



The Future of the Automotive Value Chain

2025 and beyond

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Preface

Disruptive times ahead for the automotive value chain

News of disruptive, even historical, changes in the automotive ecosystem has dominated industry debates in recent years. Fundamental readjustments to the whole automotive value chain seem inevitable. It is still not clear, however, where the journey will end, as many developments are still speculative. For example: when will e-mobility (finally) be broadly accepted in the market? Despite all this uncertainty, automotive leaders are required to make investment decisions today, in order to have know-how, production capacity, and stable supply chains in place once markets demand them. Decision-makers are feeling pressure to act. The question is: what are the right decisions in these uncertain times?

With the study “Automotive Value Chain 2025 and beyond”, we are aiming at providing approaches and tools to support automotive decision-makers in answering this question. We cooperated closely with established automotive researchers and

practitioners and identified the most important drivers of future value chain developments. We focused on the upstream part of the value chain, i.e. from R&D to outbound logistics, as we expect massive implications for assets, people, and supply structures in this area. For this we applied the approach of scenario-based business modeling: we identified four plausible setups an OEM's value chain might have in the year 2025. We are already using the results of our model calculations today to help automotive decision-makers challenge their own forecasts and strategic plans systematically. By publishing this study, we are pleased to share our thinking now with the broader public.

Most of the scenarios developed in the study demand a significant willingness to change on the part of automotive OEMs. Today's value chain decisions will without doubt have massive implications for future assets, employee numbers, and supplier structures across the automotive ecosystem.

Scenarios and model calculations can be very valuable for supporting such landmark decisions. The pace and impact of current changes call more than ever for bold action today.

We hope you enjoy reading our insights and thoughts on the future of the automotive value chain.

Dr. Nikolaus Helbig

Partner | Strategy & Operations at
Deloitte Consulting

Dr. Jürgen Sandau

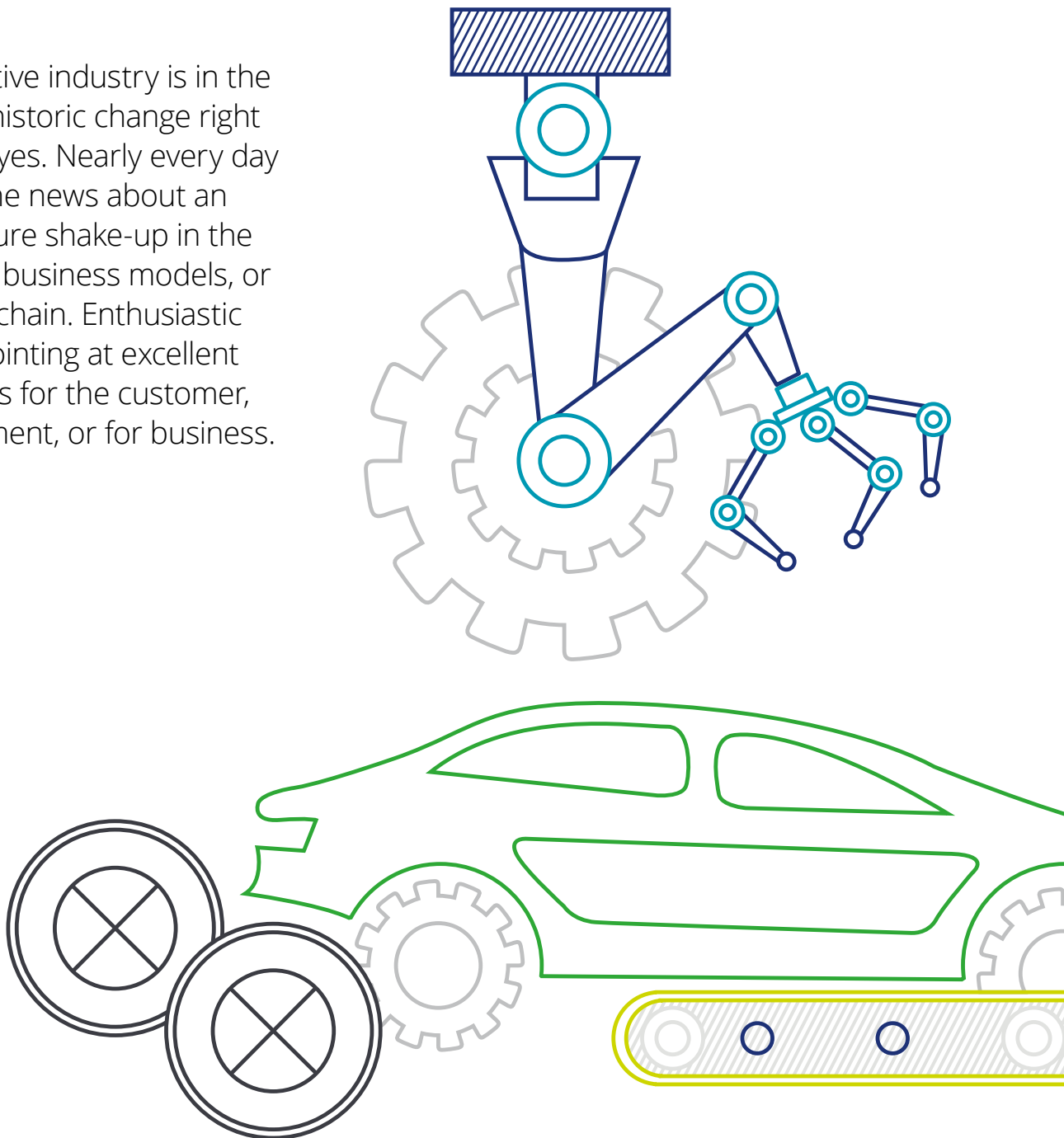
Partner | Strategy & Operations at
Deloitte Consulting

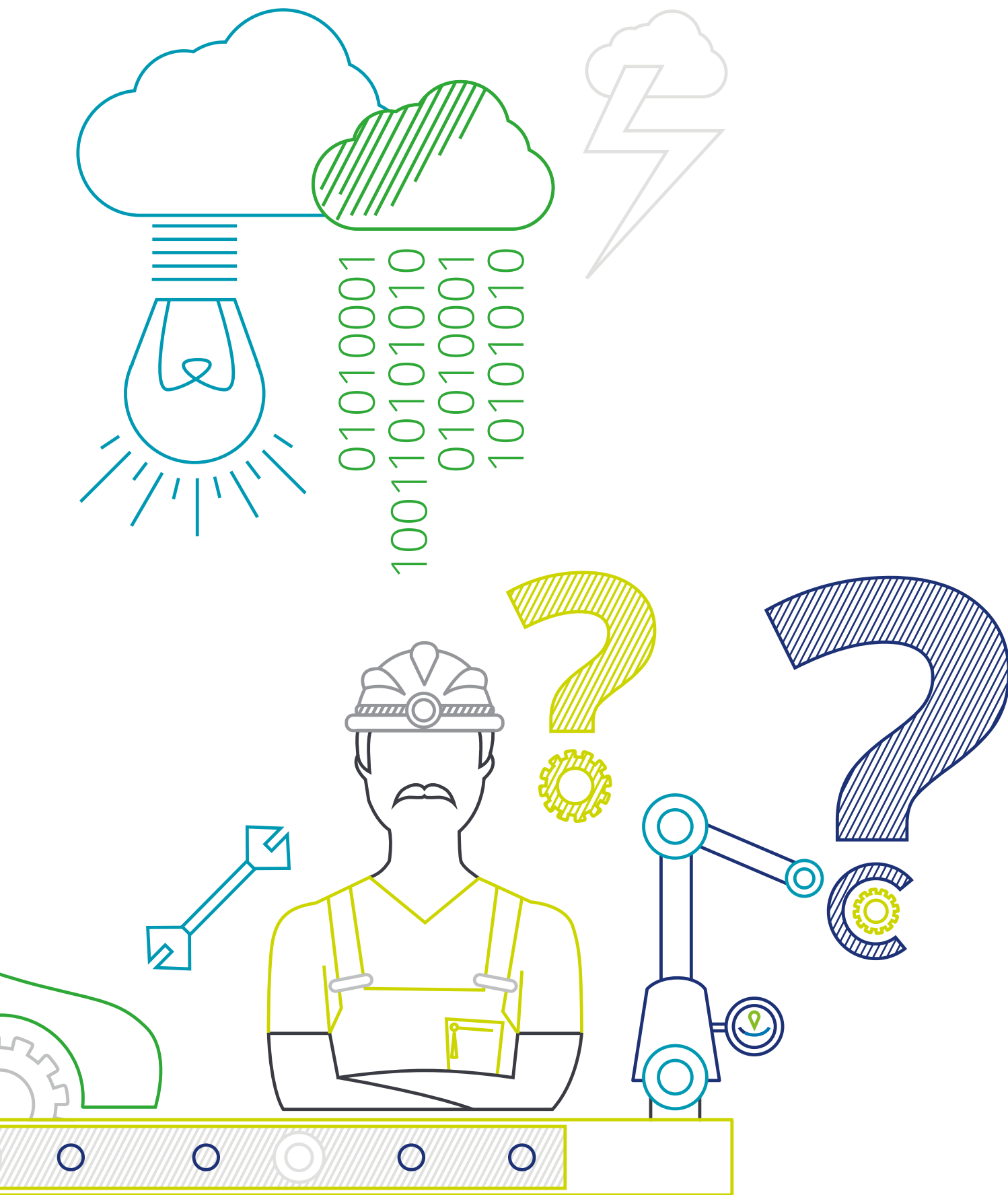
Jens Heinrich

Director | Strategy & Operations at
Deloitte Consulting

Drivers that will shape the automotive industry over the next decade

The automotive industry is in the midst of an historic change right before our eyes. Nearly every day we read in the news about an actual or future shake-up in the market, new business models, or a new value chain. Enthusiastic voices are pointing at excellent opportunities for the customer, the environment, or for business.





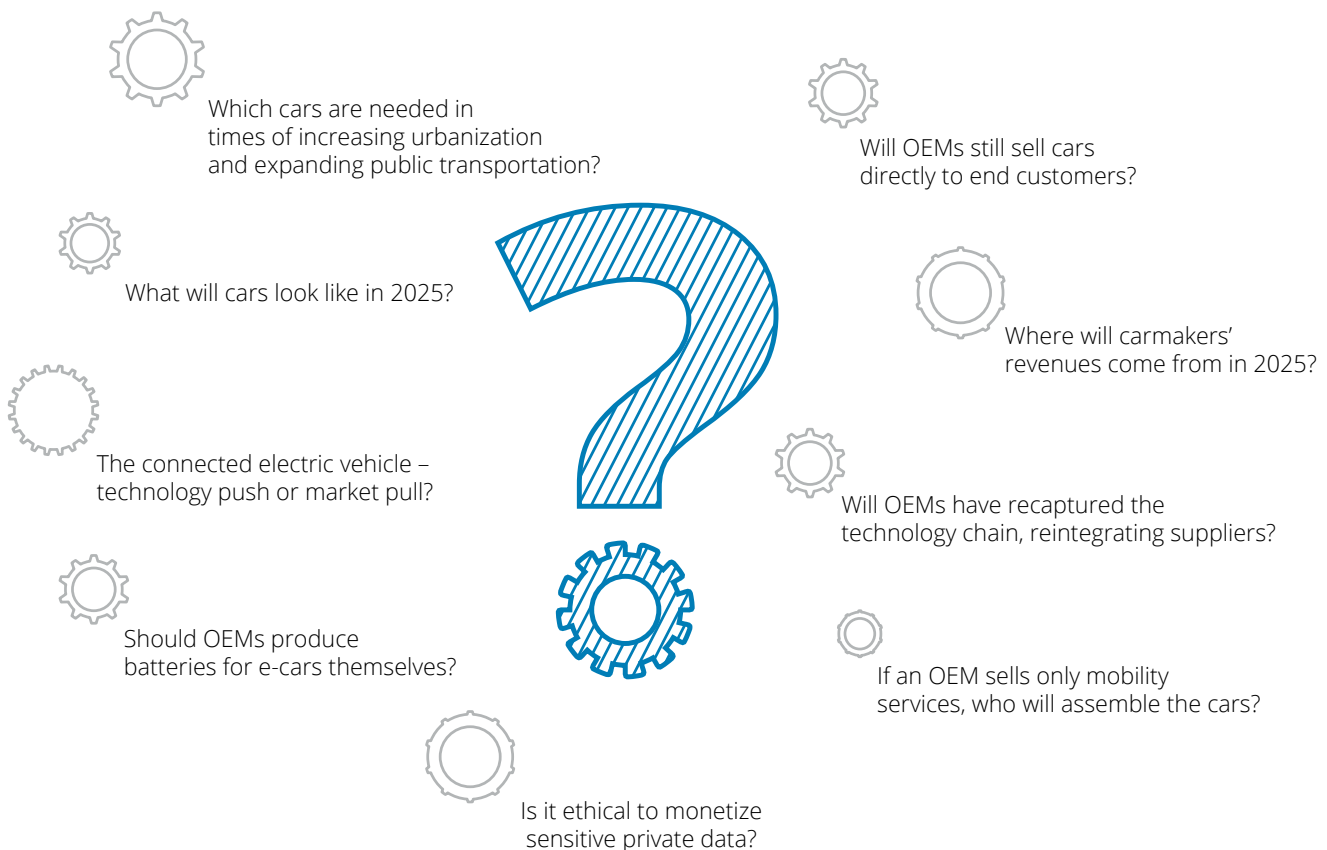
The unpredictable future

Despite promises of a brighter and better automotive future, more and more critical voices are making themselves heard and are asking very pragmatic questions: how can traditional automotive OEMs remain competitive in the face of increasing pressure from major tech players with pockets full of cash that they are willing to invest? What impact will the increasing importance of software and connected services in cars have on R&D capabilities and supplier selection? What kind of asset structure will be needed to provide mobility and digital services? How can people be trained to ensure they possess a “digital skill set”? How to deal with the fact that electric engines contain far fewer components than combustion engines, implying thousands of

potentially redundant workers? And what impact will all of this have on the economy in and around cities and regions which depend on the jobs that carmakers provide?

This study attempts to shed some light on possible developments in the automotive value chain as it progresses towards 2025. Our aim is to support our readers and facilitate decision-making in times of great uncertainty by developing a strategy that takes into account several relevant scenarios. We therefore quantify the effects in each scenario in order to be able to make educated decisions and to support OEMs in acting as strategic players to shape the automotive value chain the way they desire – into 2025 and beyond.

Fig. 1 – Questions carmakers are currently asking themselves

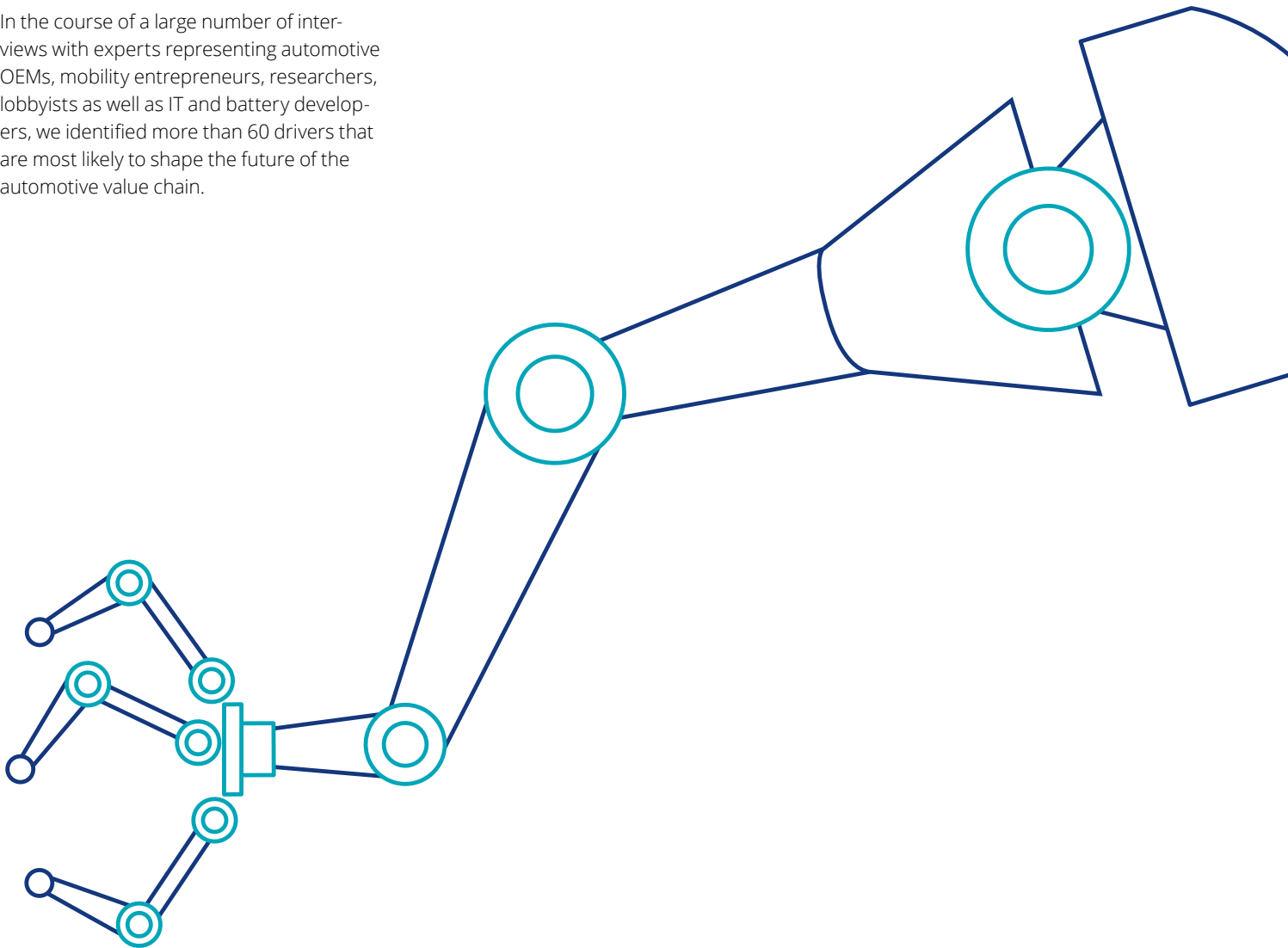


Study approach

No one has a crystal ball to predict the future. Nevertheless, there are some signposts to future developments to be seen almost every day: market launches of autonomous cars or press statements announcing thousands of job cuts, to name just two examples. These signposts are not necessarily pointing the same way. Thinking in scenarios can help here. Decision-makers need to understand the underlying dynamics that will shape the future so as to take the right strategic decisions in the face of uncertainty.

In the course of a large number of interviews with experts representing automotive OEMs, mobility entrepreneurs, researchers, lobbyists as well as IT and battery developers, we identified more than 60 drivers that are most likely to shape the future of the automotive value chain.

These drivers – backed by extensive research data – were ranked and fused into four scenario narratives, giving an outline of what the automotive value chain might look like in 2025. On the basis of these scenario narratives we conducted workshops with top managers from automotive OEMs and independent industry experts in order to challenge and fine-tune the narratives. These discussions resulted in a series of implications for the market and the value chain, and also some strategic imperatives for OEMs in each of the four scenarios.



