AUTOMOTIVE MANAGER

TRENDS, OPPORTUNITIES AND SOLUTIONS ALONG THE ENTIRE VALUE CHAIN

COVER STORY: AUTOMOTIVE VALUE-CHAIN STRUCTURE CHANGES MASSIVELY
For years, the automotive industry has been undergoing substantial structural changes. Increasing diversity of models and variants accompanied by shorter product life cycles, comprehensive modularization and platform strategies, the highly dynamic deployment of new technologies in vehicles, new areas of focus in the field of electromobility, as well as strong cost pressure and high capital intensity, have permanently changed the collaboration between OEMs and suppliers—and, consequently, their respective shares of value creation.
Dear readers,

The world has become a much smaller place and nowhere is that more evident than in the automotive industry. Gone are the days when a major carmaker or supplier could focus its attention on nearby markets and still be successful. The growing importance of China and India will dramatically affect value creation in the automotive sector. Another dramatic shift is the speed of technological change. Companies that can’t keep pace or invest in the wrong solutions will pay a heavy price. The good news is that businesses that are quick to recognize growth segments and markets and are willing to adapt their value-creation strategies will be tomorrow’s champions. These are the findings of the recent study by Oliver Wyman and the German Automotive Industry Association (VDA) titled FAST 2025—Future Automotive Industry Structure. Another prevailing message from the FAST study is that automakers and suppliers will need to work even closer together to meet future challenges. VDA Managing Director Klaus Bräunig knows the benefits of close cooperation between the two. In his guest column, he points out that Germany’s auto industry draws its strength from the collaboration between automakers and suppliers. It is one of the reasons Germany has fared better than its European rivals during the region’s downturn, Bräunig says.

Suppliers will need any advantage they can get in the future. Their list of challenges includes economic uncertainty, demands from customers to support them in new markets and the need to fund research in new technologies at a time when it is harder than ever to access capital. Our study “Supplier Fitness—Crisis Avoidance in Uncertain Times” looks at solutions for these problems.

The best defense against uncertainty is having products that customers have to have, but creating those products is neither easy nor cheap. In 2012, the world’s top 17 automakers spent more than 50 billion euros on R&D and if you include suppliers it’s safe to say that total greatly exceeded 100 billion euros. The spending trend will continue as innovation cycles get shorter and the share of electronics and software in vehicles increases. Inside this issue we look at the three steps needed to revolutionize the vehicle development system.

Best regards,

August Joas
Head of the Oliver Wyman Automotive Practice
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Challenges OEMs and suppliers need to master in a volatile environment

Klaus Bräunig, VDA
The automotive industry faces many challenging years. All companies need to prepare for unprecedented regional expansion and investment in new technologies under harsh competitive conditions. The growing importance of emerging countries—first and foremost China and India—will dramatically affect OEMs’ and suppliers’ value creation. In addition, fresh challenges will arise from new business segments such as electromobility and vehicle connectivity. If companies want to be among the champions in tomorrow’s dynamic and complex market environment, they must recognize growth segments and growth markets early on, review their own value-creation strategy and adopt a future-oriented competitive position. These are the findings of the recent study by Oliver Wyman and the German Automotive Industry Association (VDA) titled FAST 2025—Future Automotive Industry Structure.

The automotive industry has been characterized by strong growth for more than a century. Even fundamental crises such as World War II, the first and second oil price spikes and the financial crisis of 2008-2009 hardly curtailed the industry’s dynamic growth. Most recent figures show that with the production of approximately 80 million vehicles, the automotive industry has broken all records and has become one of the mainstays of today’s global economy. In many countries, the industry accounts for a significant share of total national value creation. Thus, in the United States, vehicles and vehicle components make up about 13 percent of total value creation, compared with 14 percent in Europe. Even in young automotive markets such as China and India, the auto sector already contributes 8 percent and 10 percent, respectively. The automotive industry also plays a major role in employment politics. Hundreds of thousands of engineers around the globe are developing new models and technological innovations. Several million people work in manufacturing and assembly. In addition, automakers and independent market players employ a large number of people in sales and service functions. Meanwhile, the oil, transportation, financial and insurance sectors rely heavily on the automotive industry’s success.

GROWING IMPORTANCE OF EMERGING MARKETS
For years, the automotive industry has been undergoing substantial structural changes. Increasing diversity of models and variants accompanied by shorter product life cycles, comprehensive modularization strategies and platform strategies, the highly dynamic deployment of new technologies in vehicles,
new areas of focus in the field of electromobility, as well as strong cost pressure and high capital intensity, have permanently changed the collaboration between OEMs and suppliers and, consequently, their respective shares of value creation.

Today, emerging markets such as China and India have become much more important as sales and production hubs. As a result, automakers are focusing their investments in building and expanding production, sales and development locations in countries forecasted to show a rise in demand. Manufacturers expect their suppliers to follow suit. Vehicle production in China, for example, has increased massively. In 2005, 5.2 million vehicles rolled off Chinese assembly lines. That number rose to more than 17 million in 2011, making China the largest production location in the world today with one-quarter of global vehicle manufacturing volume. By contrast, vehicle output in established auto markets such as Europe, North America, Japan and South Korea has dwindled considerably. North America has been hit particularly hard by declining production. The country’s vehicle output fell to 13 million in 2011 from 16 million vehicles in 2005. What is more, there has been a dramatic rise in the number of auto brands during the past decade. In 2011, models from 155 brands were sold compared with 129 brands 10 years earlier. This development is not just the result of modest brand portfolio adjustments in the established markets but, to a large extent, is also due to the growing number of brands in emerging markets. In China alone the number of brands more than doubled to 60 from 26 between 2001 and 2011.

