyond a physical dealership and beyond the product itself. How can you build connection in the virtual realm both for people first discovering your brand, and in ongoing engagement?

During this pandemic and in its aftermath, staying meaningful will help automotive brands successfully address the mobility needs of a changed world.

SUPPLIERS AND PROCUREMENT

62 **Trust Or Bust**
Lutz Jaede, Simon Schnurrer, Johannes Berking, and Joern Buss

66 **Don’t Be Turned Into Roadkill**
Simon Schnurrer and Kevin Rebbereh

TRUST OR BUST

How to secure the financing needed to emerge from the COVID-19 crisis

Lutz Jaede
Simon Schnurrer
Johannes Berking
Joern Buss

The COVID-19 pandemic has hit the global automotive industry hard. But the worst may be still to come. As car manufacturers are trying to ramp-up their production again, suppliers will need additional liquidity to build up working capital. So, the challenge to ensure financial stability is not off the table yet. Companies will need to convince their financiers about the viability of their business — which is increasingly difficult in an industry that sees disruptive changes.

The COVID-19 pandemic is affecting the global automotive industry on different levels. Car sales have dropped as a result of store closures, and production had to be stopped in response to lockdown measures. Based on current COVID-19 global spread and retainment measures, the impact is expected to be severe, with new car sales dropping up to -70 percent and no regional hedging possible. Depending on the length of the lockdowns and the effectiveness of countermeasures from states and car manufacturers, our models predict that this will lead to a decline of production between 17 percent and 35 percent in 2020. The remaining production volume can, however, in size and shape look significantly different from before the crisis, due to shifts in the geography and product mix and changing consumer demands. Therefore, the impact on an individual suppliers' business portfolio and revenue can be much higher.

Exhibit 1. Impact on automotive supplier profitability
Distribution of suppliers by EBITDA range

Range	2019	Automotive demand: SCENARIO 1 (sales reduced by 17 percent)		Automotive demand: SCENARIO 2 (sales reduced by 35 percent)	
	Actual data	Without reduction of fixed cost	Including typical fixed cost reductions	Without reduction of fixed cost	Including typical fixed cost reductions
> 0%	95	58	78	3	6
0 to -5%	11	22	14	4	7
-5 to -10%	2	13	5	7	14
-10 to -15%	1	4	1	14	22
-15 to -20%	1	1	1	22	24
< -20%	1	2	0	50	26

94 percent of suppliers would have negative EBITDA

Source: Oliver Wyman

We wanted to understand how this downturn may affect the suppliers' financials. So, we took a sample of 411 suppliers from all global regions and analyzed their cost structure, typical levels of investments, and working capital needs. Then we simulated a revenue decline based on the demand scenarios mentioned above and assumed that the suppliers would react by applying typical cost reduction measures — of course, taking into account that cost cannot be flexed completely. The results were shocking: in our pessimistic scenario, the average EBITDA of the global supplier industry would nose-dive from currently 8-9 percent of revenues down to 15-20 percent and even with cost reduction measures, 94 percent of all suppliers would turn loss-making on EBITDA-level. (See Exhibit 1). As the need for capital expenditures will remain and working capital will be needed when ramping up the business again, this would also lead to negative free cash flows. As a result, the indebtedness of the companies will increase. Our simulation shows that up to 41 percent of all suppliers will reach a leverage ratio (Net Financial Debt/EBITDA) of higher than three, which is commonly seen as a maximum debt capacity for automotive suppliers. In other words: Suppliers will require significant funds to sustain the crisis — but many of them may find it challenging to get financing due to their already high debt load.

COVID-19 IS NOT THE ONLY CHALLENGE

The automotive supplier industry was already under pressure prior to the COVID-19 pandemic. Suppliers face an onslaught of disruptive technologies. Trends in connectivity, autonomous vehicles, shared mobility, and electrification are stretching supplier R&D capabilities, busting budgets, and posing risks due to unknown success factors. Automakers themselves are taking different directions as they struggle to form clear, risk-balanced strategies in response to these trends. Thus, their suppliers get a double dose of insecurity since many automakers expect them to share part of the Connected, Autonomous, Shared, Electric (CASE) investment burden.