Monitoring development signposts and quantifying their effects in an integrated financial model sheds light on mission-critical transformation steps.

Since the aim is to facilitate decision-making in the face of uncertainty, it is essential to quantify projected market shifts and their implications for the value chain. On the basis of our scenario narratives and profit models, Deloitte financial benchmark databases, and forecast driver developments we modeled the income statement and balance sheet for a typical OEM in 2025 – in each of the four scenarios. Computing financial performance indicators for each of the scenarios allows prioritizing strategic decisions. Understanding how singular initiatives impact the overall financial success, stability, and workforce of a company is of great value when having to assess different options. Even more so, when great numbers and clusters of strategic decisions have to be evaluated in an integrated manner – along different potential scenarios. Of course, financial modeling reaching so far into the future can never be 100% accurate. But even obtaining an understanding of the orders of magnitude of potential financial implications is highly valuable for decision making.

However, outlining projected OEM profit models and KPIs in 2025 will not answer two important questions all decision-makers will ask: how do we get there and where do we start? This study therefore concludes with sketches of possible value chain transformation paths for OEMs from today until 2025, and also pain points that might be expected along the way. To do this, we place special emphasis on topics such as assets, people, and supply structures along the automotive value chain.

Mercedes includes iOS in onboard operating systems

Die Welt

The car manufacturer Daimler sells its Tesla shares – for more than € 600 million

Süddeutsche Zeitung

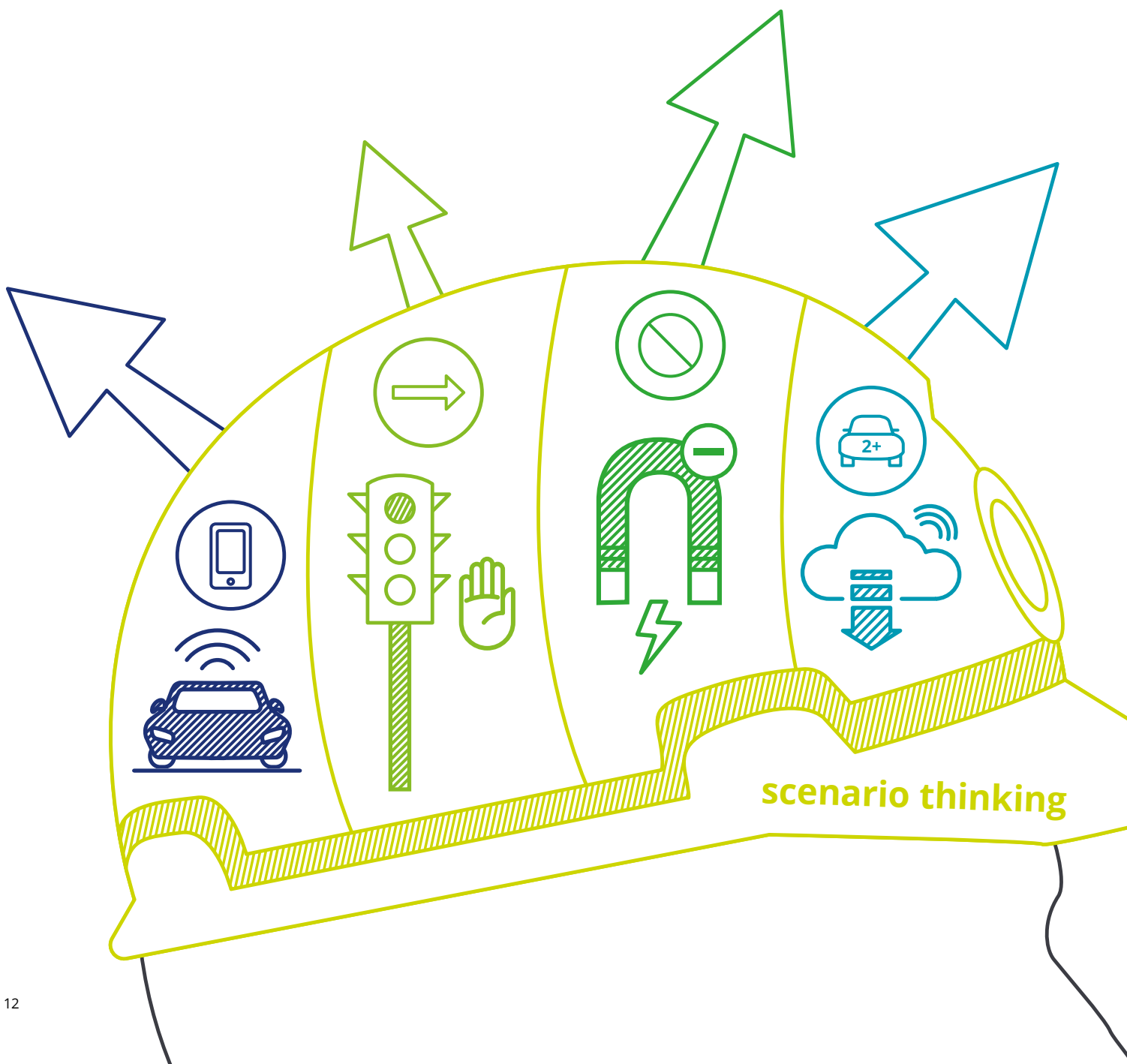
Hello, Olli: 3D Printed, self-Driving IBM Watson-Powered Bus Hits The Road

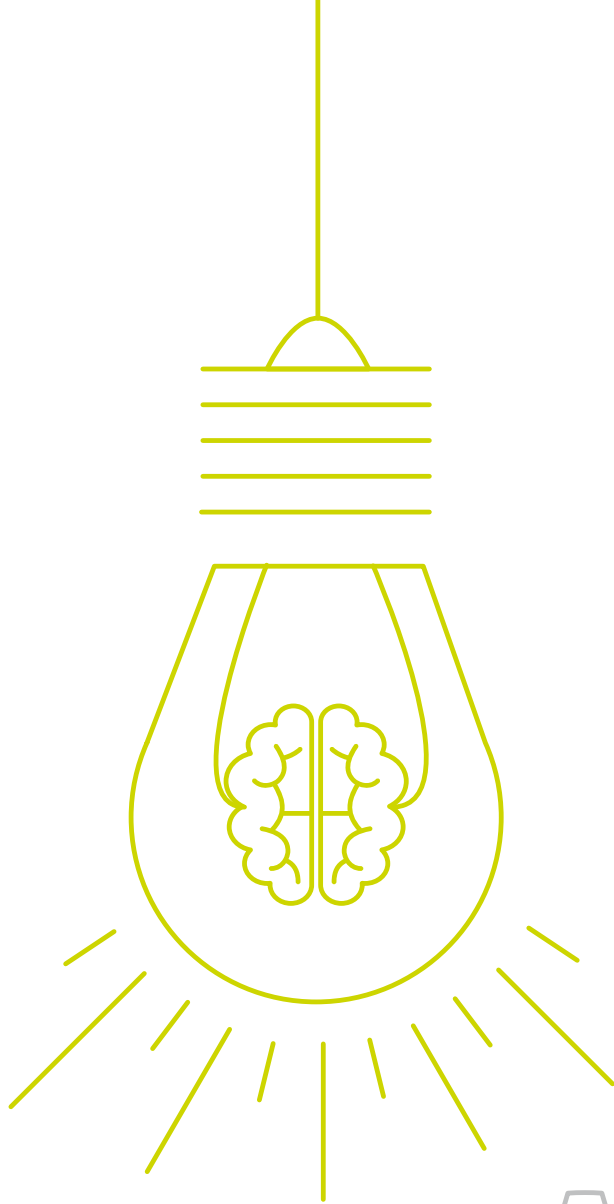
Tech Times

Fig. 2 – Signposts to the automotive future

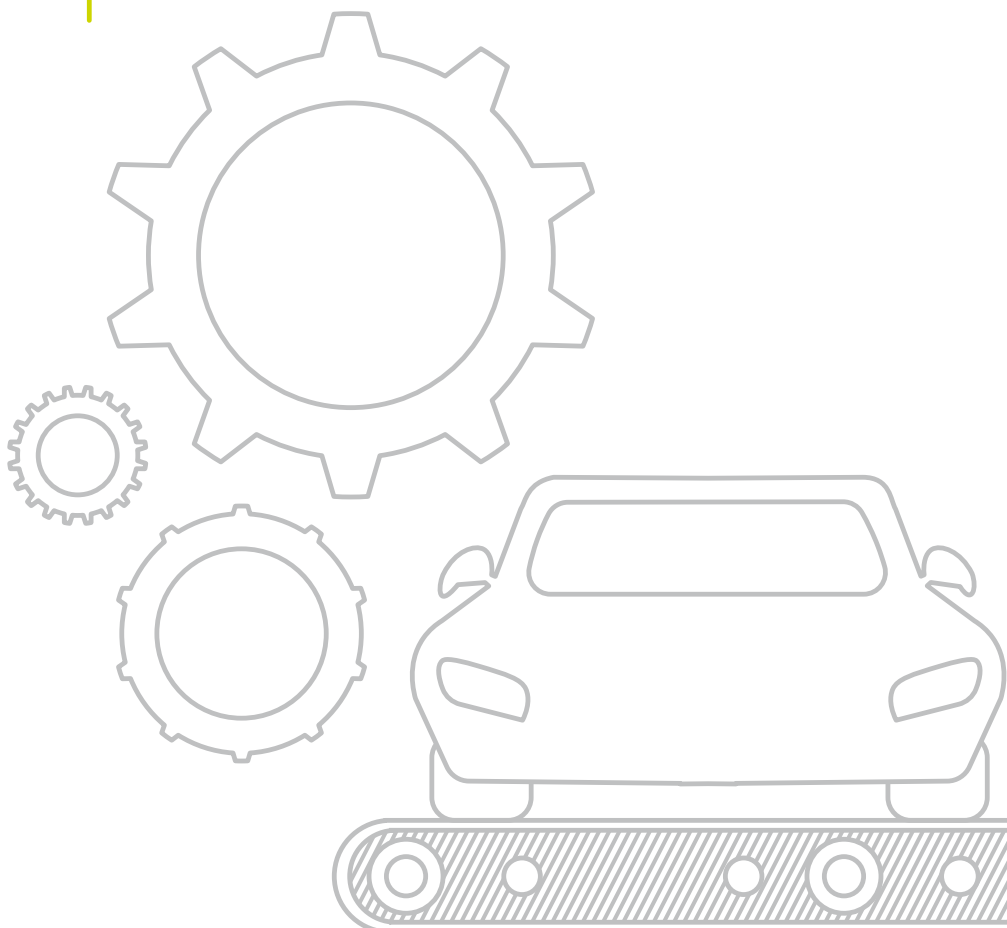


The automotive value chain in 2025: four plausible scenarios





The automotive value chain in 2025 will be determined by a multitude of high-impact drivers. Where developments are most uncertain from today's point of view, scenario-based thinking can support decision-making. We suggest four quintessential scenarios to describe the future automotive value chain.



High-influence drivers for the automotive value chain

Since the characteristics of the drivers shaping the automotive future and the direction of their development cannot be predicted precisely, and are even highly uncertain in many instances, it is necessary to think in scenarios. In order to derive plausible future scenarios from the wealth of observations, the possible drivers and their effects need to be made more transparent. We looked at a wide variety of drivers with direct or indirect impact on the future development of the automotive value chain. These drivers can be grouped into the areas of social change, technology advancement, economic shifts, environmental trends, and political developments (Figure 3).

The drivers were in turn evaluated as to their degree of uncertainty and their impact on the OEM's automotive value chain, in areas such as R&D, procurement, manufacturing, or logistics.

As an example, let's have a more detailed look at 3D printing: 3D printing is a high-impact but uncertain driver. It has a potential impact on various links in the supply chain. It reduces the time to build prototypes or even entire devices and thus supports the process of innovation. Assuming adequately trained employees, the number of suppliers could be reduced by producing a variety of parts in-house. This, together with shorter lead-times, also affects manufacturing and logistics. Parts and components can be printed directly wherever they are required and do not need to be transported. Lighter and less costly products reduce inventory and handling costs, shorter lead times reduce supply chain complexity. However, the future deployment of 3D printing is highly uncertain: production costs are too high, and production speed is still too slow to allow for a large-scale implementation.

By contrast, drivers such as "customers' and regulators' safety awareness", appear much more certain. In terms of impact we can think of alternative powertrains as being a high-impact driver, while material wealth seems to play a less significant role.

Fig. 3 – Clusters of identified drivers



Fig. 4 - Driver evaluation according to degree of impact and degree of uncertainty



Visualizing all the various drivers as a cloud (Figure 4) quickly shows patterns and highlights the zone of highest interest: in constructing future scenarios it is necessary to focus on the most relevant drivers, i.e. drivers with the highest degree of uncertainty and the greatest impact. These drivers are the significant ones for unfolding distinct and meaningful scenarios. One example for such a driver is "alternative powertrains" (such as battery electric vehicles (BEV), plug-in hybrid electric vehicles (PHEV), range extenders (REX) or fuel cell (FC)), owing to the major changes required in the workforce, logistics channels, and manufacturing processes, and also an unpredictable market breakthrough. Another example is "connectedness of cars", as the potential for new business models is huge but currently still very uncertain when it comes to the actual monetization of technological possibilities, not to mention future regulation.

By applying the well-proven methods of the Deloitte Center for the Long View, these critical uncertainties were used to shape four quintessential scenarios:

The drivers with the greatest impact and highest degree of uncertainty are the ones to unfold distinct and meaningful scenarios.

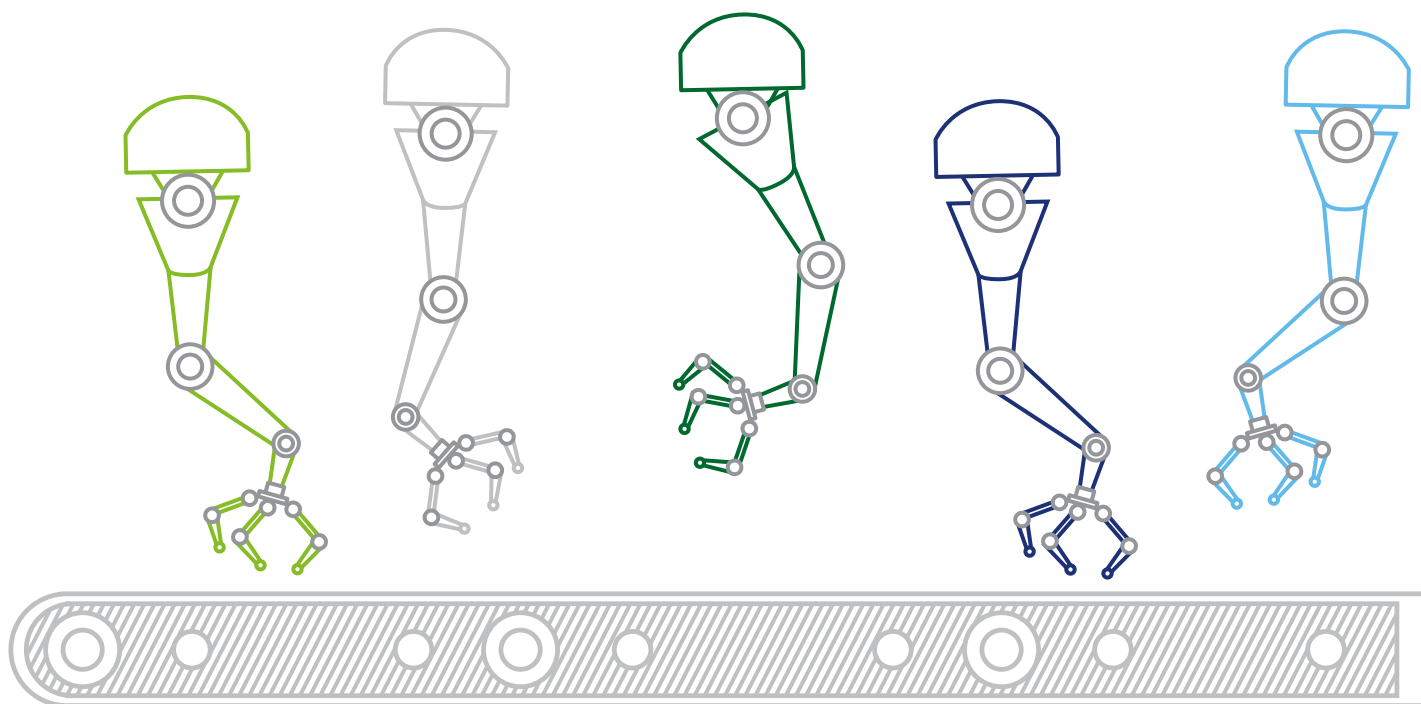
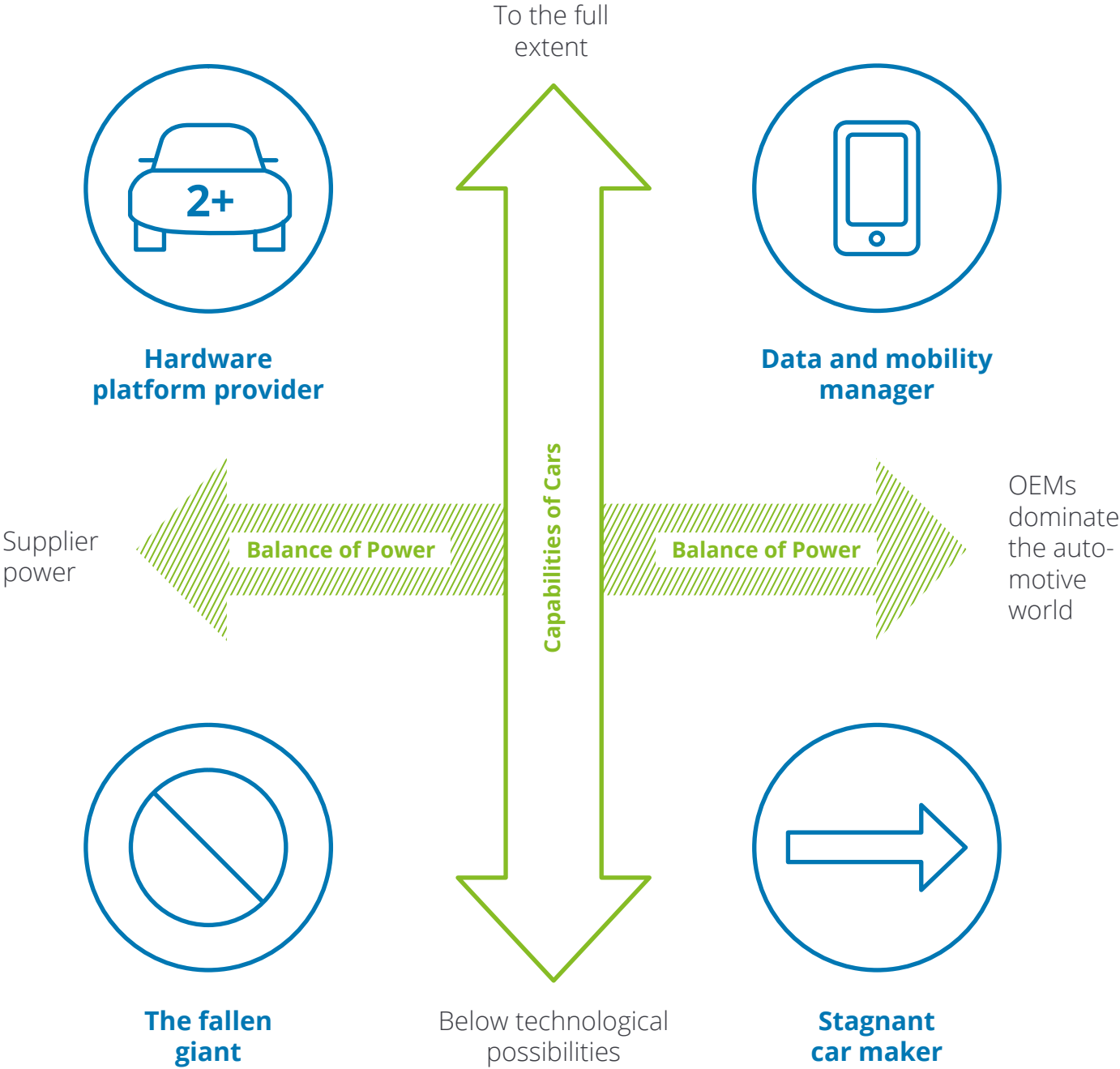
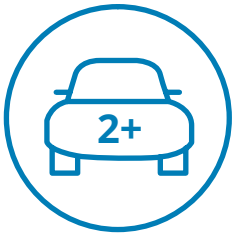


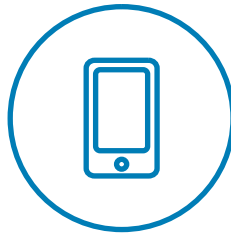
Fig. 5 – Four scenarios for 2025





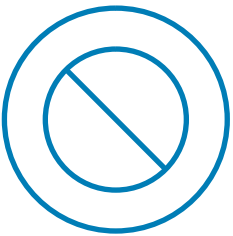
**Scenario 4 –
“Hardware platform provider”:**

IT players have disrupted the automotive value chain. OEMs have mainly become the suppliers of white-label cars to the internet giants. In this world, OEMs can play a relevant role only if they provide a superior platform for ‘infotainment’ and mobility services and / or retain a strong brand image. Since OEMs are not able to fully cash in the revenue potential, the margin per vehicle decreases.