GROWING CUSTOMER REQUIREMENTS DRIVE INNOVATION
The transformation of the automotive industry will become even more far-reaching by 2025. OEMs and suppliers will face enormous challenges. This will put the collaboration of manufacturers and suppliers to an entirely new test. The Oliver Wyman-VDA study identifies six trends that will spark fundamental changes in the industry. The shift in regional structures will persist. Because emerging countries will continue to experience strong growth, Asia will further expand its position as the dominant automotive region with the highest growth rates and largest production capacities. Today, more than half of all vehicles (commercial vehicles and passenger cars) are made in Asia. This includes India, which is quickly closing the gap on rival countries with its double-digit growth rate.

Customer requirements are forcing automakers to diversify their vehicle lineups and the options they offer in their cars. In the early 1990s, Audi, BMW and Mercedes-Benz each only needed to put seven or eight models
on the market. Today, that number has tripled as the brands add more and more derivatives to their portfolios. At the same time, product life cycles are becoming ever shorter. This increases costs as well as the complexity of companies’ internal structures and processes. Moreover, this is accompanied by growing customer demands. In the future, OEMs will place the major focus of their innovation efforts on environmental friendliness and fuel efficiency instead of comfort. The topics of electromobility and lightweight construction will take center stage and lead to dramatic value migration. All the while, cost pressure will persist. Customers are asking for higher quality vehicles, and lawmakers are demanding cars with more functions and higher efficiency. Nonetheless, given the strong competition, it is often very difficult or even impossible to push through higher vehicle prices.

RISING VOLATILITY AND PERSISTENT COST PRESSURE

Ultimately, growing demand for vehicle connectivity and integration of innovative services will contribute to expanding the traditional automotive value chain. This not only generates additional growth potential, but also reinforces competitive pressure as players from other industries enter the market. The economic situation, markets, customers, technology, competition, the global supply chain, as well as changing political and legal conditions, will also drive risk in the future. Volatility in the automotive industry will persist and perhaps even become more pronounced. This means companies must prepare themselves for regional or global crises and the resulting fluctuations in sales.

LONG-TERM GROWTH TREND WILL CONTINUE

Given the imminent changes, all market players are asking the same question: Where will future value creation take place in the automotive industry? According to FAST 2025, the global automotive industry is expected to grow by about 3 percent per annum until 2025. By then, global automotive value creation, excluding the aftermarket, will grow to 1.25 trillion euros, compared with 840 billion euros in 2012. China and India will be the main drivers of this respectable growth. As a result, by 2025, China will have further expanded its position as the most important vehicle producing country in the world, creating some 300 billion euros in value. Europe will retain its strength and its lead as an R&D location. Regional vehicle segments will also change. Although Europe will maintain its supremacy in the premium vehicle segment, China, with its traditional strength in the volume segment, will nevertheless benefit considerably from the premium segment’s growth until 2025. India, on the other hand, will substantially increase its share in the small vehicle segment.
There is also a further shift in the distribution of work between OEMs and suppliers. Because manufacturers are focusing more on their core competencies, suppliers in the future will capture additional value creation—in both R&D and production. OEMs will increasingly rely on their suppliers, especially in emerging markets. Moreover, because the pace of innovation cycles is speeding up, more engineering service providers are establishing themselves in the market. Overall, according to the FAST study, the OEMs’ share of global R&D value creation will decline to 47 percent in 2025 from 60 percent now. By contrast, suppliers will increase their share to 36 percent from 32 percent, and engineering service providers will almost double their share to 17 percent from 9 percent. Suppliers will cement their position in production, increasing their share of value creation to 71 percent from 65 percent. As a result, the share for OEMs will drop to 29 percent.

In the future, OEMs will adopt a more selective and module-specific approach when outsourcing vehicle modules. The largest shift of value creation toward suppliers will occur in the electric drive segment, currently one of the automotive industry’s most important innovation topics. Although manufacturers will continue to control the key technologies in this area, their share of automotive value creation for this module will fall to 9 percent by 2025 because they only carry out a small proportion of production themselves. In the future, OEMs that make internal combustion engines and auxiliary systems will place an even stronger focus on assembly and system competence. In combination with wider deployment of more complex technologies, this means their share of value creation will fall to 32 percent. Suppliers are also beginning to play a larger role in value creation in the exterior sector, although this has been traditionally dominated by OEMs.

**DIFFERENCES IN THE DEVELOPMENT OF VEHICLE MODULES**

Value creation by vehicle modules themselves is also changing. The new study conducted by Oliver Wyman and VDA has revealed that R&D value creation in the body and exterior sectors will experience above-average growth of 7 percent and 6 percent respectively, driven by the need to rigorously implement lightweight construction. Besides the vehicle development and integration, the internal combustion engine module and auxiliary systems will continue to contribute the largest absolute share to overall R&D value creation, which will increase by 2.3 percent to 150 billion euros in 2025 from 110 billion euros in 2012. Major improvements can still be achieved in these sectors.