Suppliers need to serve fewer but larger global platforms as they seek higher volumes. This mandate, including the task to effectively manage multi-tiered supply chains, can stretch medium-size companies. The demands of end-customers continue to evolve, as markets continue to shift away from sedans toward toward sport utility vehicles (SUVs), creating unanticipated production imbalances. Uncertainty also surrounds the future of diesel engine technology, feasibility and timing of plug-in hybrid offerings, market development in China, and incentives for e-mobility that drive take rates of electric vehicles.

Suppliers also face regulatory and tariff challenges as well as talent shortages and often resource misallocations concerning e-mobility technologies. Consequently, financial markets often do not recognize a supplier's "real" performance or the value of its innovations, choosing instead to back new technology players.

41 percent of all suppliers may face difficulties to get new funding due to lack of free debt capacity.

Oliver Wyman's research suggests that today's winning suppliers achieve superior product costs and better margins by pursuing several key goals. For example, they develop a clear, robust technology strategy backed by a strong business case and model, all of which support the sustainability of their future vision. Most importantly, they lay out a clear path and timeline for getting there. To avoid commoditization, they create premium, high quality, modular product portfolios or deeply cost-effective quality parts and components combined with supply chain excellence, that align with automaker needs, thus ensuring enhanced customer "stickiness."

In particular, they take a balanced and focused approach when addressing CASE components and new business opportunities, making sure they assume the right levels of risk when selecting innovative technologies. They also work hard to continuously manage flexibility, both globally and in terms of ensuring operational excellence in quality, delivery, and launch processes, while challenging themselves to stay lean on the overhead.