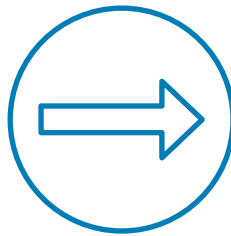
**Scenario 1 –
“Data and mobility manager”:**

In this world, connectivity has become a differentiator. E-mobility (including battery as well as plug-in hybrid electric vehicles, range extenders and fuel cell), autonomous driving, and integrated mobility are a common reality for the broad public. OEMs are able to set the standards and are the dominant players in the automotive industry, offering a rich portfolio of products and services. Innovative automotive outsiders have to play according to the rules set by OEMs. In particular premium brands and status play a decisive role in consumers’ buying behavior. OEMs offer an attractive workplace for talent.



**Scenario 3 –
“The fallen giant”:**

The car is a mere means of transportation and brand attractiveness has diminished. The technology hype has cooled down, which has put an end to the rise of the high-tech car. As mobility has become a commodity, the profit margin has decreased and OEMs are focusing on improving processes and on cost efficiency. Industry outsiders such as Uber have entered the market and are forging exclusive alliances with suppliers to provide affordable mass mobility. Since private car ownership has decreased, fleet management has become of significant importance for OEMs. New talent is hard to come by, due to the loss in the attractiveness of OEMs.

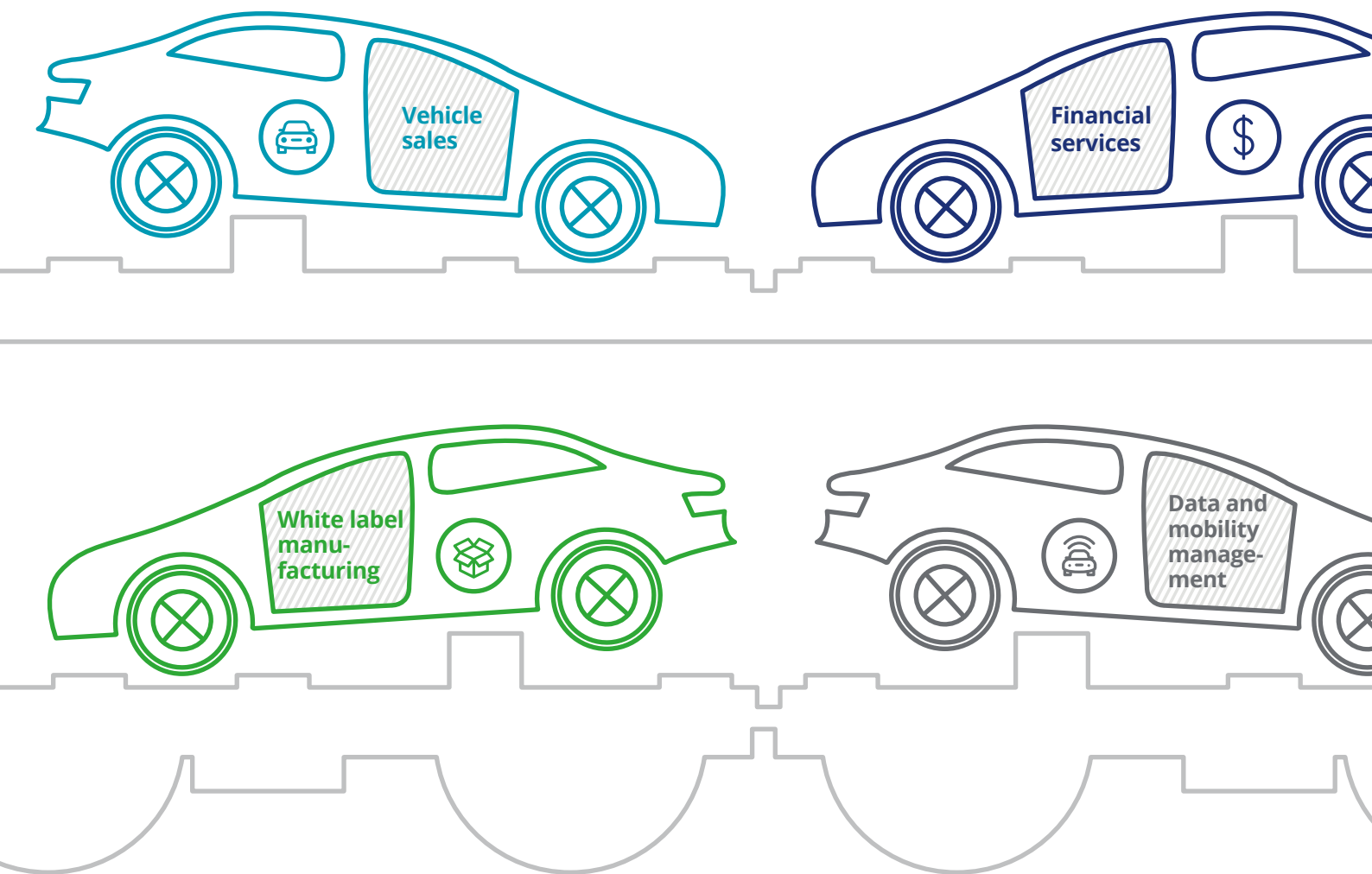


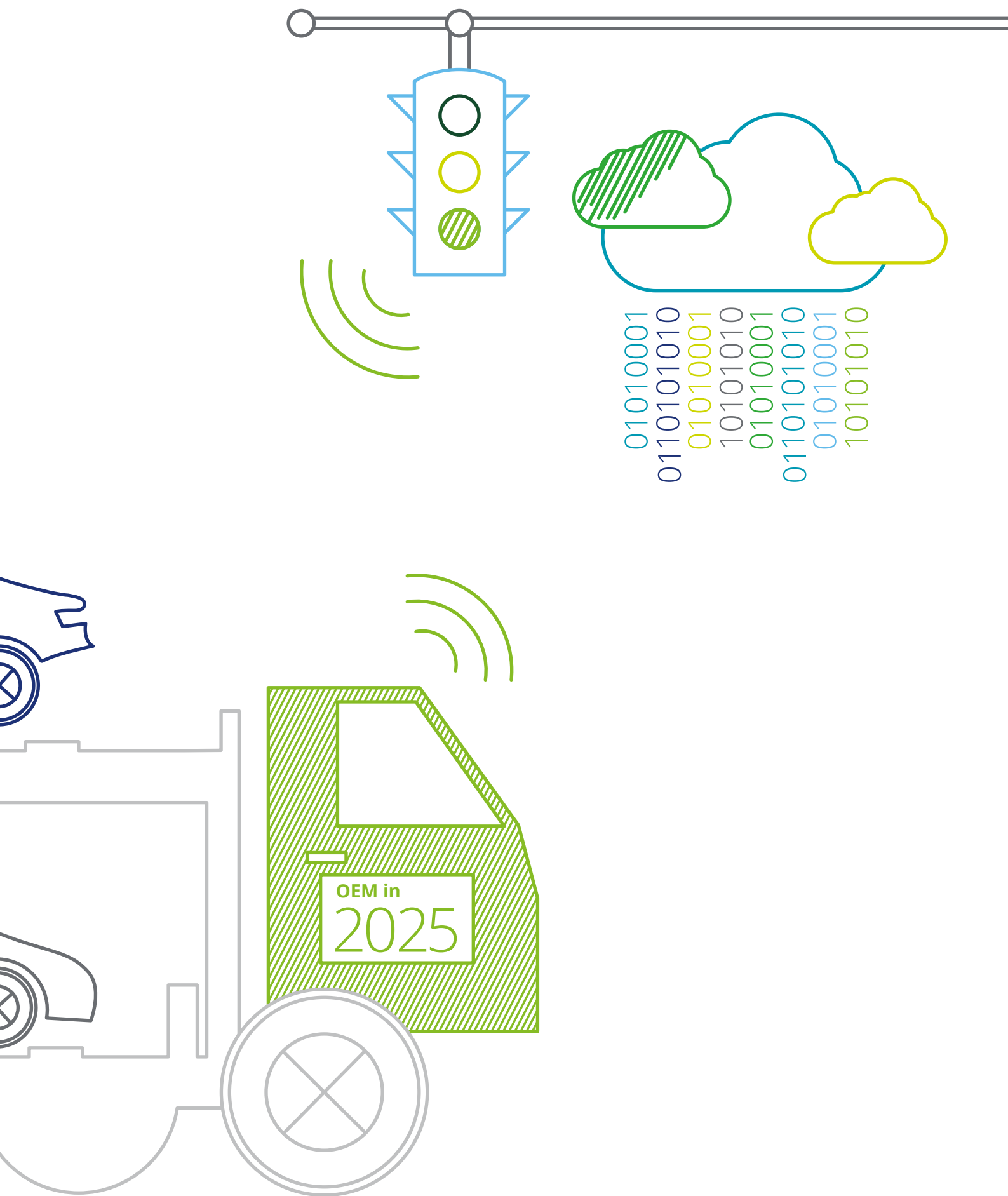
**Scenario 2 –
“Stagnant car maker”:**

Massive lobbying by OEMs has prevented potential new high-tech players from entering the market. However, this defensive strategy has also slowed down technical development, with the result that many potential innovations have not been rolled out to the market, with regulations, for example, limiting the deployment of technology. Dramatic accidents with immature autonomous cars have also resulted in a loss of consumer acceptance.

An OEM in the year 2025

Modeling four business cases for a typical OEM in 2025 indicates: car production will remain the core business, but other business models might account for up to 40% of total revenues. Depending on the scenario, workforce numbers for an OEM (not considering potential workforce growth at suppliers) might drop by up to 50%.





Let's take a look at a prototypical OEM, headquartered in Europe, with no distinct market positioning – serving both premium and volume segments – but with a respected brand and solid profit streams. With an annual turnover of almost € 60 billion and an EBITDA margin of 12.5% it ranges well within the order of magnitude of other European carmakers. EBITDA have been selected as the main KPI for profitability, because they represent the operational profit. Interest, tax, depreciation, and amortization were not modelled, as their future developments do not always have direct links to operational performance and are therefore hard to predict reliably.

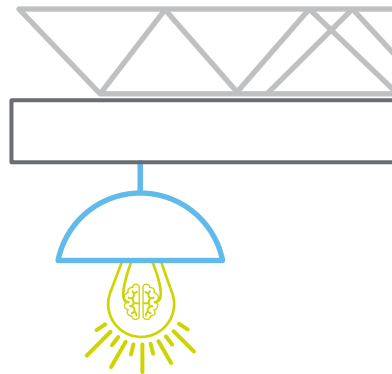
By 2025 the technological advances described above may or may not have materialized. The competitive landscape and the strength along the value chain may or may not have changed. So what could the world look like for this typical OEM in 2025? In the following section we refer to this typical OEM as the “future car company” or simply “the company”, while we refer to car manufacturers as a whole as OEMs.

Today, the company primarily operates two business models: producing and selling vehicles (turnover 2015: € 45 bn) and offering financing services (turnover 2015: € 13 bn). We believe that in 2025 two additional business models will play a significant role for the future car company.

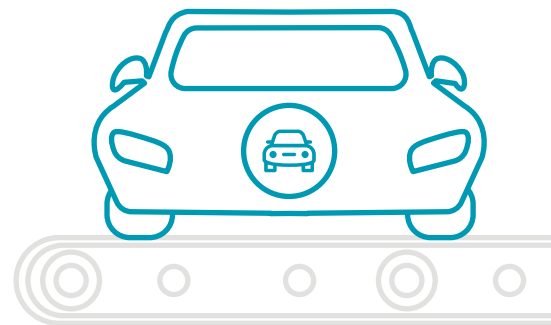
Producing white-label components and vehicles (i.e., unbranded products that are marketed by other players) will have evolved as a third business model – depending on the scenario we look at. The main customers for white-label vehicles will be new market entrants such as Google or Uber. They will focus on their strength, which is user-centric software, while leaving hardware development to OEMs such as the future car company.

As a fourth business model, the future car company will be creating profits from mobility services and user data. On the one hand this includes car- and ride-sharing services (mobility management). On the other the company will generate revenue from connected services and data, i.e. software and apps for information or entertainment offerings as well as other ways of monetizing the large amounts of data available in and around cars.

Despite the anticipated changes over the next few years, the classic core competence of OEMs, vehicle production, is expected to remain the core business.

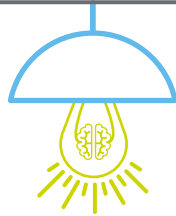
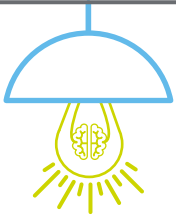


Vehicle sales



Sale of vehicles to private and corporate customers

Future business models of an automotive OEM



Financial services



Financing and leasing offers for vehicles

White label manufacturing



Contract manufacturing of engines, chassis – up to complete vehicles

Data and mobility management

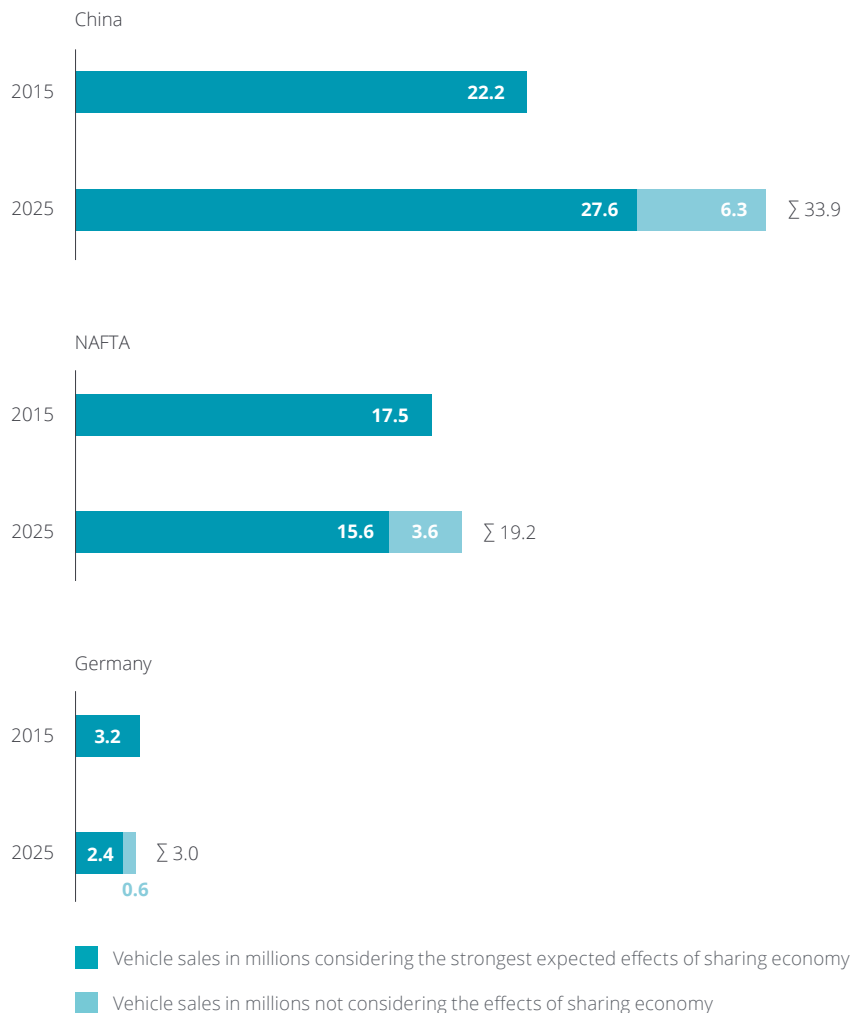


Sharing economy (car and ride sharing), infotainment subscriptions, advertising and further ways of monetizing data

As outlined in Figure 6, the vehicle markets in Germany and NAFTA are saturated, vehicle sales are therefore likely to be rather stagnant up to 2025. However, a further sharp increase in vehicle sales is expected in China (for simplification no other Asian markets were considered in the model). As a consequence, vehicle sales are expected to at least remain stable, despite the influence of the "sharing economy". This will most likely have a negative effect on vehicle sales, as car and ride sharing users are much less likely to buy their own car.

The maturity of each of the four distinct business models will vary strongly, depending on which of the following scenarios and underlying drivers materializes. So let's have a more detailed look at the future car company in each of the four scenarios.