However, electric drives will be the strongest growth sector in production, even though it is still uncertain whether customers will accept this technology. The value creation for this module will increase by more than 20 percent a year as a result of the currently small volumes and the continued high although decreasing prices for the respective components and systems. By contrast, global production value creation will grow a little more than 3 percent a year between 2012 and 2025, rising to 1.1 trillion euros from 730 billion euros. The interior sector will continue to account for the lion’s share, despite the fact that it will only grow by just over 2 percent per year.
If we look at the individual vehicle segments, value creation in the exterior sector for premium vehicles will increase sharply by 2025 because of new lightweight construction concepts and, consequently, new materials, relatively modest cost reductions and the strong focus on design. The chassis will dominate value creation in the volume segment due to customers’ demands for safety. In the small car segment, the exterior and chassis sectors will grow most strongly.

**ONLY PROFITABLE SUPPLIERS CAN SUCCESSFULLY MASTER THE CHALLENGES**

In the coming years, the market and technological trends outlined above will have a serious effect on all automotive companies. To benefit from the upcoming changes, both OEMs and suppliers must adopt a clear strategic position and become fit for the future. For this, they must identify growth segments and markets at an early stage, understand their own businesses’ potential to grow, review their value-creation strategy and attain a competitive position that is geared to the future.

The automotive suppliers, which were hit harder than OEMs by the 2008-2009 crisis, will need to reconcile numerous conflicting dimensions in the future. Suppliers are called on to monitor different trends simultaneously and more systematically than in the past and to respond quickly and appropriately. Their most pressing tasks are to optimize their global R&D, production and sales footprint; improve their innovation strength; create flexible structures and lean organizations; understand their segment’s developments; identify growth areas; acquire new customers; and build up competencies and capacities. In addition, they must assure profitability and cost control. Profitability and flexibility will rank among the key success factors for suppliers investing in technology and global expansion in the near future. Companies must take courageous, focused action to become champions in this attractive, but challenging industry.

**The outsourcing trend from OEMs to suppliers will continue but slow down**
The challenges OEMs face in automotive development have never been greater. Innovation cycles are becoming shorter and shorter, and the share of electronics and software in vehicles is increasing just as significantly as the number of variants. Against this background, decades-old development processes and tools are no longer good enough, especially since engineers are forced to respond with more flexibility to fast-changing customer requirements.

In 2012, the world’s top 17 OEMs spent more than 50 billion euros on R&D. Overall, it’s likely the automotive industry has greatly exceeded 100 billion euros in this area. The spending trend will continue as OEMs are forced to develop internal combustion engines in parallel with electromobility. On average, R&D accounts for 4 to 5 percent of OEMs’ total costs, and it looks as though this share will continue to grow. In the next decades, it is very feasible that it will reach 10 percent or more. Therefore, R&D costs will have an influence on more than 80 percent of the total cost structure, including direct, production and quality costs, and on revenue because consumers will only buy the right product. Consequently, the development system is the very backbone of an efficient and effective automotive manufacturer.

NEW CHALLENGES, OLD DEVELOPMENT SYSTEMS

The OEMs’ established development systems are increasingly stretched to their limits. Sequential development projects—marked by their defined milestones, quality gates and integration points—are no longer the standard for vehicle construction. They just don’t work as well as they used to because, for some time now, the automotive industry has been undergoing a massive transformation that is fundamentally impacting development. The speed of innovation cycles has accelerated drastically. Furthermore, the vehicle’s electronics and software content have also increased significantly and each has a much shorter life cycle than an automotive component.
Customers are changing their telematics and infotainment preferences more or less monthly. Moreover, because of the growing internationalization of OEMs, development processes must cater to entirely different customer requirements with respect to functionality and quality. What’s more, the structure of the value chain is changing. The trend toward e-mobility means that more and more new players, such as IT, telecommunications and mobility providers, are participating in the value chain. Today, in the traditional vehicle business, suppliers often build complete vehicles for OEMs. In addition, as development projects become more complex, development service providers must always be integrated.

More and more vehicle variants are offered today as OEMs try to meet increasing customer requirements and technical possibilities. Yesterday, OEMs could get by with developing two or three vehicle types in parallel; today the number is 20 or more. As a result, the engineering effort is taking on entirely new dimensions, and the number of development projects is skyrocketing. Consequently, automakers’ development systems, with their clearly structured and comprehensively documented development processes, are frequently stretched to their limits. Today, exceptions are becoming the rule and immature projects manage to get past specified milestones. Individual developers and engineers are finding it more and more difficult to locate their contribution on the comprehensive, overarching development roadmap. They’re also having trouble recognizing dependencies between milestones, components and functions. The result is that many automakers’ development organizations go into fire-fighting mode as they race to set up numerous task forces to contain the damage.

PROBLEM IDENTIFIED, DANGER NOT YET AVERTED
Leading automotive manufacturers have recognized the problem and have begun to adapt their development processes to present and future requirements. Consequently, they are optimizing their processes, organizational structures and tools to meet the growing demands.

With the help of well-organized task forces, OEMs have learned to respond to requirements that cannot be represented in the traditional process—especially in the case of overarching software functions, diagnosis-related parameters and, to an ever greater extent, modules and features of emerging connected-car services.