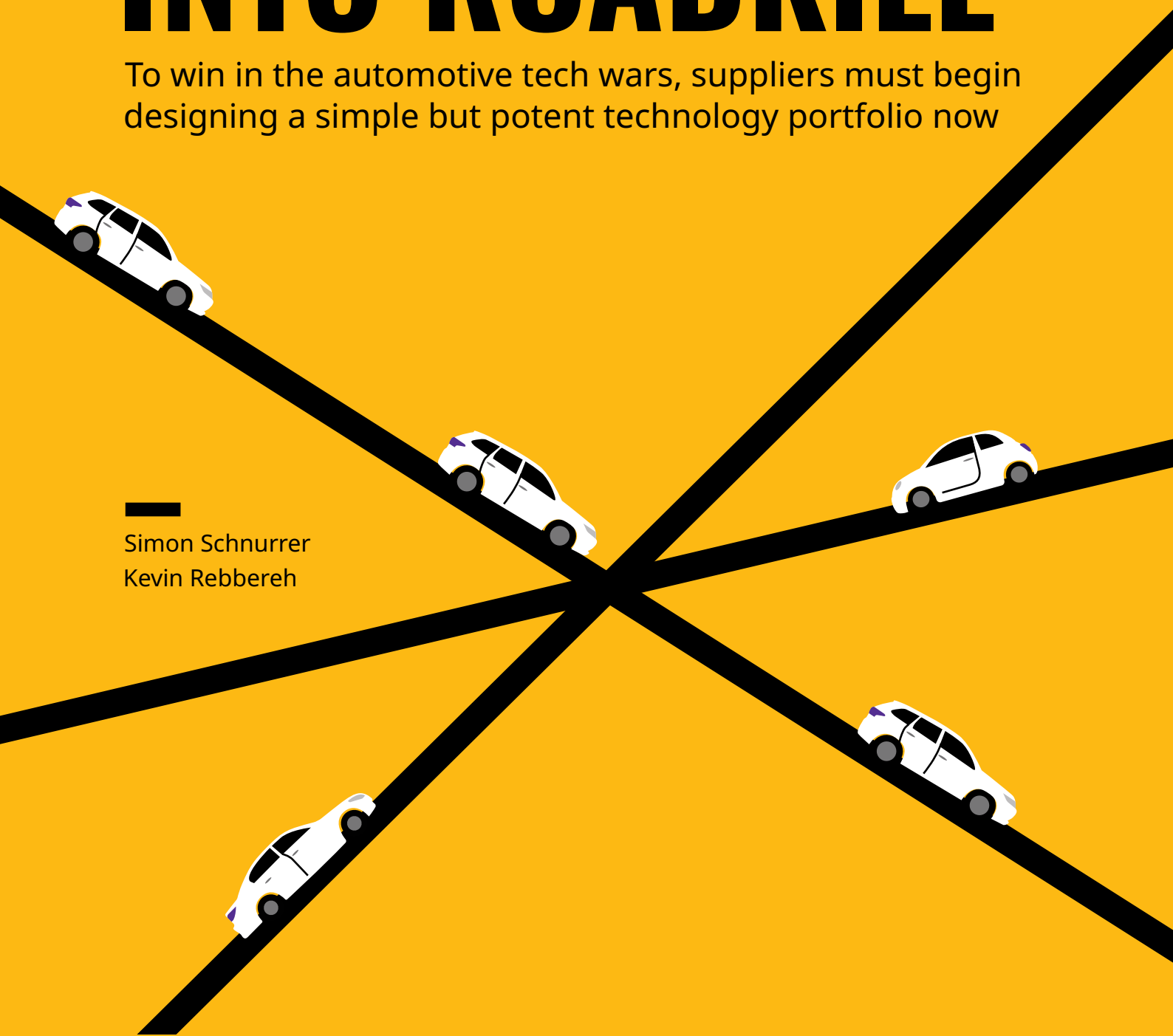
WINNING AN UPHILL RACE FOR CAPITAL

Amidst all of the disruptions and challenges described above, companies with a need for fresh liquidity will face challenges. Suppliers without a convincing business design and a strong pre-COVID-19 performance can no longer assume banks will bail them out, and evidence from recent insolvencies in the supplier industry suggests automakers are becoming much more selective when lending support to suppliers in distress. Furthermore, while alternative financing such as private debt or distressed equity funding is available, it requires a sound business plan that lays out the upside potential for investors, in a time when the public feels again uneasy about the validity of the business model of the auto industry.

We are experiencing times of high uncertainty — due to the aftermath of the COVID-19 pandemic and resulting recessionary environments in many markets, but also because of the fundamental and disruptive changes in the automotive industry. In such times, suppliers need a clear vision about their role in the future automotive world, a concrete action plan on how to get there, and a prudent estimate on the level of financing that is required. This plan should be shared with their financiers timely and proactively. Being transparent and convincing will create trust — and avoid going bust!

DON'T BE TURNED INTO ROADKILL

To win in the automotive tech wars, suppliers must begin designing a simple but potent technology portfolio now