Fig. 6 – Estimated development of vehicle sales in Germany, NAFTA, and China





Scenario 1: Data and mobility manager

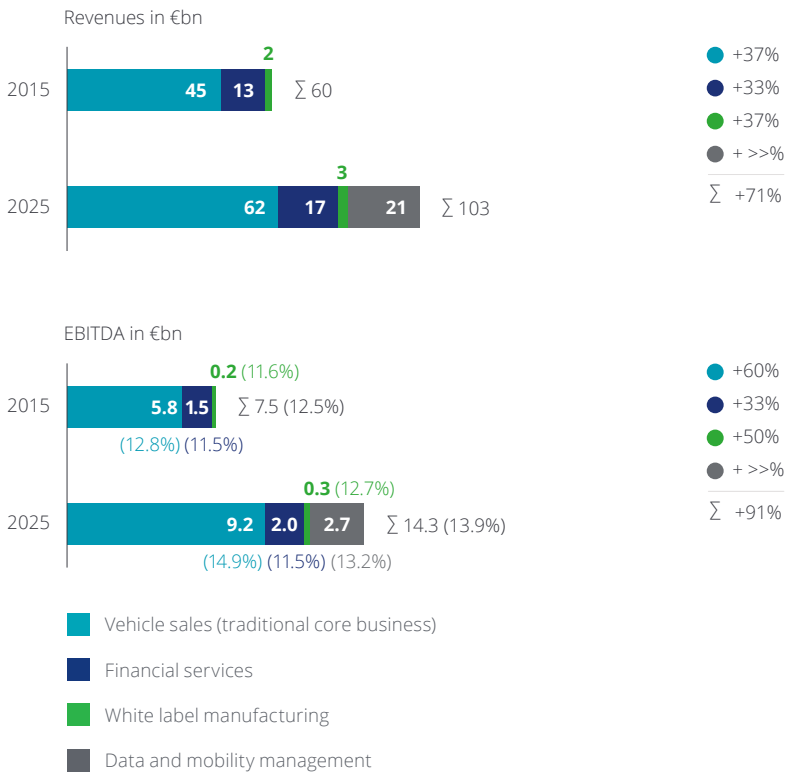
Industry set-up and market environment

In this scenario, connectivity has become a differentiator. E-mobility, autonomous driving, and integrated mobility have become part of life. Consumers demand additional infotainment services, based on platform solutions which are owned and controlled by the future car company. Brand attractiveness plays a decisive role in buyers' behavior. Guaranteeing highest quality standards for autonomous driving technology, batteries, and other high-tech components is a key to ensuring that customer ownership stays with the future car company. In addition to connected services, the value chain has been extended to include smart traffic infrastructure such as charging stations and mobility management systems. Relevant signposts to these developments can already be seen: takeovers such as the map service Nokia Here by the German carmakers Audi, BMW, and Daimler indicate strategic priorities of major industry players that correspond to this scenario.

Fig. 7 – Development of vehicle sales in Scenario 1



Fig. 8 – Scenario 1 – key financials



OEM profit pools

The future car company is a dominant player in the automotive value chain and is still in control of final assembly and powertrain production. Simulation results indicate that car sales have increased by a moderate 7% compared to 2015, as customer demand for car- and ride-sharing has increased significantly. E-mobility has emerged as an important drivetrain technology and alternative drives constitute a large proportion of vehicles sold (33%). Revenues from vehicle production are 37% higher than in 2015, since average vehicle prices have increased due to additional features such as autonomous driving. Furthermore, EBITDA from vehicle sales are 60% higher than in 2015, in particular due to efficiency improvements (Manufacturing 4.0). Revenues from financial services have grown in line with vehicle sales. As the future car company was able to set the standards needed for connected services and modern life infrastructure, it now generates 20% of its revenues and 19% of its EBITDA from mobility and connected services. With a turnover of € 21 billion, the company has a significant share of the estimated total market size of € 660 billion. Across all business models, the future car company is in a very healthy condition with increases of 71% in revenues and 91% in EBITDA.

The car company was able to set the standards for connected services: 20% of overall EBITDA come from mobility and data management by 2025.

Fig. 9 – Current and future procurement focus

	Current focus	Future focus
Hardware	Motor	Alternative powertrains (for BEV, PHEV, REX, FC)
	Interior	Semiconductors
	Chassis	Smart sensors
		Batteries
Software and data	Mobility data (maps, traffic information)	Consumer data
	Assistant systems	Mobility analytics
	Device integration (mobile phone)	Backend development
	Device platform	Artificial intelligence
	Weather data	Service platforms

Value chain structure

(a) Assets

The future car company is successful in this scenario because it has managed to improve efficiency in production and to create capabilities in the field of digital services. On the one hand, massive R&D effort is being put into battery technology development. On the other hand, software and connected service development are being pushed. In addition to internal efforts, the company engages in strategic alliances with IT companies and acquires startups and/or ventures specialized in the fields of autonomous driving, connected services, and big data analytics. Manufacturing is focused on increasing efficiency by embracing the technological opportunities of Manufacturing 4.0 (M4.0). As a consequence, the proportion of manufacturing cost in revenues from vehicle sales has declined by one percentage point.

(b) Supply structure

The supplier pool has been extended horizontally, as the future car company sources sensors, software, and analytics applica-

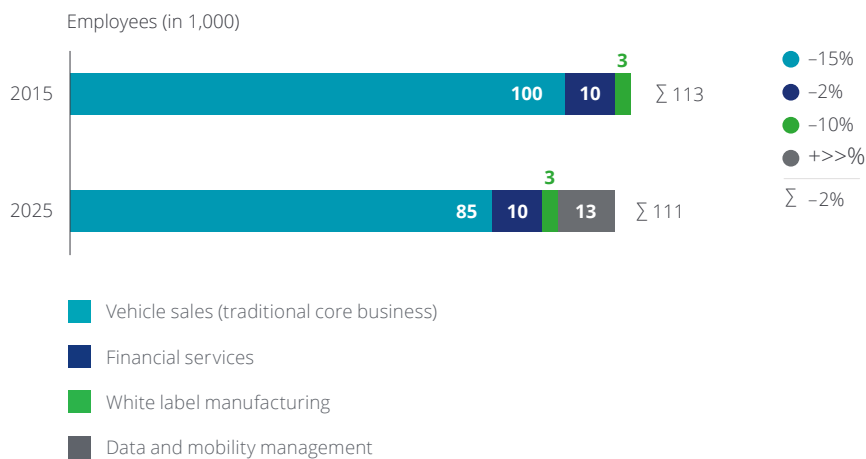
tions from tech giants and specialized companies. This poses challenges, as the future car company will have to deal with these new suppliers at arm's length, which is a totally new situation as compared to its former supplier pool. Newly-established relationships with small companies and tech start-ups are especially complicated to manage, as agility in R&D and decision-making periods are fundamentally different. Strategic suppliers such as Google will also be competitors for mobility services. Bargaining power vis-à-vis traditional suppliers continues to be strong, as the future car company remains the dominant force in the automotive industry.

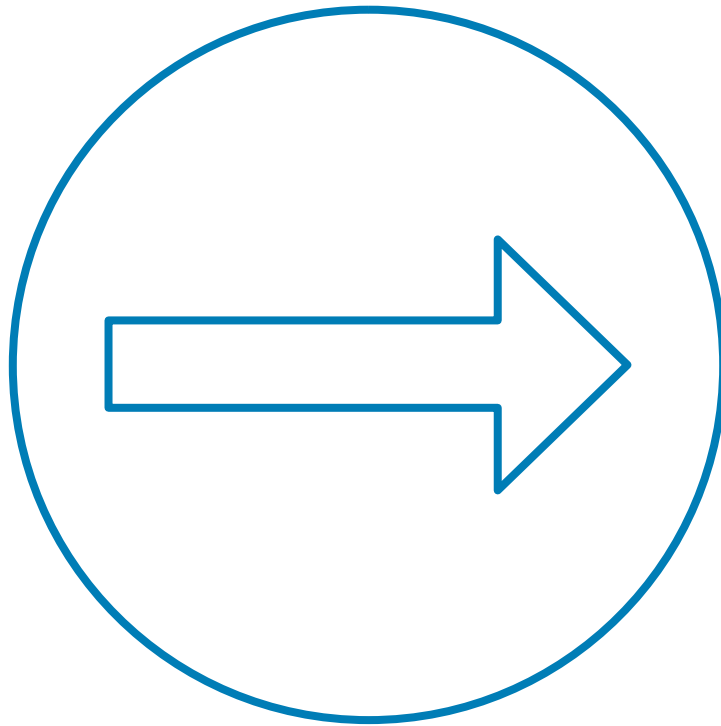
New logistics challenges arise as the rapidly growing shared car fleet needs to be managed, and the use of batteries in cars also requires obsolescence management. Digital logistics channels (e.g., an online vehicle configurator and software updates) and the supply of spare parts for small series will be key success factors for the future car company.

(c) Workforce

The large proportion of electric cars and advances in automation have led to a substantially smaller workforce in production. Twenty percent of employees in manufacturing have had to be made redundant due to e-car production and automation. However, the future car company is an attractive workplace for research and digital talents, as high-tech features and mobility management services are at the center of the company's value proposition. This helps recruit the 13,000 employees needed to build and scale the mobility services business segment.

Fig. 10 – Workforce development in Scenario 1



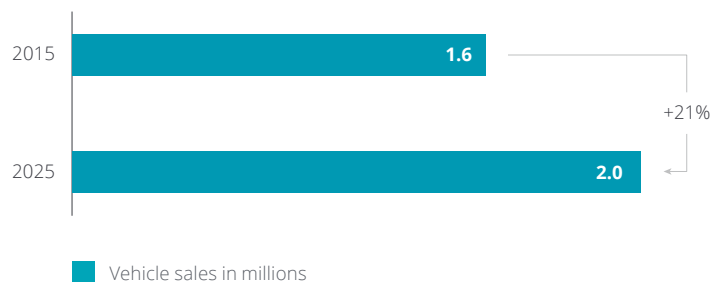


Scenario 2: Stagnant car maker

Industry set-up and market environment

The future car company has won the fight against the market entrants from Silicon Valley. After dramatic accidents with immature autonomous cars, the IT giants have lost their confidence in the consumer acceptance of new technologies and discontinued their adventures into the field of mobility. Regulatory prohibitions such as that of the Californian authorities on test drives of Uber's self-driving vehicles are signposts pointing to this scenario. User data protection issues have become the top priority for customers and legislators and digital add-ons have not made their way into cars on a large scale. The future car company plays on its strengths, such as providing high quality at affordable prices. Digitalization is advancing, but innovations are finding their way into vehicles only very slowly. This scenario is in an unstable state as it does not capitalize on existing technological opportunities for the industry.

Fig. 11 – Development of vehicle sales in Scenario 2

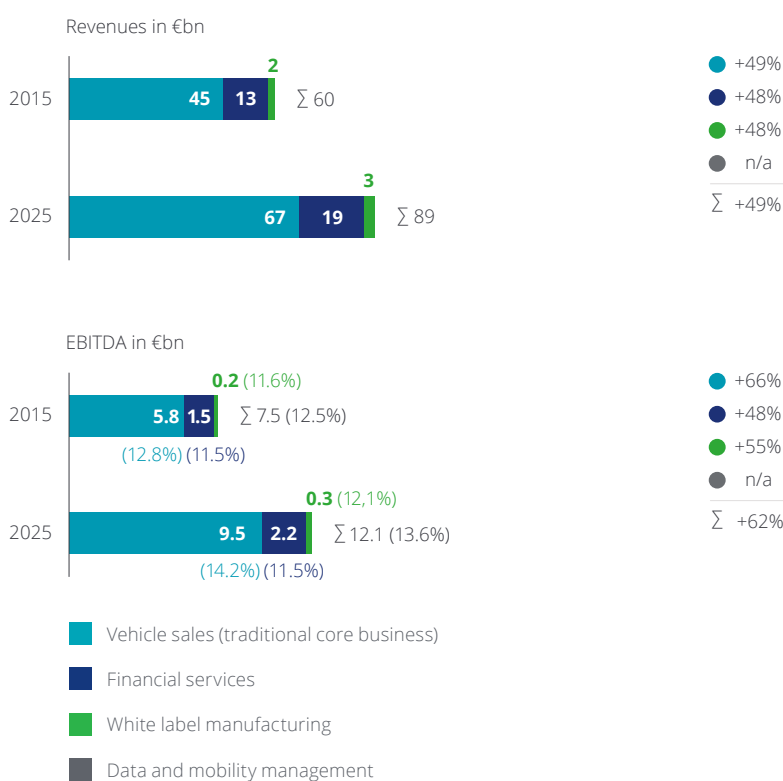


OEM profit pools

As the future car company has maintained its dominance while benefiting from a growing market, it sells substantially more cars than in 2015 (+21%). Vehicle sales are thus still the main revenue contributor with 75% of total revenues. EBITDA from vehicle sales have grown by 66% as efficiency gains due to the deployment of Manufacturing 4.0 and improved supply chain performance management made it possible to grow and improve the EBITDA margin by one percentage point. E-Mobility has emerged as an independent business model, but plays a substantially less important role than in the first scenario (18% of total unit sales). Since the hype about connectivity is gone, mobility and connected services did not emerge as a business model. Across the entire company, revenues have increased by 49%, mainly due to significantly growing vehicle sales and associated financial services. Overall, EBITDA have improved in line with vehicle sales business by one percentage point.

In this scenario, the automotive value chain will not change much, as consumers have lost interest in new mobility technologies.

Fig. 12 – Scenario 2 – key financials



Value chain structure

(a) Assets

In the second scenario, the automotive value chain will not change significantly. Advanced technologies and innovations are still generated hand-in-hand by the supplier. As mobility services do not play a significant role, the focus of R&D lies on the development of efficient combustion engines and new materials and product innovation such as driver assistance systems to preserve unique features.

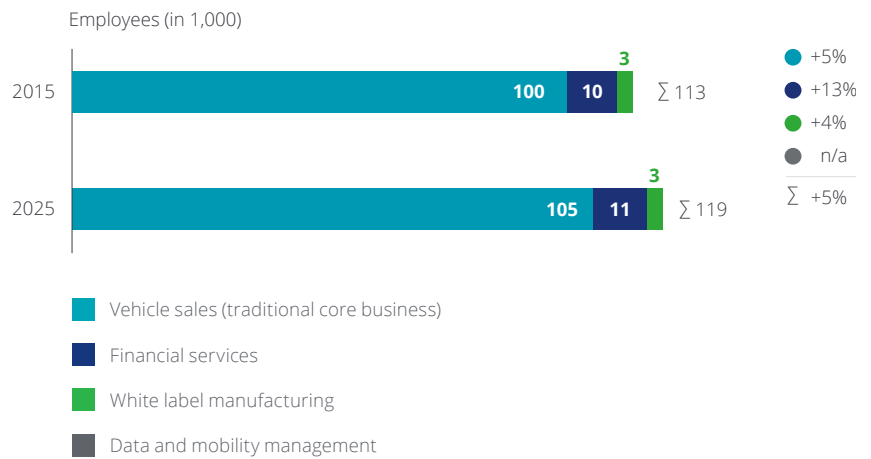
Powertrain production has become more complex, as the – still dominant – combustion engines and alternative drives co-exist. Efficiency improvements and high quality of drivetrain and interior are necessary for successful competition. Production capacities have been built up in order to produce a substantially larger number of vehicles.

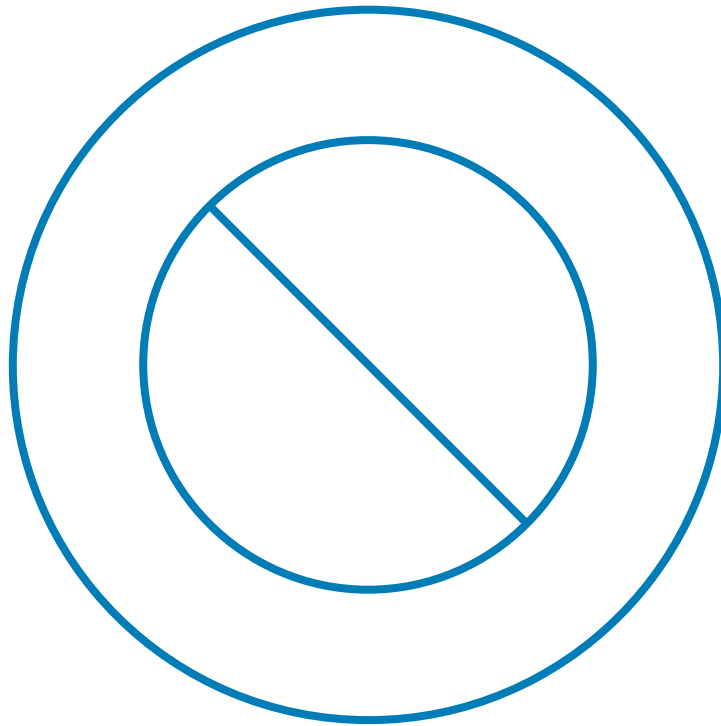
(b) Supply structure

The future car company still has strong bargaining power vis-à-vis its suppliers. The automotive eco-system has not developed much in preceding years in terms of new technologies and players to push them. Only recently has the future car company started to cooperate with innovation partners and start-ups – but on a very moderate scale.

(c) Workforce

As e-cars constitute a relatively small proportion of total vehicles sold, pressure on workforce reduction is low. In this (relative to other scenarios) low-tech environment with increasing sales quantities, the workforce is in fact 5% larger than in 2015.

Fig. 13 – Workforce development in Scenario 2

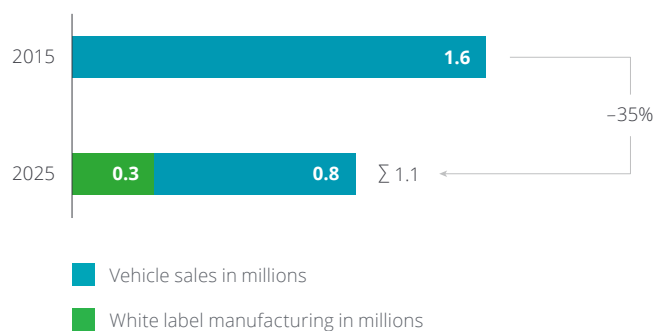


Scenario 3: The fallen giant

Industry set-up and market environment

Regulators and customers have lost faith in the automotive industry – the shift towards e-mobility is reinforced by lawmakers. A current signpost for this scenario is the e-mobility premium offered by the German government, which is used only to a limited extent by consumers. The technology hype about smart cars has cooled down, with one exception: autonomous vehicles have become part of life. Industry outsiders such as Uber have entered the market on a large scale and forged exclusive alliances with dominant automotive suppliers, cities, and infrastructure companies to provide affordable mass mobility. They have mastered the integration of informatics and mechanical engineering and provide superior autonomous driving technology. As a result, the future car company is suffering from this fierce displacement competition, as its brand attractiveness and brand value have diminished. In addition, new talent is hard to recruit due to the loss of the attractiveness of the automotive sector. This puts the brakes on the development of new business ideas.