Other industries have experienced similar upheavals. In the software industry, development systems have undergone several revolutions in the past few decades because products were often already obsolete by the time they were ready for market. Today, software firms develop their products in shorter cycles and focus on functions to better meet quickly changing customer needs.

FLEXIBILITY IS KEY
The obvious advantage of an agile development system is that automakers can respond much quicker to new requirements. A flexible system not only reduces process delays, but also makes it easier to control the entire process. With this system, the car is created step by step, which means

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<tr>
<th>Year</th>
<th>BMW</th>
<th>Daimler</th>
<th>VW</th>
<th>Peugeot/Citroën</th>
<th>Fiat</th>
<th>Renault</th>
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<td>2015E</td>
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Research and development costs typically account for 5 to 10% of revenue at global automotive OEMs.

R&D has a high impact on overall economics and significant impact on 80% of the overall OEM cost structure.
that any shortcomings in the maturity of particular modules can be recognized even before the last phases of the process. In addition, it is also possible to focus the entire development effort, because the necessary steps for each module, vehicle and regional variant are precisely defined—without unnecessary milestones, extra steps, or waiting time. Furthermore, recalls and quality issues can be avoided by securing development process modules independently and using them in conjunction with platform modules. But, above all, it is possible to downsize the development system to such an extent that it once again becomes a helpful support for engineers.

Ideally, an agile automotive development system encompasses the process, organization, tool and technology dimensions and should be elaborated in detail. Thus, designing a suitable and sustainable methodology requires a lot of thought and far-reaching analysis, whereas the implementation of such a methodology on a specific project is relatively straightforward. In most cases, improvements pay off thanks to the savings that are already achieved during the first two to three development projects. Over the long term, impressive efficiency advantages become apparent—in the software world, companies often achieve a factor of two to three with respect to development effort, resources deployed and time to market. Furthermore, such efficiency improvements make savings of 20 percent to 30 percent in the automotive sector’s even more multilayered development process seem realistic, and would represent several hundreds of millions of euros per new vehicle development.

**AUTOMOTIVE DEVELOPMENT SYSTEMS PUT TO THE TEST**

An appropriate approach for revolutionizing the vehicle development system is comprised of three steps. In the first step, the existing development system is reviewed in detail in order to identify elements of the system that have been successful in the past, as well as actions that need to be taken, prioritized by their importance. The second step involves designing an agile development system with the help of tried-and-tested product engineering process (PEP) elements, as well as key elements and best practices derived from other industries. This ensures that development processes, tools and organizations are systematically improved. The new cornerstones of the future development systems can and should break with entrenched traditions, get rid of unnecessary ballast and systematically make development more flexible and better suited to new requirements. The final step is implementing and testing the new, agile system on an actual development project.

In recent years, all OEMs have benefited from the industry’s established development systems. These systems have helped manufacturers achieve outstanding market success and gain an excellent competitive position. Because they face new challenges, manufacturers must shift into higher gear and make this necessary paradigm change. Those who act promptly and resolutely have a very good chance of setting themselves apart from the competition.
Sustainability is a key issue for the automotive industry, but most component suppliers so far have not tapped their potential here. That’s despite considerable pressure, especially from high resource consumption and the growing demands of automakers. Time is running short for suppliers to address their sustainability risk missing out on future business.

Sustainability will be one of the major drivers of differentiation and competitiveness in the medium term. In the resource-intensive automotive supplier industry, it is no longer enough for a supplier to pay lip service to sustainability in order to remain on a manufacturer’s preferred supplier list. If manufacturers want to maintain their positive image, they cannot, in the long term, afford to work with partners that neither sell sustainable products, nor operate sustainable production. It is important for automakers to understand that sustainability is becoming a key criterion for car buyers. Consequently, in the future, automakers will step up the pressure on their suppliers to achieve the best possible results in all sustainability dimensions, including carbon emissions, water consumption, waste disposal and safety and social standards at production locations in low-cost countries.

Michael Lierow, Lars Stolz
RISING COST PRESSURE
Demand for raw materials will be in much higher tomorrow. At the same time, these materials will become more scarce—making them more expensive. This will put even more pressure on suppliers’ costs. Over the last decade, copper prices have risen 19 percent, oil 16 percent, rubber 14 percent and aluminum 10 percent. In the years to come, we will not only see more frequent price hikes, but also extreme fluctuations in the prices for renewable resources such as rubber and cotton, making it more and more difficult to draw up a reliable production plan. As a result, resource and cost efficiency will play a pivotal role in suppliers’ business success.

This development calls for sustainable production processes and, thus, innovative technologies and manufacturing processes. In many cases, modifying existing machinery is also extremely effective. For example, thermally insulating the cylinder of an injection molding machine can achieve energy savings of approximately 30 percent for heating the plastic.

UNDERSTANDING THE RELEVANCE OF SUSTAINABILITY
Today, many automakers understand the importance of sustainability and have begun to conceive concrete programs to address the issue. Most suppliers, however, are still entirely unprepared. Although they are aware of the enormous significance of sustainability, they don’t see how it can be relevant to their companies. But the facts speak for themselves. With the right sustainability strategies, suppliers can realize substantial cost and revenue potential—depending on their position, size and present situation. By doing so, they also help automakers turn their sustainability potential into a competitive advantage.