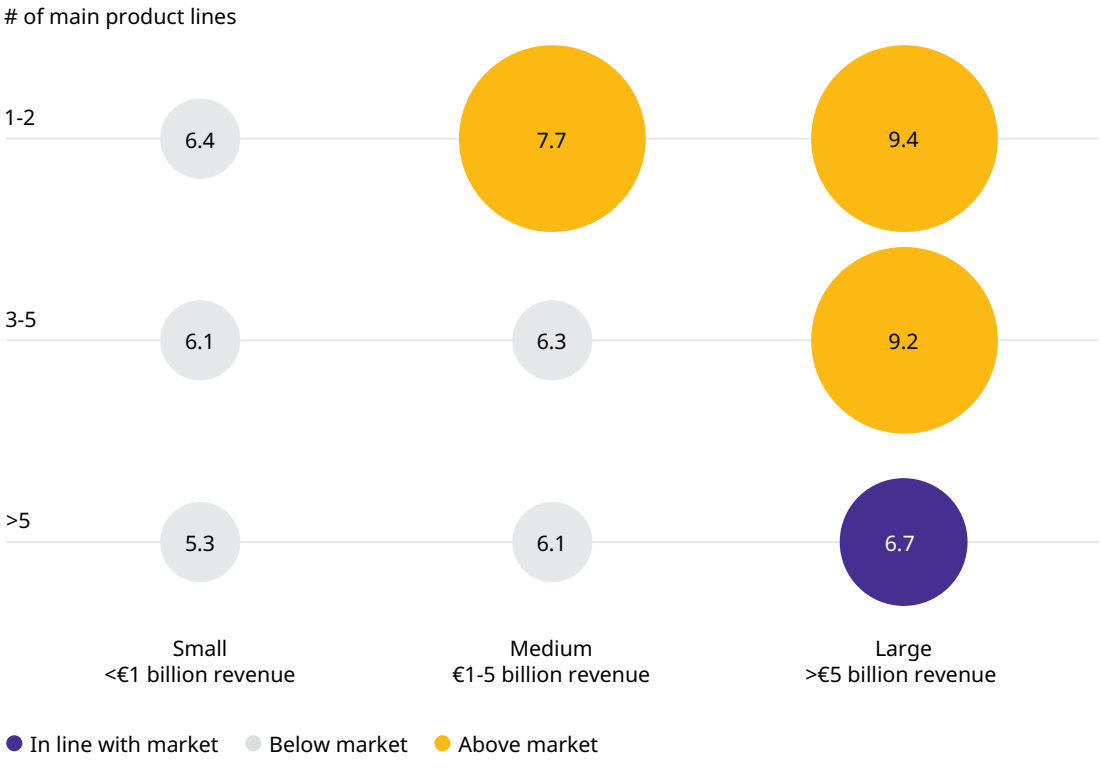
Simon Schnurrer
Kevin Rebbereh

The coming decade will be the toughest one automotive suppliers have ever faced. Supplier — many of whom are already in full crisis mode — will need to manage the drawdown of declining product lines while simultaneously creating their future core offerings. Maintaining "old tech" solutions while rapidly venturing into "new tech" can result in overly complex product portfolios and inflated R&D budgets, potentially putting a company's survival at risk. (See Exhibit 1.)

How players approach this challenge will influence their chances of success. For example, business unit leaders, driven by current performance expectations, often try to maintain control and influence over both "growth" and "cash cow" offerings — even when those would mesh better with other parts of the company. While some suppliers may dedicate the responsibilities for electric and autonomous vehicle solutions to a specific business unit, leaders of more traditional product segments may try to secure their own slice of the pie by introducing related products outside the business unit's actual core. Such actions can put the overall company in an uncompetitive position. Another hurdle: Suppliers often accept long-term negative returns on new product areas like e-mobility, without any roadmap for reaching profitability. (See Exhibit 2.)

Exhibit 1. High portfolio complexity negatively impacts profitability independent of the company's size

EBIT-Margin (Ø 2013-2018) of global top 350 suppliers categorized in their product diversification and size



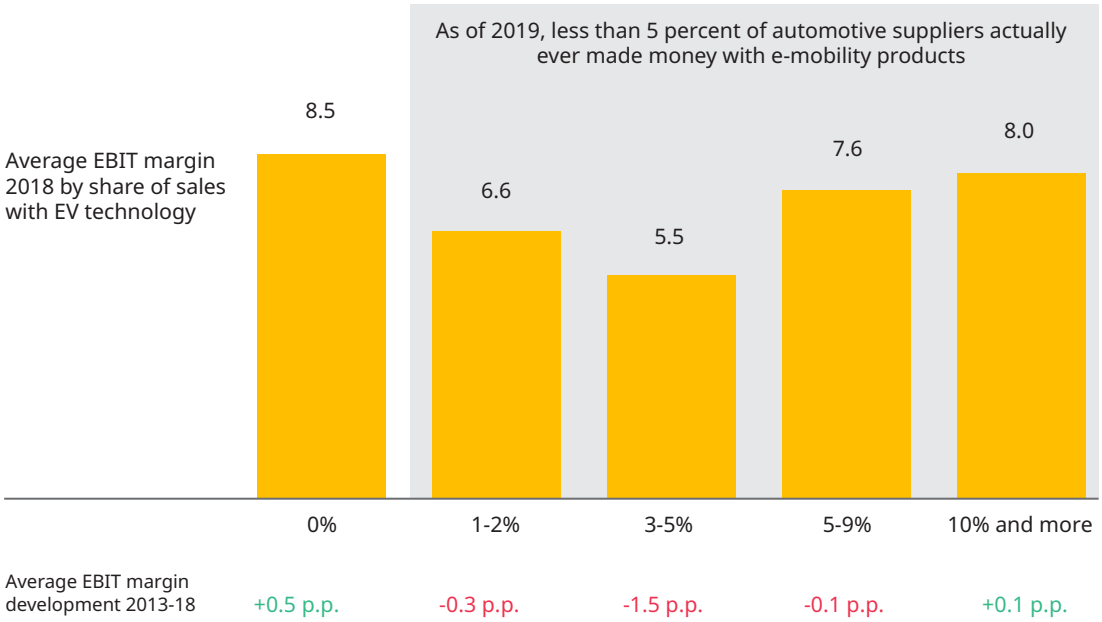
Source: Oliver Wyman's Supplier Performance Benchmark Proprietary