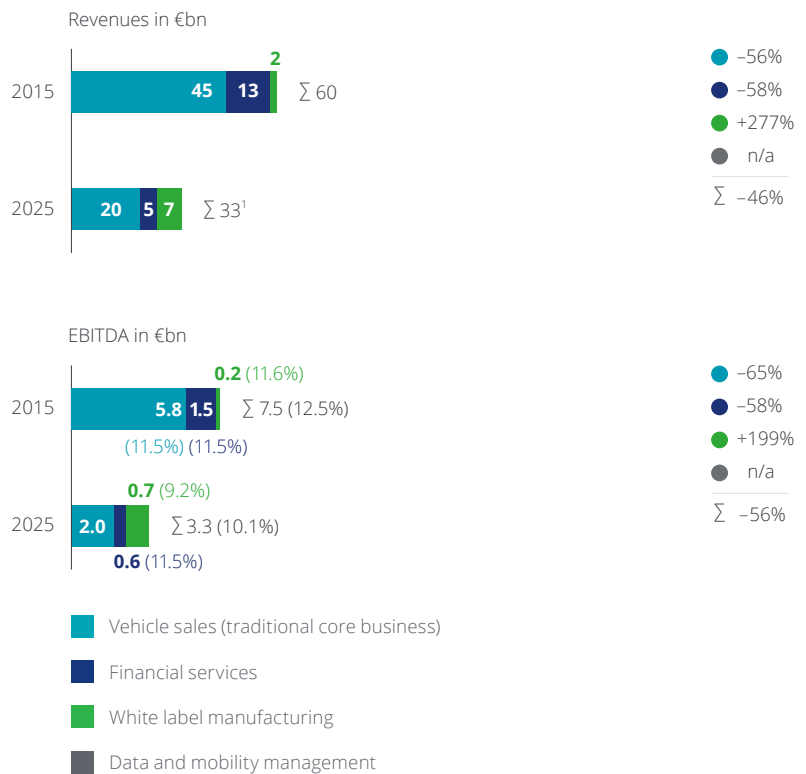
Fig. 14 – Development of vehicle sales in Scenario 3



OEM profit pools

Private car ownership has decreased and the future car company has lost market shares to the growing competition. As a result, revenues from vehicle sales have dropped sharply. As the future car company lost bargaining power vis-à-vis suppliers and was only able to invest in minor efficiency improvements in manufacturing, EBITDA from vehicle sales decreased even more (–65%). However, the company was able by return to extend the white-label business by selling cars and components to some of the new players. The white-label business contributes 22% of revenues and 21% of EBITDA. By contrast, the future car company has not been able to play a relevant role in mobility and connected services. All in all, the future car company is under severe pressure as revenues have decreased by 46% and EBITDA by 56%.

Fig. 15 – Scenario 3 – key financials



Decreasing power over suppliers may result in up to 14% higher procurement cost for the company.

Value chain structure

(a) Assets

As the high-tech hypes have cooled down, the R&D focus is on cost reduction in production. Large-scale, cost-efficient manufacturing processes have gained in importance and the use of robots is maximized. Cost pressure also demands intensified development and production partnerships among OEMs.

(b) Supply structure

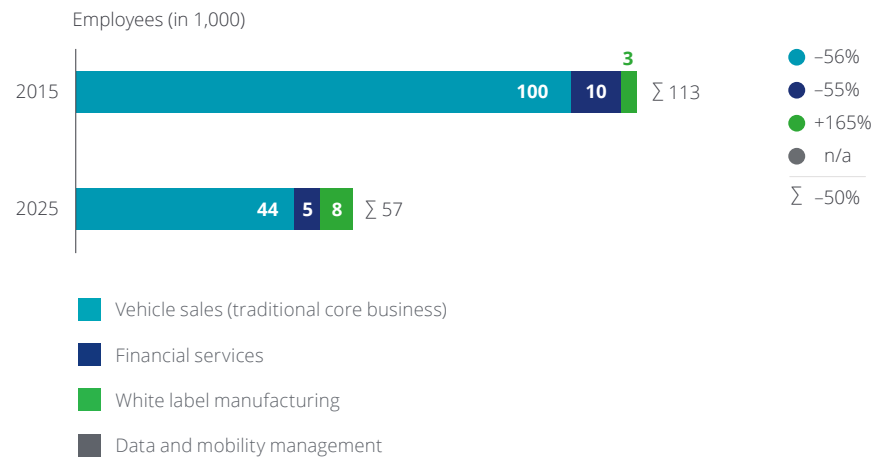
Bargaining power has suffered due to partnerships between suppliers and the new mobility providers. This has also led to supply bottlenecks, as the future car company is no longer a top priority for its suppliers. The future car company has therefore had to increase its depth of added value through insourcing and forging alliances with other OEMs. Cost pressure demands the improvement of supply chain efficiency through demand management.

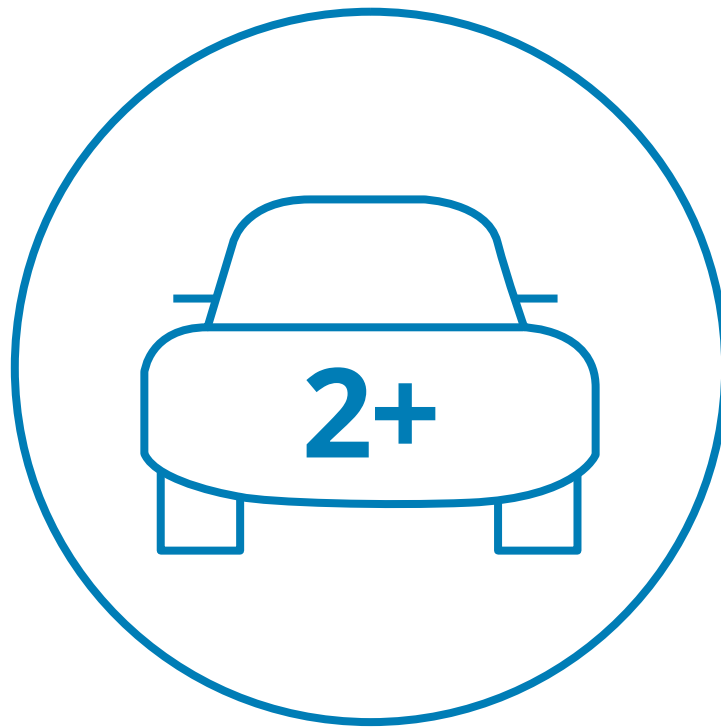
¹ The totals may differ from the sum due to rounding.

(c) Workforce

The smaller number of cars produced and the immense pressure to reduce costs have led to a substantial shrinking of the workforce so that the future car company employs 50% fewer FTEs than in 2015.

Fig. 16 – Workforce development in Scenario 3



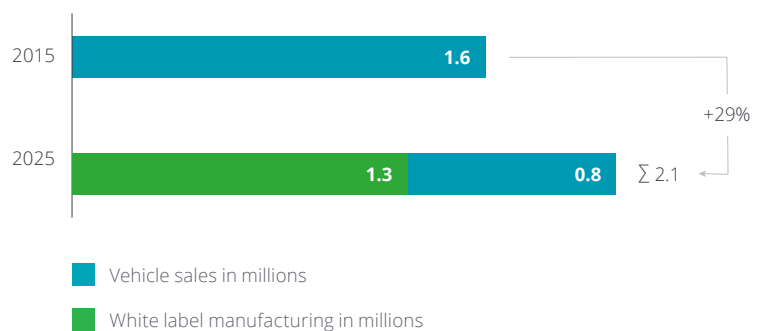


Scenario 4: Hardware platform provider

Industry set-up and market environment

Cars have become software-based high-tech products with standardized interfaces comparable to today's smartphones. Tech players from Silicon Valley and other hot spots have gained critical access to the automotive world, provide key elements of the software, and have captured the mobility and data management service business. Many customers choose cars labeled by these new tech players, for whom the future car company now produces only the shell and the platform. In a small and exclusive premium segment, however, customers are still interested in buying directly from the car company. Liability situations are complex due to the multilayered production process of the company as a white-label producer, with the Silicon Valley players building their solution on top. Is not the presentation of autonomous cars based on a Chrysler platform by Google's sister company Waymo at the 2017 Detroit Auto Show a signpost to such a development?

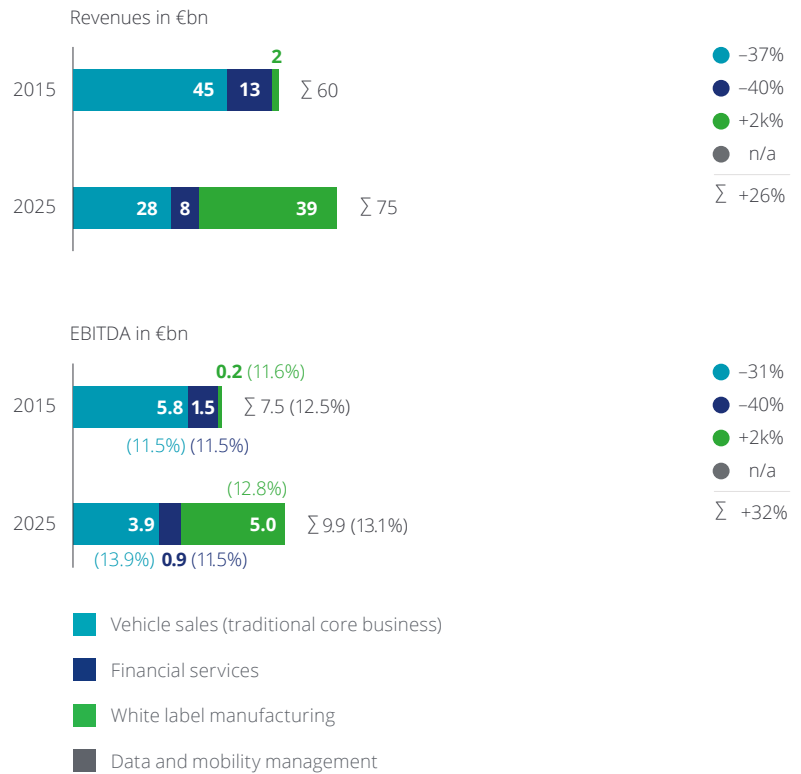
Fig. 17 – Development of vehicle sales in Scenario 4



OEM profit pools

The future car company is struggling to create the same brand appeal to private customers it used to have. The private car customer base – and consequently the number of cars directly sold to the end user – is 52% narrower than in 2015. Vehicle sales thus only contribute 37% to total revenues. However, as the remaining vehicles are sold primarily to the premium segment, the EBITDA margin on vehicle sales is stronger than in 2015. Business in financial services is shrinking in line with lower vehicle sales. Revenues and EBITDA from financial services are thus 40% lower than in 2015. However, by selling an additional 1.3 million white-label vehicles to business partners, the total sales volume could be increased to 2.1 million units. The white-label business is now even the OEM's main business (52% of overall revenues). As the dominant automobile platform provider and significant efficiency gains in production processes (Manufacturing 4.0) were achieved, EBITDA margin in the white-label business is strong (13%). Mobility services do not play a role, since value-added digital services and shared mobility are operated by other players. All in all, the future car company is in a good position with high revenues (26% higher than in 2015) and strong EBITDA (32% higher than in 2015).

Fig. 18 – Scenario 4 – key financials



Value chain structure

(a) Assets

The key priority for R&D is to further develop system interfaces in order to remain the dominant platform. In addition, the company is aiming for hardware improvements while leaving major parts of software development to the new players from Silicon Valley. R&D has become more complex, as the future car company has to consider the input of B2B customers who want to influence the development process. As the platform provider, the company needs to manage these different interests and also the significantly different lifecycles of automobiles and computer hardware. In effect, R&D expenses have increased in relation to revenues. Manufacturing needs to become more flexible in order to fulfill the requirements of white-label customers. For example, factories may have been moved closer to business partners, triggering major investment. Modularity of production processes is high in order to achieve flexibility with regard to hardware and software lifecycles.

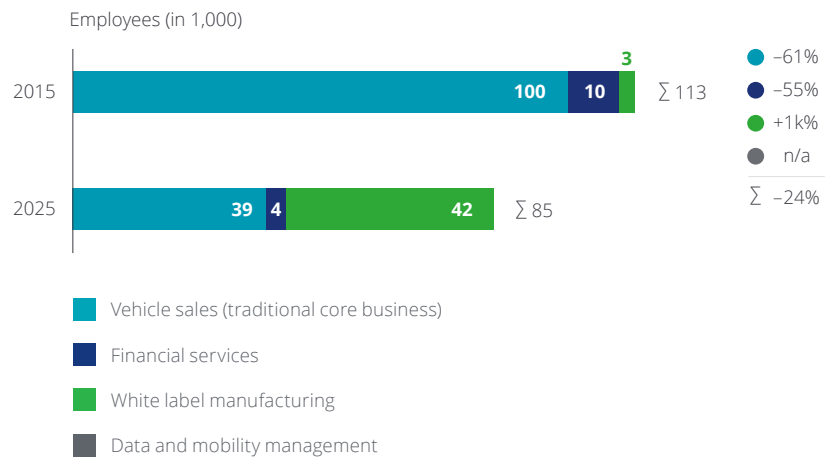
OEMs should open up their platform and engage in cooperative ventures.

(b) Supply structure

Since bargaining power vis-à-vis suppliers has decreased, the company has had to invest in its relationships with software and analytics providers. The flexibility of logistics is greater than in 2015, as the future car company has to follow the expectations of B2B customers. 3D-printing is helping to supply spare parts for small series. Maintenance of the rapidly-growing sharing economy fleet is a key issue from the logistics point of view.

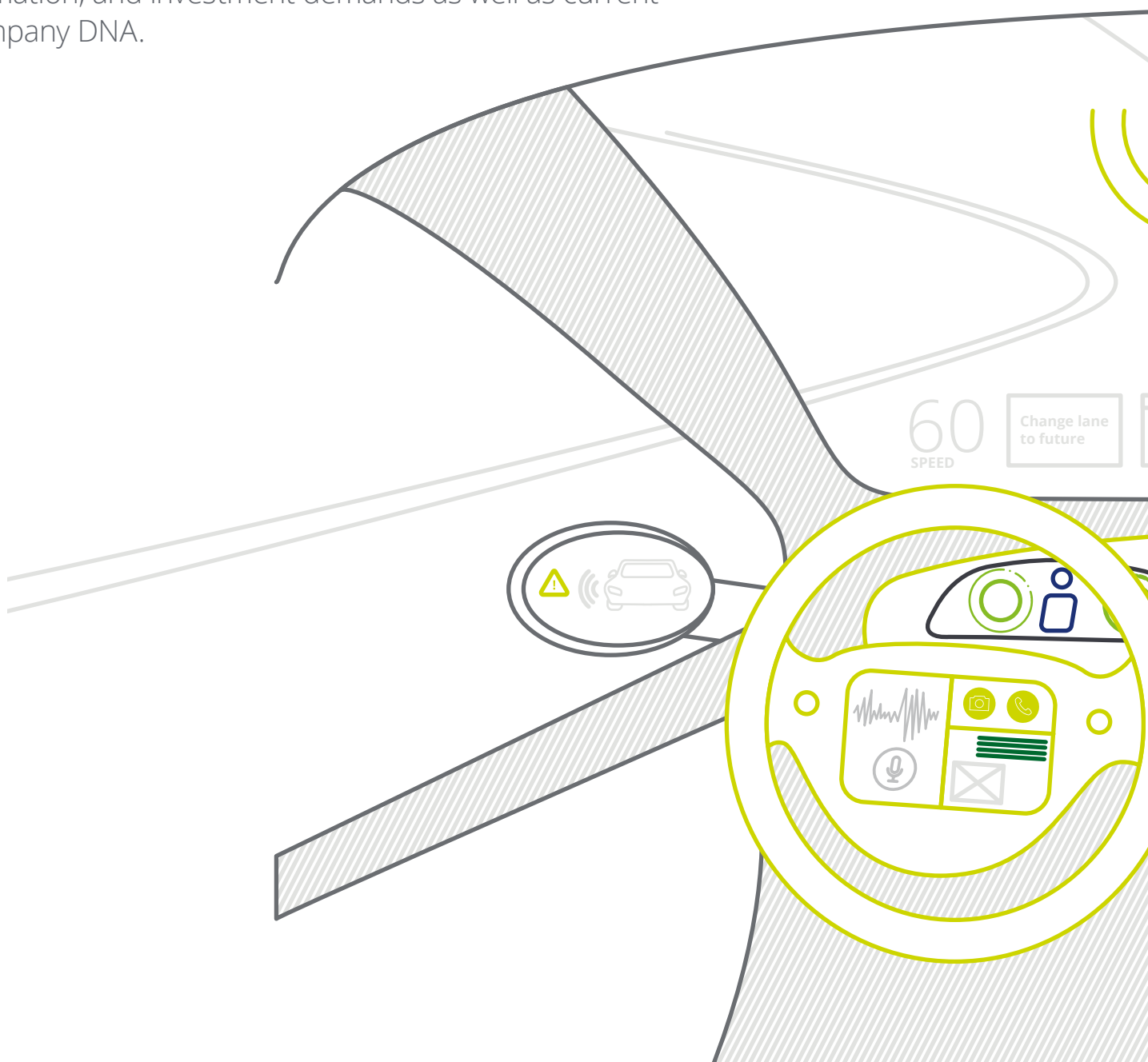
(c) Workforce

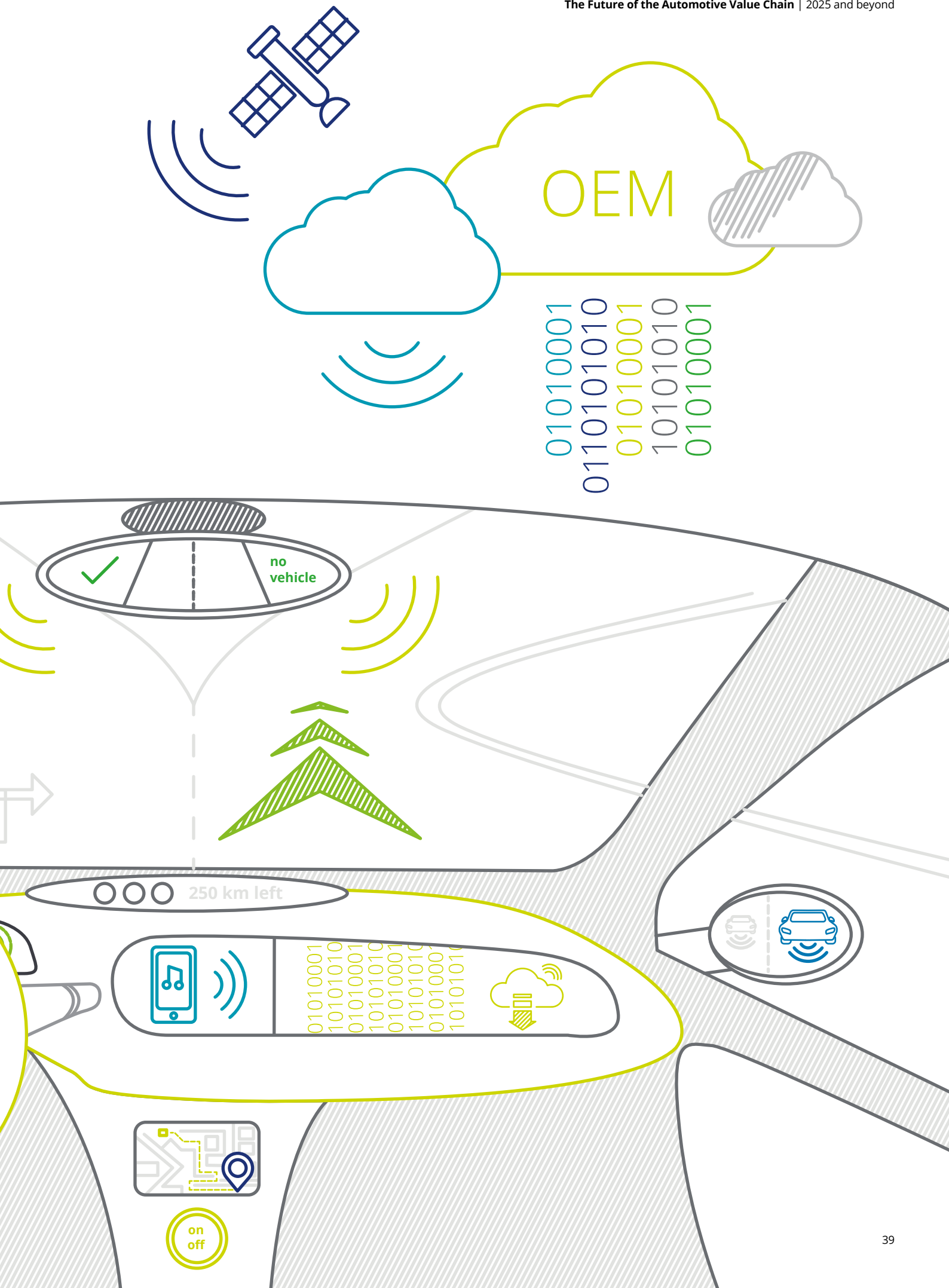
Since the future car company produces a large proportion of e-cars and has invested in automation, the workforce has decreased by 24% – despite higher revenues.