Commodity prices increase with strong CAGRs. In many cases, this leads to sustainable alternatives, or locked-in prices/supply CAGRs of selected price indices. Commodities 2003—2012, in %

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<thead>
<tr>
<th>Commodity</th>
<th>Percentage</th>
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<tr>
<td>Copper</td>
<td>19%</td>
</tr>
<tr>
<td>Brent oil</td>
<td>16%</td>
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<tr>
<td>Rubber</td>
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<tr>
<td>Cotton</td>
<td>10%</td>
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<td>Aluminum</td>
<td>6%</td>
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<tr>
<td>Electricity</td>
<td>4%</td>
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<tr>
<td>Steel</td>
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Reduction potential in manufacturing costs through sustainability.
Creating Transparency

Oliver Wyman’s study titled “Sustainability Wins—Strategies for Automotive Suppliers” not only identifies possible sustainability strategies—and their potential—but also recommends appropriate actions to suppliers. First and foremost, suppliers must take the right steps now. It takes time to develop and implement sustainability programs. This means that suppliers have to be quick if they want to set themselves apart in the medium term regarding sustainability and ensure that rise to—or remain at—the top of the automakers’ lists of preferred suppliers.

Transparency is vital for the development of an effective sustainability strategy. It is essential to carry out systematic measurements to identify those areas that require urgent attention. The next step is to use the results to define strategic steps and put concrete measures into practice. Those might include insulating a machine or using renewable cotton instead of harmful plastics in production. And, finally, it is important to establish systematic reporting to track the measures over the long term. Without continuity or management reporting, the effect of sustainability programs all too often fizzles out very quickly.

In the future, sustainability will be what matters. It will not suffice for suppliers to just put the topic on their agenda. They must make sustainability a priority today.
Automotive suppliers are facing more new challenges than ever before. There is growing uncertainty about how the economy will develop. Markets are shifting, new technologies are demanding additional investments, and competition is becoming more fierce. At the same time, it is harder to access capital. If company owners and management want to meet these challenges and successfully ward off and manage future crises, they must increasingly implement long-term measures targeting their strategies, business models and operations. These are the findings of Oliver Wyman’s study titled “Supplier Fitness—Crisis Avoidance in Uncertain Times.”

In recent years, the global automotive industry has experienced an unprecedented roller coaster ride. Despite a number of insolvencies, the majority of automotive suppliers managed to ride out these turbulent times by rigorously implementing cost reduction measures. As a result, they are almost as successful as before the crisis. But there are many signs that a new crisis is emerging, both in the market and in the macroeconomic environment. Optimism at automakers and suppliers is dwindling as they revise their sales forecasts and announce plant closures, especially in Western Europe. In addition, changes in the economy, as well as industry-specific developments in the market, competition, and technology, serve to aggravate the prevailing uncertainty. Furthermore, the fact that new regulations and restrictions are currently making banks more reluctant to grant loans might also act as a catalyst that plunges companies into a crisis.

NEW SIGNS OF A CRISIS ON THE HORIZON
In recent years, the economy has become increasingly volatile. In the past, economic cycles differed by region, whereas today they are largely in sync. This means fluctuations in core sales markets
such as China, disruptions in financial systems such as the euro crisis or in international value chains such as in the aftermath of the nuclear disaster in Fukushima are felt globally. As a result, enterprises and capital providers expect that any new crisis will be much more serious than the last one—especially in light of a probable loan shortage and the failure of sales volumes to increase at the predicted pace in foreign growth markets.

What’s more, uncertainty is exacerbated by a changing value chain structure. For example, according to forecasts, value creation by vehicle modules mainly for electric drives and exterior components will continue to shift from automakers to suppliers until 2025. Moreover, automakers will force down product costs for a multitude of vehicle modules, significantly impacting suppliers. Consequently, despite a hike in value, suppliers will not be able to increase their prices, not even for new model series. While suppliers can set themselves apart in new innovation segments such as e-mobility and lightweight construction, they need to make additional and appropriately allocated investments here while also exercising a lot of patience because it will take time for them to reach their targeted sales volumes. Overall, the global automotive market is expected to grow, despite forecasts that have been significantly revised downward time and time again—especially for the European market. What’s more, sales volumes are subject to strong regional shifts, and automakers are increasingly relocating their capacities—and thus their sourcing—to emerging markets.

GROWING FINANCING REQUIREMENTS

In the coming years, it is very likely that a host of companies will need significant amounts of capital, mainly driven by due LBO funding and high-yield bonds. However, banks have become more sensitive to risk, and their creditworthiness assessments have become stricter as a result. Moreover, risk analyses have changed. Although traditional financial factors, transparency and trust in partners continue to play a major role, more than 70 percent of capital providers say these have been overtaken in importance by a supplier’s financial plan for the next years, as well as the company’s strategy and business model. Consequently, provision of capital is more strongly tied to a supplier’s business prospects. At present, 90 percent of financiers put higher demands on companies with a poor outlook than in the past, compared with just 47 percent for companies well-positioned. But there is no indication of an impending credit crunch. Only a relatively small number of capital providers have decided to reduce or terminate their investments early.