CAPITAL LOVES SIMPLICITY

Complexity not only kills profits, it also reduces a company's potential to adapt dynamically to disruptive changes in markets and technology. Capital markets penalize complexity, too: Investors overwhelmingly view simple stories as winning ones. Since the last crisis in 2009, well-defined automotive supplier brands have outperformed their peers by a factor of three. But simplifying product portfolios and streamlining underlying structures remain stumbling blocks for many automotive suppliers. These companies often do not recognize that growth is not a one-way street.

For instance, one large US-based tier-1 supplier significantly simplified its offerings through major divestments of its climate and lighting business. It now purely focuses on cockpit electronics, from displays and instrument panels to telematics and infotainment solutions. As a spokesman put it: "We have become laser-focused on what we do best, and we are a very different company than we were even a few years ago. You can just be a supplier of many auto parts, but there are 25 other companies doing that. It is a race to the bottom."

Exhibit 2. Performance assessment e-mobility business (of top 100 automotive suppliers)
Only a limited number of suppliers active in e-mobility actually make money from it — especially the "stuck in the middle players" experienced heavy profitability decline



Source: Oliver Wyman Supplier Financial Benchmarking 2020

Complex product portfolios with hundreds or even thousands of products are not uncommon in the industry. The resulting miscellany makes it difficult for investors to understand the company’s true core value proposition — its DNA. This fragmentation often results in sub-optimal manufacturing slot allocation, lack of differentiation, and declining profitability.

What is more, trendy portfolio diversification strategies can quickly lead companies off course. Investors recognize that as a company ventures into new territory where the chances of success are limited, it will find itself competing with players with superior brand recognition and economics in the new product segments.

CREATING A FUTURE-FOCUSED PORTFOLIO

Suppliers have several options for reducing product complexity and building a profitable technology portfolio.

Review, prune, streamline

To survive the technology transition, automotive suppliers must adapt and rebuild their sweet spots. This means a complete assessment of the portfolio, starting with the company’s strategy and including its competencies and capabilities, financial stability, global footprint, and workforce skills. It should evaluate the overall profitability and margins of each business unit and identify synergies and dependencies. Finally, a product group assessment should look at size, market share, margins, sustainability, value-added, and capital intensity.

A systematic review typically reveals that supporting the status quo is the wrong strategy. Companies often need to search for strategic partners or make tough divestment decisions. They often must cut back on products and complete business units as they redefine and streamline their business models. While commoditized products with limited tech differentiation or low cost-cutting potential would seem obvious candidates for selling, some companies have also revised their recent portfolio investment aspirations despite entering booming segments with large growth potential. Why? Leaders realized they would have to incur high ongoing R&D expenses to gain a meaningful share in markets characterized by increasing price competition.

Generate cash and focus resources

Once a company develops a new business model, it needs to finance it and focus resources on the right topics. A variety of options exist to generate cash, such as introducing operational improvements like lean or agile practices to boost the bottom line, or efforts to simulate topline performance.

Another option involves entering the right partnerships to pool complementary capabilities, divide costs, and share risks. For instance, four large Japanese automotive suppliers joined forces to accelerate the development of their next-generation vehicle technologies and cut product and research & development (R&D)-related costs. The companies merged to create a more robust entity with the strength to become a major player in autonomous vehicle and electric vehicle (EV) technologies.

Develop an investor story and become a credible partner

To overcome the market’s hesitation to take part in the incumbent automotive industry, suppliers need to craft a compelling investor story. At the same time, they need to become a credible partner on profitable growth products that align with their DNA. In one cautionary example, a European supplier invested in a variety of e-mobility opportunities that had little to do with its core value proposition and has since struggled with this strategy. Series production ramp-up has remained far below expectations, as some products remain technically inferior and other players enjoy higher credibility with end customers.

Use strong key performance indicators (KPIs) and governance policies

Suppliers need to manage their selected new technologies actively, requiring new KPIs and strong governance structures to ensure projects stay on track. Consider installing a separate roadmap and KPI base for growth businesses to protect them from the core organization, without compromising the ability to steer them. Some larger supplier organizations even develop separate access to capital markets for traditional and new technologies and business units, a move usually rewarded by shareholders.