Fig. 19 – Workforce development in Scenario 4

Transformation paths towards the value chain of the future

Six key strategic fields of action should be at the core of every OEM's transformation agenda. Depending on the desired scenario in 2025, OEMs will have to assess each of them according to their current capabilities, transformation, and investment demands as well as current company DNA.





Shaping the path towards 2025

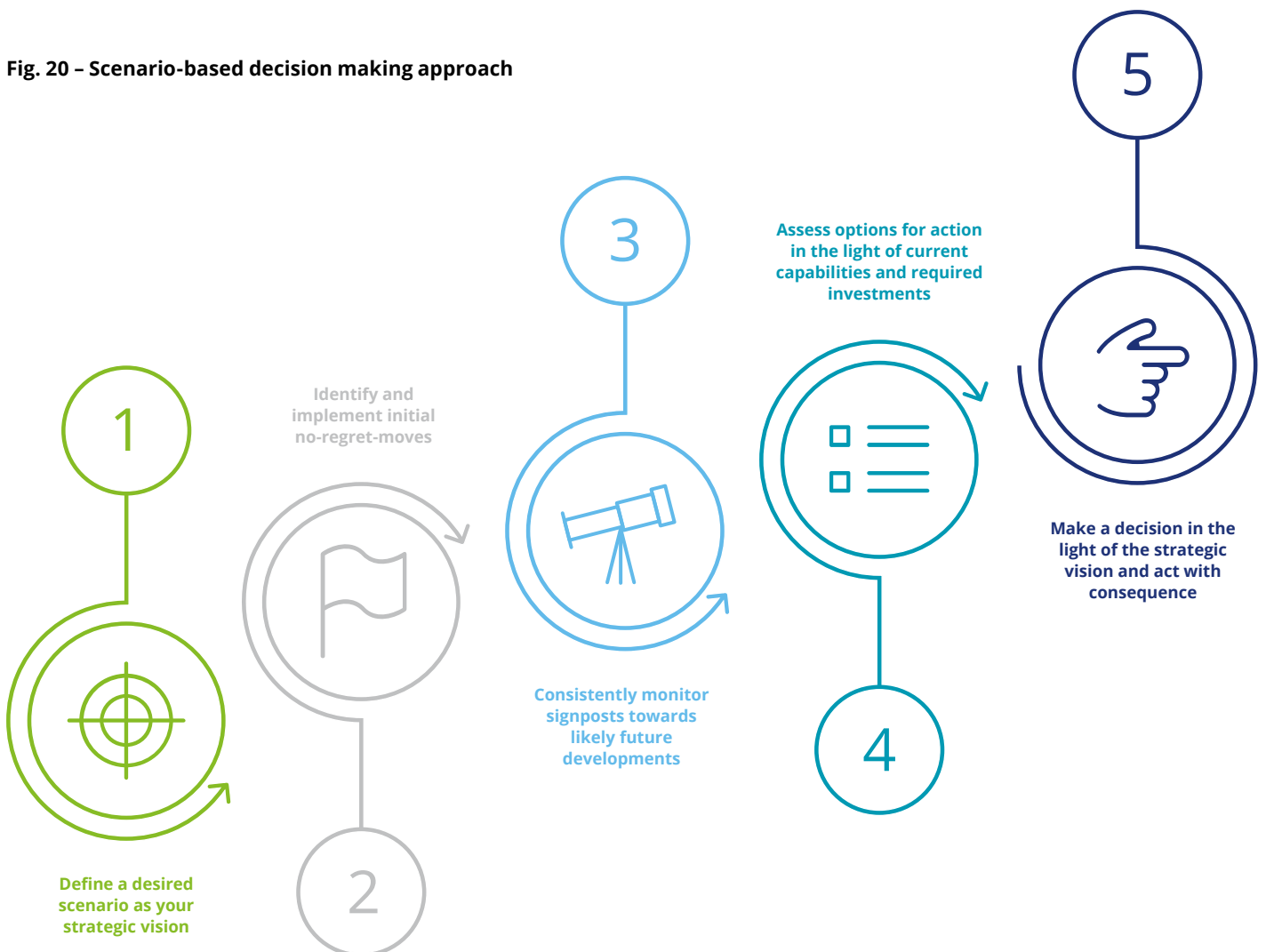
The transformation of profit pools and the value chain to 2025 will be the result of a series of decisions by OEMs. Along the transformation path, OEMs will have to make decisions that will have a major, often irrevocable impact on assets, people, and the supply structure. However, the future does not lie entirely in the hands of the OEMs. It also depends on the moves of other players, regulators, and the speed of technology development in general. OEMs therefore need to position themselves towards a clear target picture, perhaps investing at times in order to get “a foot in the door” – while accepting that some of these investments will end up as sunk costs. Our recommended decision-making method in the face of high uncertainty follows this process:

1. Define a desired scenario as your strategic vision
2. Identify and implement initial “no-regret-moves”
3. Consistently monitor signposts towards likely future developments
4. Assess options for action in the light of current capabilities and required investments
5. Make a decision in the light of the strategic vision and act with consequence

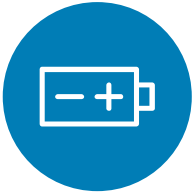
From everything we know about the key trends and drivers for the automotive value chain, we selected six top strategic fields of action, which all automotive decision-makers are most likely to be dealing with up to 2025.

Wherever possible, we have in the following added quantitative outputs from our modeling, illustrating the implications, either for market developments in one or several scenarios, or for an OEM acting in a scenario, i.e. the “future car company” introduced in the chapter above. Therefore, especially statements regarding EBITDA, workforce, and others always relate to the “future car company” and not the the industry as a whole.

Fig. 20 – Scenario-based decision making approach



Signature priorities for the value chain transformation of a generic OEM towards 2025 and beyond



E-Mobility: **Develop and source for an electrified product portfolio**

In 2025, between 18% and 36% of all cars sold in the market will have alternative drives – either customers or regulators will drive demand. The OEM offers an attractive workplace for talents



Autonomous driving: **Focus R&D efforts on self-driving vehicles**

Top quality offering through development alliances and lobbying towards a clear liability situation is crucial – but only in markets that fully accept and foster technological possibilities



Sharing economy: **Adjust your value chain towards shared vehicle use**

The OEM's vehicle sales potential might be cut by up to 23% due to widely accepted car sharing offerings – building dedicated business only advisable if OEM maintains dominance in the value chain



Digital business models: **Build profit pools around data and media**

Infotainment and mobility services can contribute up to 20% of total revenue and 19% of the OEM's EBITDA – if technology and customer preference keep evolving at today's high pace



Manufacturing 4.0: **Build the smart factory and administration**

Efficiency gains in plant and back offices can improve total EBITDA of the OEM by up to 20% and are a prerequisite for future profitability – irrespective of scenario differences




Workforce transition: **Prepare for restructuring**


Strong variance in workforce implication per scenario: Up to half of the OEM's production jobs are at risk, while up to 13,000 IT talents might be needed by 2025


Fig. 21 – Signature transformation priorities for "the future car company", detailed to implications by scenario













	E-Mobility	Autonomous driving	Sharing economy
 Data and mobility manager	 <p>33% of all cars sold will have alternative drives – broad product range (BEV, PHEV, REX, FC) crucial for market success</p>	 <p>Customers expect self-driving cars – OEMs need it as a prerequisite for lucrative digital business models</p>	 <p>Vehicle sales will be down by 24% due to car sharing offerings – participation in new profit pool crucial</p>
 Stagnant car maker	 <p>18% of all cars sold will have alternative drives – while customer pull is low, regulators might push the agenda</p>	 <p>Technology hype cools down – high-tech cars are marketable only in premium niches</p>	 <p>Overall vehicle sales potential for the future car company is reduced by 10% due to car sharing – own offering to be used to differentiate in the market</p>
 The fallen giant	 <p>21% of all cars sold will have alternative drives – regulators expectations to be met as far as investable funds allow</p>	 <p>Cars are mere vehicles for transportation – investment only relevant for premium segments</p>	 <p>Vehicle sales will not be significantly affected by car sharing offerings – no need to invest</p>
 Hardware platform provider	 <p>36% of all cars sold will have alternative drives – leading platform must include electrical vehicles</p>	 <p>B2B customers will only accept platform for connected services if top quality self-driving ability ensured</p>	 <p>The future car company's overall sales potential will be down by 24% due to car sharing – business in hands of tech giants and OEM with limited B2C exposure</p>

 **Potential deal breakers:**
Must-Do in order to avoid major business risk in scenario

 **Key initiatives:**
Fundamentals for business success in scenario

 **Differentiators:**
Ways to outperform competition in scenario

 **Not applicable**

Digital business models	Manufacturing 4.0	Workforce transition
 <p>Digital business models can contribute 20% of the total revenue – investment should be made to develop new types of products and service offerings</p>	 <p>M4.0 potential driver for competitiveness in terms of manufacturing efficiency, product prices, and quality (and further upside through improved cost control)</p>	 <p>Up to 15,000 of the future car company's employees in production might become redundant whereas 13,000 need to be hired</p>
 <p>Digital services are not the focus of customers' interest, investment worthwhile only to address premium segments</p>	 <p>M4.0 potential prerequisite for competitiveness in terms of manufacturing efficiency, product prices, and quality</p>	 <p>The future car company needs to hire 6,000 employees due to increasing vehicle sales and large remaining share of combustion engines</p>
 <p>Customers have lost trust in the future car company's ability to innovate, investment would most likely be unprofitable</p>	 <p>In order to remain competitive through cost reductions, efficiency gains from M4.0 are indispensable for survival</p>	 <p>Up to 56,000 of the future car company's employees become redundant due to decreasing vehicle sales and required cost savings in production and administration</p>
 <p>The market for digital services is growing enormously, but competition from IT-giants is difficult to defeat</p>	 <p>To provide superior platforms and fast response times to customer requirements, large scale deployment of M4.0 is essential</p>	 <p>Up to 28,000 of the future car company's employees become redundant due to decreasing vehicle sales and efficiency gains through M4.0</p>

The amount of invested funds and resources must be aligned to scenario requirements and the OEM's existing capabilities in each area.

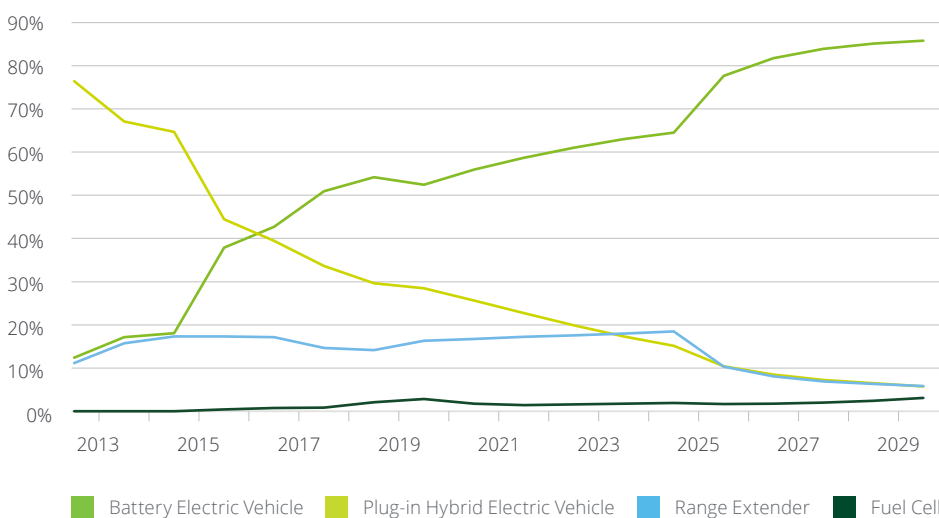
The following chapter will exemplify recommended transformation paths from the perspective of two different deciders: one who wishes to position him or herself in Scenario 1 ("Data and mobility manager"), and another who considers Scenario 4 ("Hardware platform provider") as the most attractive vision for 2025 from a strategic point of view.

Capabilities and production capacity for e-mobility

E-mobility (including alternative powertrain technologies such as battery electric vehicles, plug-in hybrid electric vehicles, range extenders or fuel cells) has been gaining traction over the last few years and is likely to continue to do so. Firstly, as battery development is advancing, e-cars are getting cheaper and more customers will consider buying an e-car. Secondly, regulation is likely to accelerate the development of e-mobility further. The Deloitte e-mobility model provides orientation on scenarios and market distributions of alternative powertrains, including total sales broken down by country, customer segment as well as powertrain technology and market share by the future car company's vehicle segments.

The simulation results for both scenarios 1 and 4 suggest that up to one-third of all cars sold could be equipped with alternative drives in 2025. And this trend will continue further: our model suggests that in both scenarios, sales of combustion engines might have nearly disappeared by the year 2030 in the three markets under consideration (China, Germany, NAFTA).

Fig. 22 – Deloitte e-mobility model – market share development of alternative drives for China, Germany, and NAFTA (Scenario 4)



The probable growth of e-mobility is associated with one big decision: should the OEM produce batteries itself or buy them from other producers? The impact of this decision is major, as upfront investment will be in the billions. During the first years, utilization of a large battery plant and hence profitability are likely to be low. Moreover, it will take a tremendous R&D effort and/or M&A activity to establish the OEM as a

cutting-edge battery producer. However, the in-house production of batteries has the advantage of controlling a substantial part of e-car value creation (the battery pack represents between 25% and 40% of value added to an e-car). Market demand is likely to grow significantly and batteries are expected to remain expensive over the next few years.

The development of the price of batteries is absolutely crucial to the market acceptance of electric vehicles.

Fig. 23 – Deloitte e-mobility model – Development of alternative drivetrains

Annual sales of alternative drivetrains in million car sales and share of total vehicle sales
(Model incorporates data from China, NAFTA, and Germany)

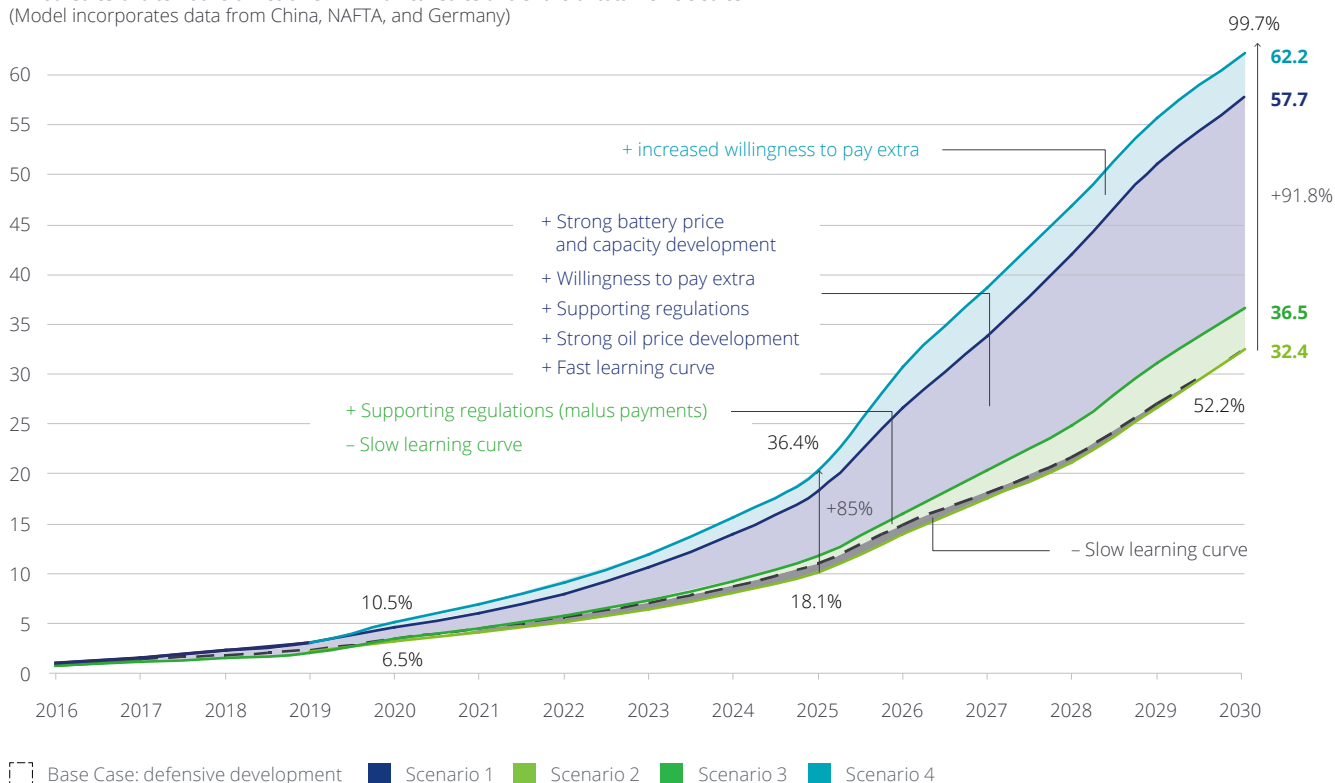
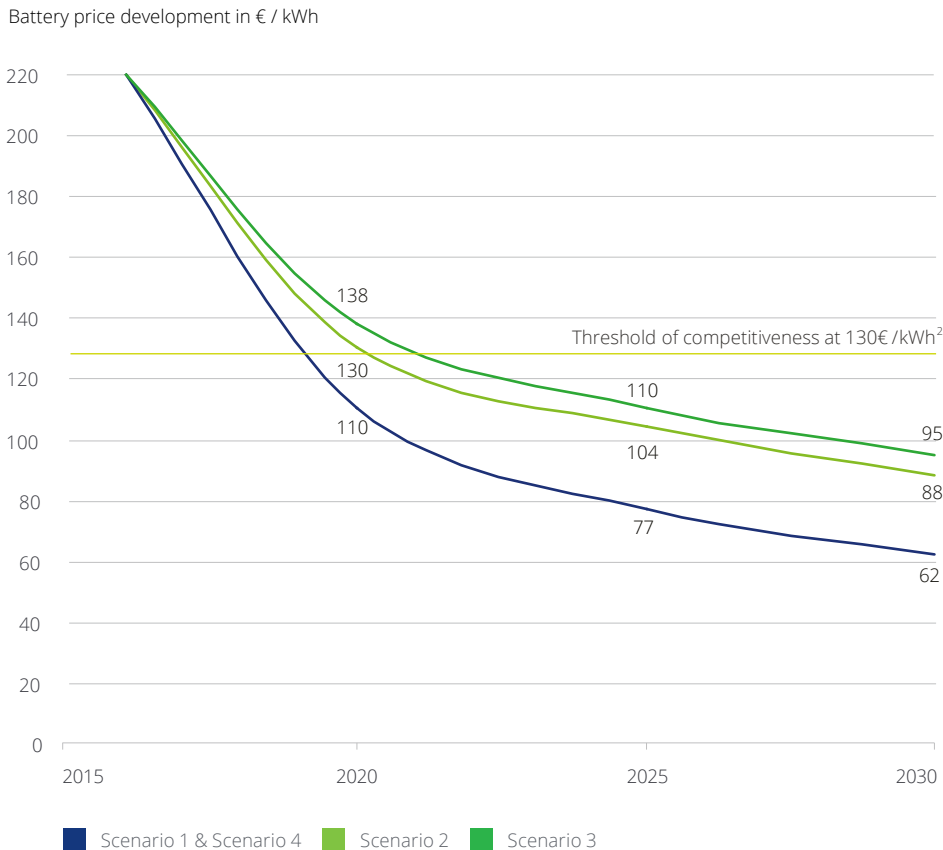


Fig. 24 – Deloitte e-mobility model – Battery price development

Most OEMs have already shifted significant funds into e-mobility investment. With the ambition to establish in Scenario 1, it is further necessary to not only invest in the development of e-cars, but also to prepare production capacity for rapidly growing customer demand and define standards for the corresponding infrastructure, especially with regard to charging technology. For that purpose, close cooperation with public authorities is to be recommended. For car manufacturers aiming to succeed in Scenario 4, cost-efficient production of alternative drives and vehicle platforms should be in the focus.