The Basel III regulations will increase automotive suppliers’ capital costs. At the same time, the circle of financing parties is growing as institutional investors begin to crowd the market alongside traditional commercial banks. The former includes insurance companies, equity funds and hedge funds that invest in minority stakes, subordinated capital or corporate bonds. These capital providers have adopted the same procedure for granting loans as commercial banks—they carry out an intensive risk assessment in advance. Basel III will especially affect companies with poor creditworthiness and an unconvincing business model. Because of increasingly future-oriented...
internal ratings, these companies will score lower values, which may lead to liquidity bottlenecks. Higher costs of capital not only put a strain on cash flow, but also hinder access to capital and reduce the capacity for new loans. Thus, due to Basel III, it is increasingly important for companies not only to convincingly communicate positive financial results to investors, but also to highlight the strength of their strategies and business models.

AVOIDING AND MANAGING THROUGH CRISSES

More than any other companies, automotive suppliers with a need for capital are under pressure to develop strategies for preventing crises and making the most of market opportunities. They must simulate various economic scenarios and identify the appropriate mix of measures that will help them strike the right balance between a proactive and a defensive strategy. Companies that rule out the occurrence of another crisis are not only putting their hopes on efficiency improvements, but also on market development investments, the expansion of their product and service portfolio and M&A activities. By contrast, companies anticipating another economic downturn are concentrating on structural changes and financing. Regardless of the strategy, it is important to conclusively discuss all of the scheduled measures with the capital providers.

Standard tools for achieving a turnaround such as headcount reductions, working capital cuts, and working-time model adjustments are still important for sustainably managing through a crisis. But short-term measures alone will not achieve long-term restructuring. While quick cost reduction measures were applied during earlier crises, in the future such cuts they largely will be replaced by measures designed for the long term. Strategic realignment, production relocation, process optimization and product-cost reductions are now higher up on the list of operational restructuring measures—and constitute a vital basis for new financing sources and improved financing structures. Companies need to act promptly and resolutely if they want to avoid or effectively manage potential crises.

64% of the companies surveyed say portfolio optimization will be much more important than during the last crisis;

45% say that strategic realignment will be more important.

THE STUDY

Approximately 100 experts on corporate and financing issues were surveyed for the study “Supplier Fitness—Crisis Avoidance in Uncertain Times” during the first six months of 2012. The main focus of the study was on the automotive industry, but the survey also included other industry segments such as machinery, electronics and chemicals. The evaluations also drew on findings and analyses of previous Oliver Wyman studies.
Automotive manufacturers striving to improve factory performance through the extensive use of advanced technologies often get the opposite result: Higher costs without new revenue. It becomes increasingly important to fully assess these new technologies against long-term operating costs.

Manufacturing technologies play a significant role in boosting efficiency, improving plant safety and achieving world class quality. The trouble begins when engineers become enamoured with advanced technology and stop searching for the most efficient solution. In their quest to deploy technological solutions, some manufacturers overestimate the true return on investment. They can end up with remarkable pieces of complex equipment and software that ultimately cost more to operate than simpler, human-controlled processes.

The best approach is to carefully balance the trade-offs between complex automation and human interaction. Using automation to aid the human workers rather than replace them will ultimately lead to the most effective and simplest solution. As manufacturers prepare to handle new materials for lighter, more fuel-efficient vehicles, it is time to consider the true cost of full technological deployment.

THE LAST 10 PERCENT
As the cost of automation continues to drop, manufacturers tend to seek ways to solve more complex problems with technology such as flexible tooling, vision systems and manufacturing resource planning software. But it’s that final 10 percent of full automation that can dramatically boost complexity and costs beyond any recoverable value. The customer wants engineering excellence in the vehicle at an affordable price. The customer doesn’t care about the technology in the assembly plant and is unwilling to pay for it in the price of the car.

Advancements in welding technology have allowed some manufactures to achieve nearly 100 percent automation in their body shops. While robotic welding is operating more reliably, complex automation
for part selection and loading has ironically resulted in higher downtime. To compensate, some manufacturers are actually designing plants with more capacity and buffers to run at higher rates. Instead, manufacturers should carefully consider the people required to load parts for more flexibility and reliability, and avoid the high capital and downtime.

Consider the process of installing vehicle doors. We’ve witnessed simple hand tooling replaced with complex stop stations, vision positioning, automated fastening and, in some cases, precision automated racking systems. This added complexity drives higher investment, maintenance expense, control system complexity and downtime from parts variation that could have been contained by an operator.

Another hidden cost is the loss of a shop floor management culture that’s important to truly understand emerging issues. High reliance on complex MRP software can leave key manufacturing processes vulnerable to shut-down without warning due to elimination of simple visual control confirmation. Quality information and production scheduling systems should always drive management to go and see the operations, not encourage remote status monitoring where people become divorced from the process.

**SIMPLICITY IS KEY**

The best approach is to find the simplest solution that works. When planning new automation, create the best balance of technology and human labor that accounts for time, capital investment and total operating cost. Never automate a process that should first be eliminated.

New vehicle technology and advanced material selections provide the opportunity for manufacturers to re-examine their current processes and equipment. However, rushing to a technology solution could result in automating processes before they are fully understood. Manufacturers should first consider low-risk alternatives such as first generation trials, disposable equipment or converting existing equipment to the new use.

Finally, high technology does not always mean high flexibility. Some of the most advanced automated facilities have been overwhelmed by the first model changeover. Fully automated roof module cells have been scrapped because few customers wanted the option. An 800+ robot body shop was torn out, deemed too inflexible to efficiently change for the new model. Rarely do manufacturers consider the cost of the discarded equipment, engineering, maintenance and launch loss.