SETTING A FOUNDATION

The decade ahead will be an extraordinarily turbulent one for automotive suppliers. Incumbent suppliers need to set a foundation capable of supporting the new business models required to ensure their survival. This process must start now, with a frank assessment of the company’s aspirations, capabilities, and future value proposition. Only by doing that can industry players hope to catch the market’s eye and win in tomorrow’s automotive industry.

AUTHORS

ROBERT BAUER
Head of Sharing Economy & Mobility Group at Marsh & McLennan
robert.bauer@mmc.com

ALEXANDRE M. BAYEN
Director, Institute of Transportation Studies, University of California, Berkeley
bayen@berkeley.edu

MATTHIAS BENTENRIEDER
Partner
matthias.bentenrieder@oliverwyman.com

JOHANNES BERKING
Partner
johannes.berking@oliverwyman.com

MARC BOILARD
Partner
marc.boilard@oliverwyman.com

FABIAN BRANDT
Partner
fabian.brandt@oliverwyman.com

JOERN BUSS
Partner
joern.buss@oliverwyman.com

LESLIE CHACKO
Managing Director, Digital Insights and Solutions at Marsh & McLennan
leslie.chacko@oliverwyman.com

ROMAN DAFFNER
Partner
roman.daffner@oliverwyman.com

JOACHIM DEINLEIN
Partner
joachim.deinlein@oliverwyman.com

RICHARD HELL
Partner
richard.hell@oliverwyman.com

LUTZ JAEDE
Partner
lutz.jaede@oliverwyman.com

AUGUST JOAS
Partner
august.joas@oliverwyman.com

SOEREN JUCKENACK
Principal
soeren.juckenack@oliverwyman.com

LEO LI
Partner
leo.li@oliverwyman.com

HENRI-PAUL MISSIOUX
Vice President
henri-paul.missioux@oliverwyman.com

ANDREAS NIENHAUS
Partner
andreas.nienhaus@oliverwyman.com

HEIKO RAUSCHER
Partner
heiko.rauscher@oliverwyman.com

KEVIN REBBEREH
Senior Practice Research Expert
kevin.rebbereh@oliverwyman.com

SRINATH RENGARAJAN
Senior Research Specialist
srinath.rengarajan@oliverwyman.com

SIMON SCHNURRER
Partner
simon.schnurrer@oliverwyman.com

GUILLAUME THIBAULT
Partner
guillaume.thibault@oliverwyman.com

DYLAN STUART
Partner, Lippincott
dylan.stuart@lippincott.com

DAVID THOMPSON
Director
david.thompson@oliverwyman.com

EDITORIAL BOARD

AUGUST JOAS
Partner
august.joas@oliverwyman.com

SOEREN JUCKENACK
Principal
soeren.juckenack@oliverwyman.com

SUSANN SCHEICH
Marketing Associate
susann.scheich@oliverwyman.com

PAT WECHSLER
Marketing Manager & Editor
pat.wechsler@oliverwyman.com

DESIGN

VLA STANOJEVIC
Junior Art Director
vladica.stanojevic@oliverwyman.com

KATHARINA VAUBEL
Photo Editor
katharina.vaubel@oliverwyman.com

KARIN LÖFFLER
Designer
karin.loffler@oliverwyman.com

LORENA MONDRAGON
Illustrator
lorena.mondragon@oliverwyman.com

DIGITAL PRODUCTION

MAGGIE LUO
Video Lead
maggie.luo@oliverwyman.com

AGNIESZKA LASINKIEWICZ
Marketing Associate
agnieszka.lasinkiewicz@oliverwyman.com

LEO FERRI
Senior Videographer
leo.ferri@oliverwyman.com

TARA DONSTON
Marketing Associate
tara.donston@oliverwyman.com

Oliver Wyman is a global leader in management consulting that combines deep industry knowledge with specialized expertise in strategy, operations, risk management, and organization transformation.

For more information, please contact the marketing department by phone at one of the following locations:

Americas	EMEA	Asia Pacific
+1 212 541 8100	+44 20 7333 8333	+65 6510 9700