Although the approach to a future of e-mobility is different in both scenarios, alternative drives should be a top investment priority of any OEM. Since necessary expenses are immense in both cases, attention must be paid to signposts in the direction of market and consumer behavior. Although classic OEMs are credited with e-mobility, new players such as Tesla enjoy a higher reputation and confidence for e-vehicles through their stronger determination. With the i-series, however, BMW has preempted the ability of OEMs to tackle the topic, even if market success was less than expected. Others are working on it. Those who have not started yet will have to think about alliances, partnering or other clever ways of catching up fast.

² Source: Fraunhofer-Institut ISI (2015): Gesamt-Roadmap Energiespeicher für die Elektromobilität 2030; VDI News 04/2016: Batteriepreise sinken schneller als erwartet; Automobilwoche: 09/04/2016 – Batteriekosten sinken rapide

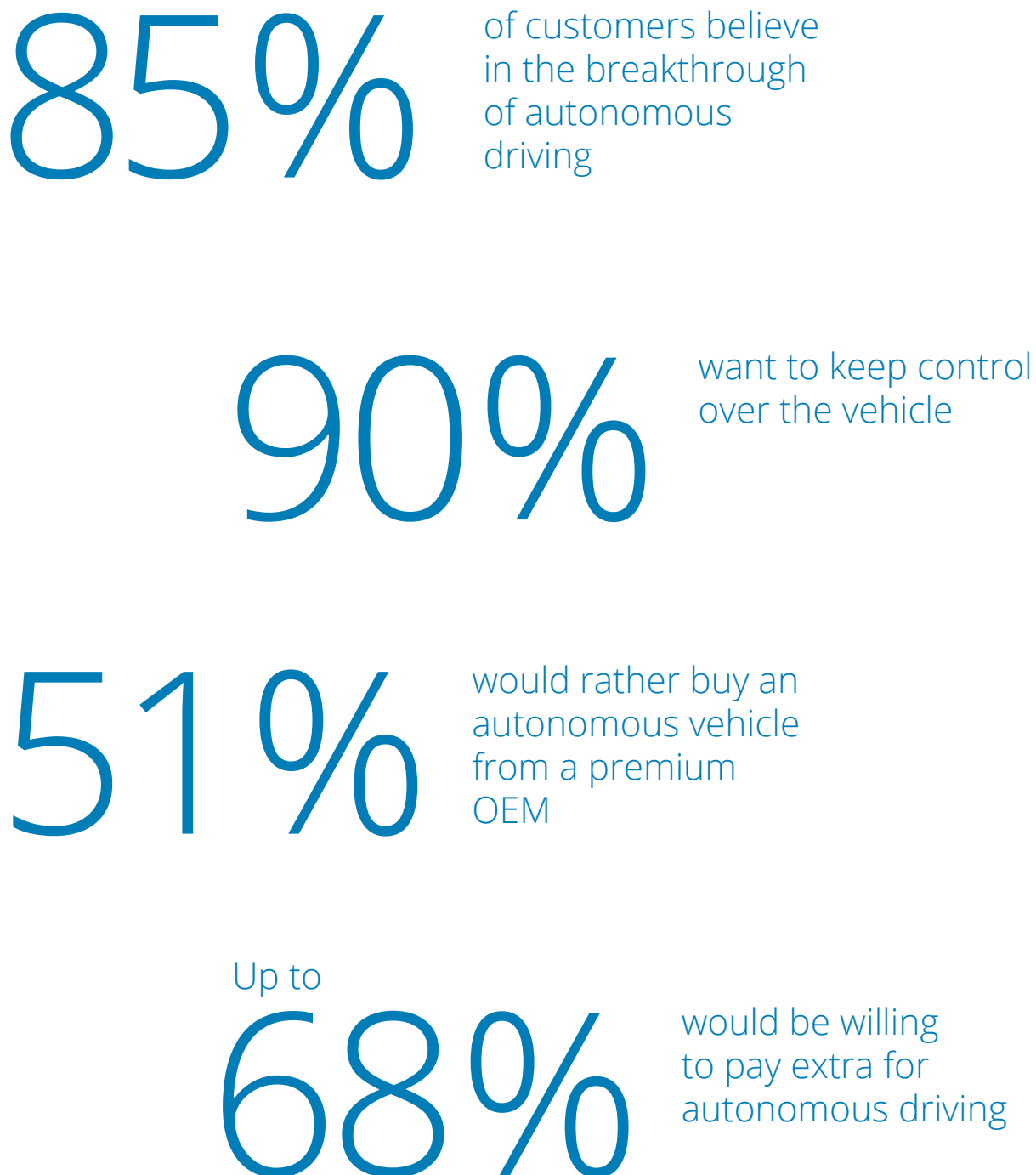
Embracing autonomous driving

Like investing in e-mobility, building capabilities for autonomous driving is a "no-regret-move" in all scenarios from our point of view. While autonomous driving seemed farfetched only a few years ago, it is on the verge of becoming common reality, as multiple players are pushing the technology. However, in addition to technical advances, the impact of this technology on the future of mobility also largely depends on customer acceptance and favorable regulation. Especially for commercial vehicles, autonomous driving is an attractive business case. For private users it will further gain importance as mobility and work-life balance are becoming more and more relevant. However, doubts about self-driving vehicles still exist. A survey conducted by Deloitte among 2,100 drivers in Germany (see Deloitte, "Autonomes Fahren in Deutschland – wie Kunden überzeugt werden" and Figure 25) showed that 85% of participants believe in the breakthrough of autonomous driving, however, 65% would currently not trust the technology. For almost 90%, it is essential to retain control of the vehicle. However, the survey also revealed that measures such as safety statistics or live demonstrations could significantly increase interest and trust in autonomous vehicles. Depending on the traffic situation, up to 68% of participants are even willing to pay an extra charge for autonomous driving. It seems likely that customers – and regulators –

will get used to the technology and will accept autonomous vehicles once they are evidently safe. For OEMs, this means that the development of reliable autonomous driving technology is the key to being able to participate in future mobility markets. If this has not already been done, R&D budgets will need to expand when aiming for the high-tech Scenario 1. Alliances – such as the cooperation between BMW, Intel, and Mobileye – might be a feasible way to support this. The extensive guarantee of liability is a key to ensuring technology acceptance and a sustainable customer relationship: according to the Deloitte survey, 59% of drivers would be more likely to use autonomous vehicles if the OEM offered a warranty for accidents resulting from technological failure. Additionally, a strong brand image creates a boost in confidence among customers. By offering demonstrations and explaining the technology, the OEM should help to build confidence in autonomous vehicles further, in order to increase customer acceptance and, ultimately, loyalty.

For an OEM targeting Scenario 4, the focus should be on the provision of suitable hardware concepts and standardized interfaces in particular. Furthermore, modularity should be increased to achieve flexibility concerning different hardware and software lifecycles.

Fig. 25 – Source: Deloitte Study "Autonomes Fahren in Deutschland – wie Kunden überzeugt werden"



Ramping up for the sharing economy

While autonomous cars are more and more accepted, we also expect a growing demand for ride- and car-sharing services. Self-driving vehicles can be pre-ordered to a certain location at a certain time. While this is highly attractive for customers, it could be challenging for OEMs: total vehicle demand is expected to decrease significantly compared to a world in which customers do not have the option to share. If 36% of citizens in metropolitan areas regularly use car- and ride-sharing instead of owning a private vehicle (as expected for Scenario 4), the annual market volume will be 13 million vehicles lower than initially projected for 2025 (based on Germany, NAFTA and China). Although revenues from shared vehicles are still very low in 2015 (around € 10,000 annually per vehicle), the investment in a mobility platform opens up opportunities for participating in the growing market for the sharing economy and to compensate for potentially decreasing sales potential. With a larger customer base and greater utilization of the vehicles, this effect could even be more than compensated for.

The construction of a mobility platform is feasible and low-risk: the investment requirement is relatively moderate and the platform can be operated with rented cars or even as an intermediate stage for private car owners (as implemented by Uber). However, competition is already stiff today. Also the profitability of shared service providers is reported as not quite satisfying yet for the respective shareholders. Since in Scenario 1 the desire is to be a market

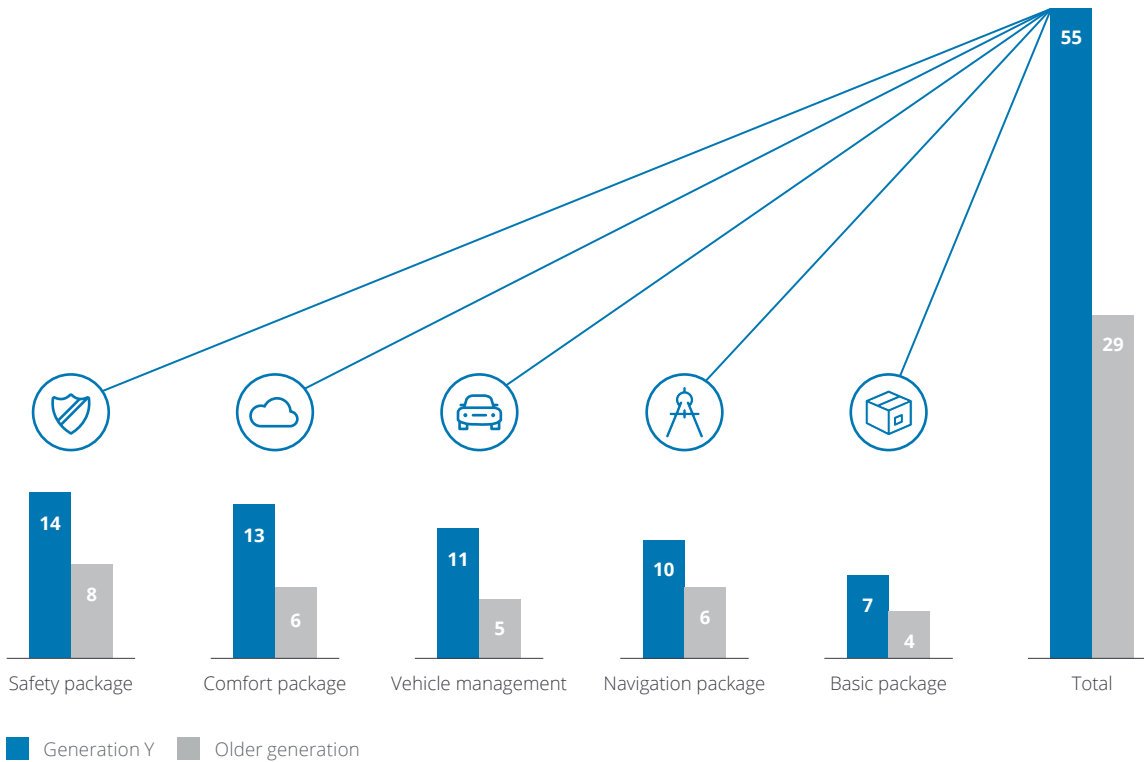
In 2025, up to 36% of citizens will be using the sharing economy instead of owning a car. This could decrease vehicle sales by 24%.

Deloitte Automotive Value Chain Model

leader in mobility services, the development of an attractive service offering and an easy-to-use application is a key to success. In this scenario, the OEM needs to create a strong brand to find a place in the sharing economy. Attractive vehicles, a well-chosen city selection, and customer-oriented pricing are essential to compete. The free use of fast lanes or special parking spaces can additionally help to keep usability high. Systems and experts for mobility data management and predictive analytics are essential for a functional system. On the other hand, the OEM should focus on the cost-effective maintenance of the vehicles.

In contrast to this, an OEM aiming for Scenario 4 will not be operating in this field. It should rather try to boost its vehicle sales to vehicle platforms through long-term and extensive cooperation with dominant car- and ride-sharing players.

On-demand and pay-per-use mobility models might – especially in urban areas – increasingly replace conventional car ownership models.

Fig. 26 - "Datenland Deutschland Connected Car" - Willingness to pay for connected services in € per month

Investment in the development of digital capabilities and the monetization of data

New technologies for a stronger connectivity of cars offer a large number of new possibilities for generating revenues, e.g. infotainment offerings: watching movies, playing games, or receiving information about available parking, while your car (autonomously) navigates to the destination. OEMs need to consider developing and integrating infotainment systems and apps, including interfaces with home devices and links to offices. According to our research on connected car services, customers would be willing to pay an additional € 55 per month for connected services (see Figure 26). Furthermore, companies could sell advertising during autonomous shared rides in the same way as public transport does today.

Monetizing data collected in and by cars is another potential billion-dollar market.

Predictive maintenance, i.e. analytical predictions on when best to have your car serviced, saves both time and money for customers. Insurers are interested in driver behavior. Individual motion profiles are a potential source for tailor-made (in-car) advertising. However, the possibilities of data monetization involve a fundamental decision: does the OEM want to capitalize on highly sensible customer data such as motion profiles and sound recordings? While the data will potentially be very valuable, legal and ethical considerations might arise as customers and regulators have a strong interest in ensuring privacy. Our research shows that 63% of Generation Y users fear that their data will be passed on to third parties.

In order to move towards the first scenario, the future car company has to build up digital capabilities aggressively. In addition to its own research activities, the company will also have to acquire knowledge and re-

sources strategically from startups and other tech ventures. In our model calculation, the recruitment of up to 13,000 IT specialists could be necessary for the future car company. In order to achieve customer acceptance for the offered services, the OEM must ensure data security and transparency in the handling of the data. In the case of Scenario 4, the future car company should avoid trying to compete against players with already strong capabilities in the digital sphere. Moreover, the goal is to provide the safest, best-performing, and standard-setting platform.

However, at this point in time we should keep in mind, that no OEM has yet created a profitable business model of significant scale around the monetization of data in vehicles. This is also why uncertainty is still high in this field.

Moving towards Manufacturing 4.0

In order to stay competitive in terms of manufacturing efficiency, product prices, and quality, a broad variety of investment options in new technologies under the umbrella of Manufacturing 4.0 must be assessed. Potential fields for action range from updating assembly lines with advanced robotics, equipping manufacturing and intralogistics hardware with sensor systems for data collection, to smart analytics solutions and voice-controlled systems. The Deloitte M4.0 Cube can provide orientation and help in integrating the multitude of potential Manufacturing 4.0 applications towards a holistic concept.

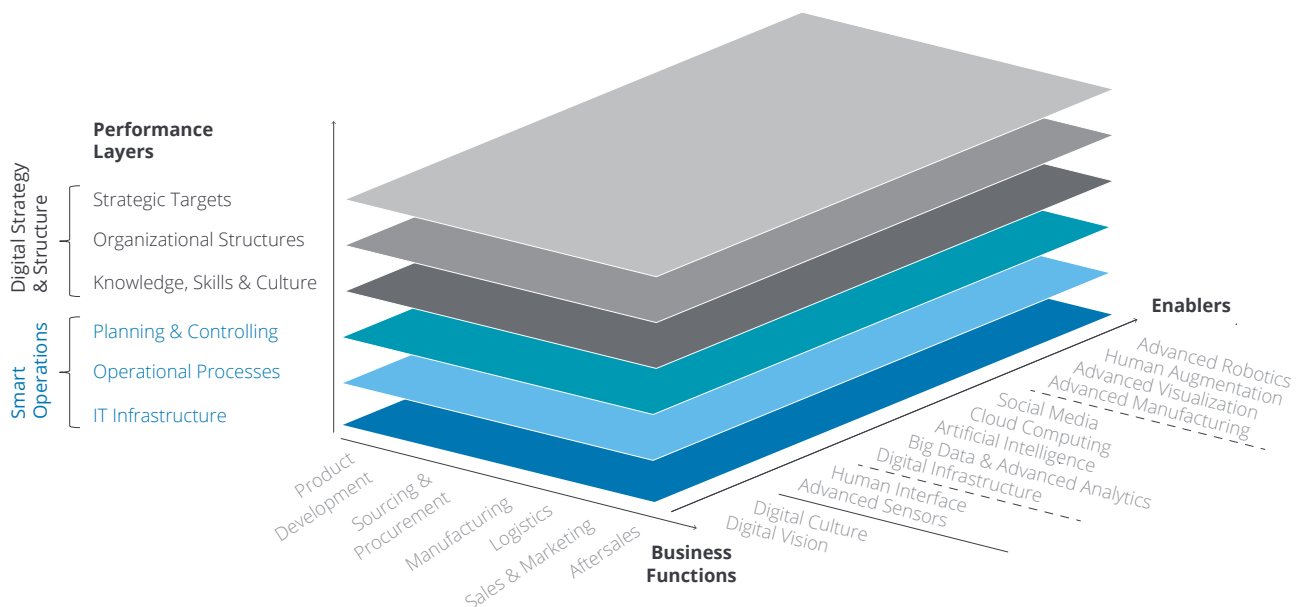
With the necessary investment in the range of several billion euros, the financial effort for creating “smart factories” is enormous. Moreover, an increased level of automation entails big changes for the OEM’s workforce. Socially responsible – and costly – solutions to adapting the workforce to the challenges of a digitalized world are needed.



Considering now the perspective of two different decision-makers striving to move either towards Scenario 1 ("Data and mobility manager"), or towards Scenario 4 ("Hardware platform provider"), the recommendation is the same: most observers consider it a "no-regret-move" to invest and develop integrated M4.0-concepts. Irrespective of whether OEMs will continue to be in control of the automotive value chain (Scenario 1), or act as the "hardware suppliers" for tech giants and technology platforms – making the most of new manufacturing technologies is an imperative in both scenarios. One important distinction between the two worlds must be made, however, with respect to white-label production. The need for stronger integration in the supply chain and standards set by new players requires higher flexibility of production systems to cater for multiple customers.