Oliver Wyman recommends manufacturers fully understand the balance between efficient deployment of human labor and efficient deployment of advanced technology. Thoroughly assessing your current operations against future product requirements, workforce skill levels and core technologies can mean the difference between a successful, revenue-generating operating model and an unsustainable factory that is nothing more than a monument to great engineering prowess.
High hopes for composite materials in the automotive industry need to be downplayed, a new global study by Oliver Wyman has determined. New regulations are pushing car manufacturers to consider numerous ways to reduce vehicle weight, but widespread use of composites by the industry is unlikely before 2020. According to the study “Composites Materials 2020,” high costs and manufacturing complexities reduce the attractiveness of composites. While glass fiber composites are expected to make their entrance in the semi-structural parts segment soon, carbon fiber composites in the structural parts segment will take more time to emerge. Innovation related to manufacturing processes and quality levels are needed to speed up adoption. It is therefore a good sign that activity along the value chain suggests that work is being done to generate these innovations.
Between 2010 and 2025, car CO₂ emissions will need to be reduced by 4.7 percent in the United States and 3.9 percent in Europe. Potential solutions for cutting emissions include engine downsizing, replacing conventional engines with hybrid and electric powertrain and vehicle light-weighting. One example of the latter is the new Peugeot 208, which weighs 230 kg less than the 207. It’s the first time in 30 years that a new generation of Peugeot’s subcompact vehicle weighs less than the previous-generation car.

**MAIN CHALLENGES**

The main advantage of composites (i.e., continuous fibers reinforced plastics) is that they weigh less than steel and aluminum. High-end composites are 70 percent lighter than steel for the same mechanical properties. Nevertheless, the Oliver Wyman study shows that composite makers need to address four key challenges to make their products more attractive to the entire automotive industry:

1. **Reduce cost compared with steel to save ~$10 per kg**

   After hybrid technology, composites are the most expensive way to reduce CO₂ emissions in vehicles. In addition, studies show that consumers are willing to pay a premium for hybrid systems but not for light-weighting as they do not consider it a tangible product. The automotive industry’s high sensitivity to price explains why automotive accounts for 9 percent of the volume but only 5 percent of the value of the 42 billion-dollar market for composite products.

2. **Reduce manufacturing cycle time to less than two minutes**

   Current cycle time for the fastest RTM process is 10 min/cycle. This is significantly slower than the current steel stamping process.

3. **Improve quality of high-volume production parts**

   The rate of defects for composites is still very high. This means that introducing parts made from composites adds risk at a time when automotive quality requirements are getting tougher.

4. **Adapt assembly lines to composite materials**

   Automotive processes are centered on metals, which means producing a body in white with composites is almost impossible today as composites cannot go through the cataphoresis process. Adapting the assembly lines will require significant CAPEX, making any transition to composites even more challenging for cash-strapped OEMs.
DEVELOPMENT POTENTIAL

Composites in automotive can be separated into two categories.

Semi structural parts (e.g., bumper beams, seat frames, hatch) offer great potential for glass fiber composites. OEMs and Tier 1 suppliers have several projects underway. For example, the new composite seat from Faurecia-BASF is 20 percent lighter than a traditional seat while Plastic Omnium's hatch for the Land Rover Evoque is estimated to offer a 30 percent weight reduction (e.g., 4 kg to 6 kg). Oliver Wyman expects these parts to start appearing on the market in 2015.

Structural parts (e.g., pillars, floor panels, cross car beam) are limited to supercars and to the new BMW i3 EV due to the prohibitively high production costs associated with carbon fiber composites. Oliver Wyman expects these parts to very slowly enter the market in 2020 and appear mainly in premium vehicles.

VALUE CHAIN ACTIVITY

Even with limited growth potential in automotive, main players are positioning themselves on the value chain. Almost all OEMs have secured supply through partnerships with fiber producers. BMW-SGL Carbon, General Motors-Teijin and Daimler-Toray are examples of such partnerships. Joint ventures and alliances between resin and fiber manufacturers and Tier 1 suppliers also are being formed (e.g., SGL-Huntsman-Benteler, Zoltek-Magna, Dow-Ford). It remains to be seen whether these strategic alliances will be able to generate affordable products that are compatible with the automotive industry or if composite materials will remain a niche product only for luxury vehicles.
The automotive industry is on the threshold of establishing connected services for the car. Initial offerings already have been launched on the market, and the number of services will multiply in the years to come. Bundling and operating a rich mix of connected content—and winning customers with attractive subscription models—will be a huge challenge for all automakers.

Demand for vehicle connectivity is growing fast. Market analysts forecast a 50 percent global penetration rate for connected services in new vehicles by 2016, and just under 100 percent in the next 15 to 20 years in Japan, North America and Western Europe. At the same time, the development of connected car services is progressing at full throttle. Yesterday’s proprietary telematics systems that offered single services have been replaced with converged, complex, and increasingly open systems. It is no longer a matter of bringing the Internet into the vehicle, but of bringing the vehicle to the Internet.