In any case, both deciders – aspiring either Scenario 1 or Scenario 4 – should fully pursue the strategic opportunities Manufacturing 4.0 is offering.

Fig. 27 – Deloitte Manufacturing 4.0 Cube – Overview



The Deloitte M4.0 Cube provides the scope for Industry 4.0 solutions and further discussions.

Up to 13,000 IT specialists and mobility managers may be required for the future car company to play a significant role in the market.

Managing implications for the workforce

Many of the previously discussed decisions have a serious impact on the workforce of the future car company. Especially depending on the size of the e-mobility business, substantial reductions in the workforce are required. When investing in the sharing economy and data management, significantly more IT specialists are required than today. The same applies to autonomous driving - not only to provide the software, but also to continuously improve its safety and always meet data security standards.

When aiming for Scenario 1, the OEM faces both the need for additional digital talent and also the required workforce reduction in manufacturing and administration. Implementing training programs for employees and developing recruiting strategies to attract the brightest people in software development and data analytics should be one key field of action. Being well known as an attractive place to work is a key to succeeding in acquiring the necessary talent. Negative impact from workforce restructuring in other areas might be softened by applying a number of mitigating measures: redistribution of employees to other manufacturing areas (e.g. white label manu-

facturing), extensive training programs for employment in other functions (e.g. battery production) or early retirement plans. In any case, however, the future car company has to consider the strong influence and interest of politics, unions, and the general public on this question. Continuing to be a good "corporate citizen" will be crucial for the future car company. This means being a responsible member of the communities in and around the OEM's headquarters and production sites also in times of restructuring. On top of that, the OEM must ensure trusted and open dialogue with work councils, or else the overall ability to act on any strategic issue will be in danger.

When working towards Scenario 4, the necessity to manage workforce restructuring carefully is even more urgent. The strong increase in white-label production will only partly compensate for workforce reduction in other areas: an estimated overstaffing of more than 20% of the OEM's necessary workforce requires very close and trusting cooperation with social partners. The management of such processes requires highest attention from top management levels and will certainly cause controversy in both internal and public debates.

Manufacturing 4.0 and e-mobility might cause the redundancy of up to 24% of the OEM's production workforce.

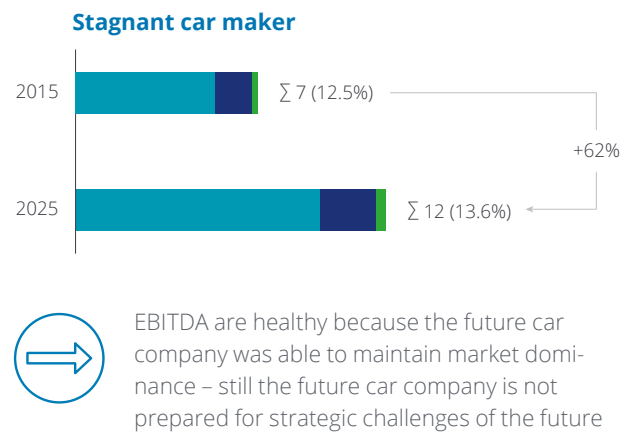
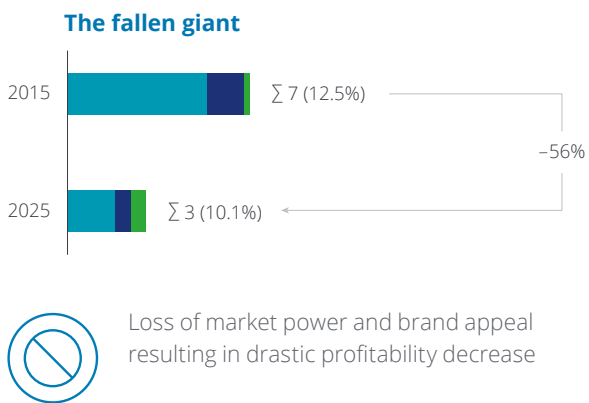
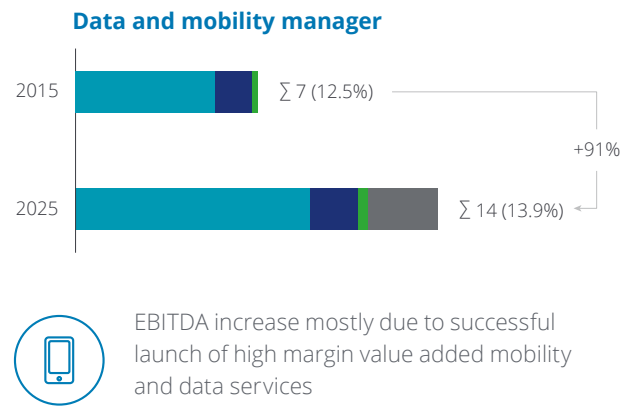
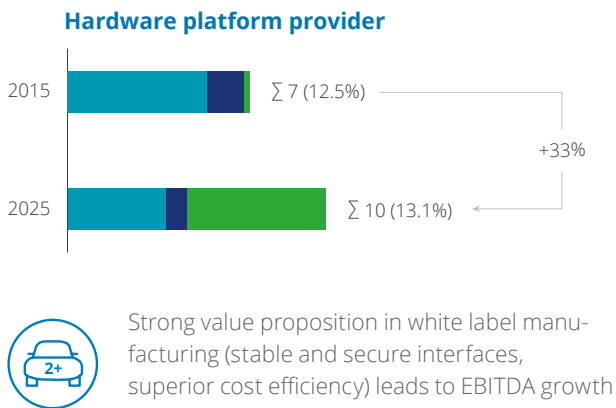
From integrated
modeling and signpost
monitoring to an OEM-
specific transformation
path

Comparison of the transformation paths of Scenarios 1 and 4 shows that the strategic initiatives identified are significant, but often involve very different implications for the OEM. If the goal is to be a technological pioneer and face the struggle with IT giants, there is an urgent need to develop digital capabilities. In order to get ahead of the IT corporations, OEMs will need to aim for cooperation and mergers and adopt management and innovation culture. However, as in Scenario 4, it can also be useful to concentrate on the core competency of vehicle construction, given the massive investment required and the associated risk. In this case, research and development efforts should be invested particularly in efficiency increases. The early formation of cooperation with mobility providers supports the transformation to a leading vehicle platform provider. In doing so, however, OEMs must be willing to cooperate on an equal footing.

Integrated modeling is essential to increase transparency about the influence of change drivers

The manifestations of the scenarios presented within this study are based on extensive research of drivers and intensive exchange with experts. However, since the drivers can change dynamically in their form and direction of influence, a high degree of transparency about their impact is of paramount importance. Integrated modeling is indispensable to define business-specific scenarios and to adapt constantly to changes.

The simultaneous consideration of key financials illustrates the importance (see Figure 28): the EBITDA comparison across scenarios points out highly varying risk-reward relationships. Identified deal breakers and key initiatives differ greatly between scenarios. The more ambitious the goals, the greater the necessary change and underlying risk. The scenario with the highest growth also requires the largest investment.

Fig. 28 – Scenario-specific EBITDA development in €bn exemplary for the future car company

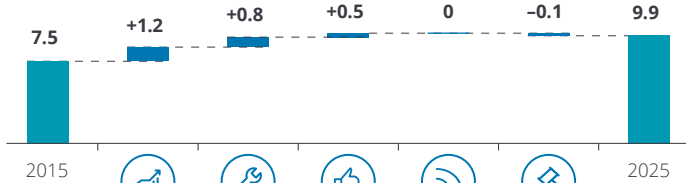
- Vehicle sales (traditional core business)
- Financial services
- White label manufacturing
- Data and mobility management

The analysis of the main modeling drivers shows the possible impact on the EBITDA margin. While vehicle sales and the development of alternative drives, in particular, are of great importance, the other drivers can still have a significant effect and

should not be overlooked. With the help of company-internal experts and financial benchmarks it is important to quantify and evaluate the influence of the prevailing drivers on a particular OEM.

Fig. 29 – Scenario-specific EBITDA development according to influencing drivers €bn exemplary for the future car company

Hardware platform provider



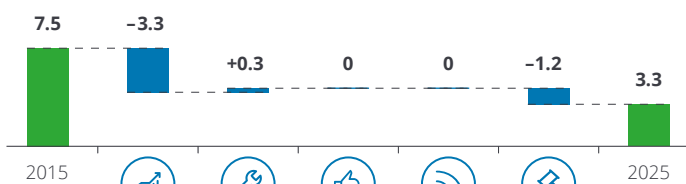
The strong business with white label cars and the advancement of manufacturing technologies are key for success

Data and mobility manager



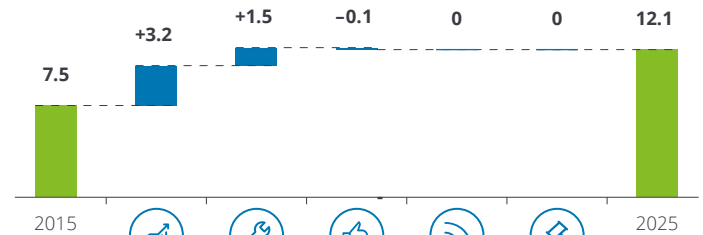
EBITDA growth is mainly driven by digital service offerings and increasing vehicle sales

The fallen giant



Decreasing vehicle sales and loss in bargaining power amongst suppliers are responsible for the EBITDA loss

Stagnant car maker



Increasing vehicle sales and a large proportion of profitable combustion engines account for the large EBITDA growth



Sales development: Number of vehicle sales as well as acceleration of alternative drives. Regional differences (China, NAFTA, Germany) as well as changes in segment distribution are taken into account



Advancement of manufacturing technologies: Includes technology development such as 3D-printing, lightweight technology, artificial intelligence, and automatization



Acceptance of new mobility concepts: Considers car sharing, autonomous driving, and integrated public transportation



Capability development for connected services: Considers the impact of successful data monetization and other digital service offerings

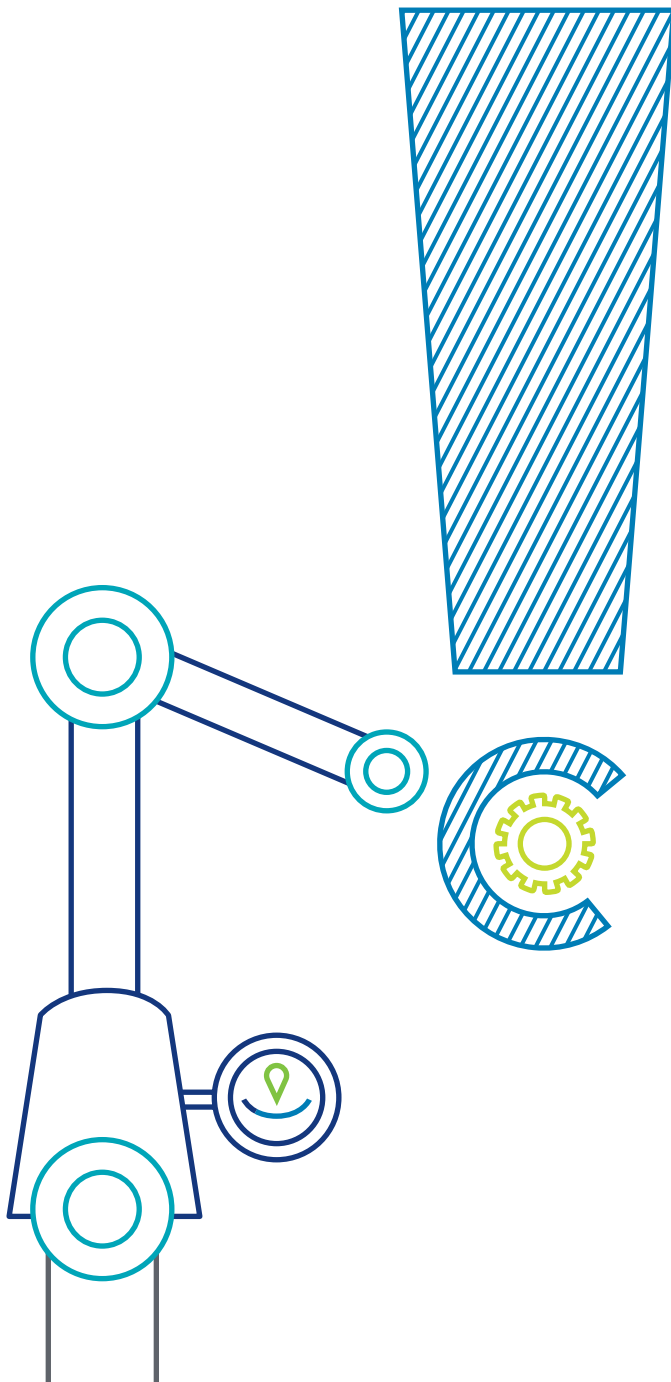


Value chain dominance: Considers effects from changing bargaining power towards suppliers as well as depth of value creation (e.g. insourcing) on overall profitability

Signpost monitoring to track trends

In order to determine the optimal transformation path for a specific OEM, it is not enough to choose a desired scenario. The scenarios presented in this study may be conceivable for our generic OEM. But for today's real-world car-makers not every one of our Deloitte scenarios is realistic. OEMs must develop quantified and qualified company-specific scenarios. Strategic decisions should never be made without

understanding the expected and integrated impact on the income statement. Based on integrated modeling, no-regret moves and also further strategic options can be derived. However, on the basis of OEM-specific scenarios, the consistent monitoring of signposts and the consideration of the feasibility of one's own company is of paramount importance in the development of individual transformation paths.



Automotive executives are facing pressure to make landmark decisions: use scenarios and integrated income statement modeling as a foundation.

Conclusion

As indicated by the results of the simulations, the core business of OEMs will undergo significant changes over the next decade. Current market shares and profits are greatly endangered by new mobility concepts and increasing competition. As pointed out in our forecast for e-mobility, alternative drives are highly likely to gain significant market shares up to 2025 and beyond. Owing to the reduced need for human labor in the production of e-cars and further efficiency measures, there is substantial pressure for workforce reduction. However, there are several future scenarios in which the OEM can successfully compete – and even increase revenues and operating profits by up to 70%. Based on the investigations in this study, there are four potential futures for OEMs:

- 1. Become a technology leader with strong branding through massive investment in new business models**
- 2. Achieve at least mid-term stability of your market position through joint collaboration and lobbying with other OEMs to protect know-how and influence against emerging IT giants**
- 3. Try to survive by focusing on efficiency improvements, niche markets, and company vehicle business to compete in a tough market environment with financially potent competitors**
- 4. Set up strategic partnerships with IT giants. The production of high-quality and cost-effective vehicle platforms combined with a strong brand image will result in a mobility offering that leads the white label market**

There is a strong indication that across these scenarios, embracing e-mobility, autonomous driving as well as Manufacturing 4.0 could well be no-regret moves. On the other hand, workforce transition management seems crucial in three out of four scenarios, holding the potential to create a burning platform if neglected. In order to prepare for the future, OEMs will have to evaluate the drivers according to the internal and external circumstances of their company. In the face of uncertainty, scenario planning permits us to map out clear paths into the future. This is by no means limited to qualitative observations. Using a parametric, driver-based model we are able to show that quantitative insights at the income statement level are possible in scenario planning too, permitting us to provide sharp, qualitative views based on figures. In fact, we strongly believe that this is the approach that will permit decision-makers in today's automotive industry to take the necessary decisions now on a well-informed basis, actively shape the future of the industry and of their own company and continue playing a significant role in 2025 and beyond.

Contacts



Dr. Nikolaus Helbig
Partner
Strategy & Operations
Tel: +49 (0)89 29036 7604
nhelbig@deloitte.de



Dr. Jürgen Sandau
Partner
Strategy & Operations
Tel: +49 (0)40 32080 4474
jsandau@deloitte.de



Jens Heinrich
Director
Strategy & Operations
Tel: +49 (0)711 16554 7309
jheinrich@deloitte.de



Dr. Harald Proff
Partner
Strategy & Operations
Tel: +49 (0)211 8772 3184
hproff@deloitte.de



Dr. Florian Klein
Head of the Center for the Long View
Strategy & Operations
Tel: +49 (0)69 9713 7386
fklein@deloitte.de



Matthias Nagl
Manager
Strategy & Operations
Tel: +49 (0)89 29036 7503
mnagl@deloitte.de

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Joe Vitale

Partner - Automotive Sector Lead Global
jvitale@deloitte.com
Tel: +1 (0)313 324 1120

Dr Thomas Schiller

Partner - Automotive Sector Consulting Lead Global
tschiller@deloitte.de
Tel: +49 (0)89 290 367 836

Damon Cantwell

Partner – Automotive Sector Lead Australia
dacantwell@deloitte.com.au
Tel: +61 (0)396 7175 43

Carlos Eduardo Ayub

Partner – Automotive Sector Lead Brazil
carlosayub@deloitte.com
Tel: +55 (0)115 1861 227

Dr Marco Hecker

Partner – Automotive Sector Lead China
mhecker@deloitte.com.hk
Tel: +85 (0)228 5265 88

Svetlana Fedorova

Director – Automotive Sector Lead CIS
svfedorova@deloitte.com
Tel: +42 (0)246 0439 04

Lars B. Nielsen

Partner – Automotive Sector Lead Denmark
larnielsen@deloitte.dk
Tel: +45 (0)307 037 28

Guillaume Crunelle

Partner – Automotive Sector Lead France
gcrunelle@deloitte.fr
Tel: +33 (0)155 6123 05

Rajeev Singh

Partner – Automotive Sector Lead India
rpsingh@deloitte.com
Tel: +91 (0)124 6792 000

Giorgio Barbieri

Partner – Automotive Sector Lead Italy
gibarbieri@deloitte.it
Tel: +39 (0)115 5972 64

Masato Sase

Partner – Automotive Sector Lead Japan
msase@tohatsu.co.jp
Tel: +81 (0)804 3677 936

Jung Hee Bae

Partner – Automotive Sector Lead Korea
junbae@deloitte.com
Tel: +82 (0)2 6676 3604

Alberto Torrijos

Partner – Automotive Sector Lead Mexico
atorrijos@deloittemx.com
Tel: +52 (0)55 5080 7087

Sharad Mishra

Partner – Automotive Sector Lead SEA
sharmishra@tohatsu.co.jp
Tel: +65 (0)933 735 18

Ruwayda Redfearn

Partner – Automotive Sector Lead South Africa
ruredfearn@deloitte.co.za
Tel: +27 (0)315 6070 74

Jordi Llidó

Partner – Automotive Sector Lead Spain
jllido@deloitte.es
Tel: +34 (0)932 5337 02

Martin Larsson

Partner – Automotive Sector Lead Sweden
martlarsson@deloitte.se
+46 (0)70 080 24 30

Güneş Süsler

Partner – Automotive Sector Lead Turkey
gsusler@deloitte.com
Tel: +90 (0)212 3666 031

Michael Woodward

Partner – Automotive Sector Lead UK
mwoodward@deloitte.co.uk
Tel: +44 (0)207 303 0884

Craig Giffi

Partner – Automotive Sector Lead US
cgiffi@deloitte.com
Tel: +1 (0)216 830 6604



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