**BUNDLING OF SERVICES—A LUCRATIVE BUSINESS**

Oliver Wyman identified seven service segments that will become integral parts of the car in the medium term: 1) safety and remote maintenance, 2) fleet management, 3) mobility, 4) navigation, 5) infotainment, 6) insurance, and 7) payment systems. These segments promise billions in earnings if they are offered as a comprehensive package. Driven largely by the mandatory installation of the eCall system in all new vehicles sold in the EU from 2015, emergency and security services will boom in the coming years. So will remote diagnosis and aftersales services such as maintenance reminders or automatic notification of the repair shop if key parts start to wear down. Fleet management systems are already in use and will systematically penetrate the mass market and standard platforms in the coming years. Moreover, the price for such systems will drop with each new generation of vehicles, and the systems will also become the norm in smaller fleets.
In total, seven service segments are emerging as battle fields, with different business designs competing to exert control and extract value.

Each service segment contains a bundle of connected car services, which

- are based on a set of telematics functionalities.
- belong to one self-contained ecosystem.
- have access to the same profit pools.
- target the same customer group.
- contain different business designs tapping the same power sources.

1. Safety and remote service
A fully customized aftersales service portfolio could be offered based on the eCall platform.

2. Fleet management service
Telematics hardware penetration enables, but does not determine, fleet management service penetration.

3. Mobility service
Vehicle telematics will become an additional platform for offering innovative mobility services.

4. Navigation- and location-based service
Increasing location-based B2C and B2B opportunities have emerged through enhanced navigation technologies.

5. Infotainment service
Web-based information and entertainment services are offered in an in-vehicle environment.

6. Insurance service
New policy offerings and differentiating customer services are enabled based on a better driver database.

7. Payment and commerce service
Mobile payment services will be adapted and extended to in-vehicle use.

STRATEGIC POSITIONING WITH THE RIGHT SERVICES
Mobility and infotainment services have gained a new distribution channel through connected cars. Two trends are generating enormous growth potential: customers’ growing desire to access intermodal functionalities at all times with a telematics system and to use a car-sharing service rather than own a vehicle. However, users are still reluctant to pay for the services offered. Navigation services will continue to evolve, whereas mobile payment systems are still at a very early stage and only gaining momentum slowly. The challenge here is to boost acceptance both among users and business partners. In the insurance industry, new, region-specific possibilities for product development will take shape, as well as for customer and accident management. There are seven connected car service segments emerging in which OEMs, suppliers, and aftermarket players will have the opportunity to earn money in the future. Companies that concentrate on their core competencies, target a specific position with the right services and, thus, offer an attractive and comprehensive bundle, stand a very good chance of success.

FOCUS ON ONE’S OWN STRENGTHS
Automotive manufacturers have decisive advantages, namely, their existing customer bases and cars. In the years to come, the premium automakers’ primary goal must be to keep their edge in innovation and integration and to transition from their past activities as system integrators to their new role as service integrators. This involves gaining content supremacy, as well as bundling and operating a multitude of in-car services. Furthermore, manufacturers must make numerous correct decisions in terms of which platform, standards, content or services to adopt. This, of course, is not without risk. Banking on the wrong smartphone connection may already have negative
consequences. Manufacturers should concentrate on their own strengths in the service segment, i.e., to focus on vehicle-related services such as safety and aftersales services. Providing automatic maintenance scheduling, for example, generates more value than other services because it secures both the car and the margin. It makes little sense, however, for premium companies themselves to provide weather and navigation data or music streaming. Manufacturers must find the right partner, or expand existing alliances if they want to offer these services soon.

Volume manufacturers will need to partner with system integrators to create comprehensive service bundles. This calls for the best partner and new business designs. For example, Renault and Atos, the French IT service provider, have entered into a strategic partnership to sell connected car services. In this venture, Renault uses Atos’ IT infrastructure, which integrates a large variety of content providers, and also offers an app store and a payment function. The deal allows Renault to pay Atos on a transactional basis.

Also, aftermarket players are racing to gain greater control in the vehicle. Apple’s Siri voice control system, for example, will be integrated into eight different global automakers’ vehicles—including Audi, BWM and Daimler. With its successful cloud-based infotainment services, aha Radio is partnering with several automakers—among them are Chrysler, Ford and Porsche. The aim is to pre-install infotainment platforms that offer personalized, in-car Web content. However, aftermarket players also face enormous challenges.

NEW REVENUE MODELS
Operating connected car services will give rise to new payment models. Today, many services are offered to end-users free-of-charge in an attempt to gain valuable user data. For example, WAZE, a provider of free social GPS and navigation services, has started to launch advertising platforms and promote B2B activities. Google and eBay are also combining free location-based search services with advertising and shopping.

In the future, however, money will also be made with the customer. Subscription models will make it possible to achieve an attractive profit with the right service bundles. Oliver Wyman’s calculations show that the connected customer is worth several hundred euros per year. For example, an Internet-savvy premium car driver might spend up to 500 euros per year on connected services. The customer would pay directly, by transferring personal transaction data, or as a result of changing consumption behavior and shifting spending to the automaker, e.g., by making use of automatic maintenance scheduling. Even today, millions of customers are willing to spend some 100 euros per year on Internet music streaming alone. This will rapidly spread to in-car infotainment. Commissions for service mediation, advertising or listing fees are other important value sources. Furthermore, increasing aftersales loyalty, and new business designs for insurances such as pay-as-you-drive or pay-how-you-drive offer additional potential. The benefits are enormous, especially for premium OEMs. They possess the car and the necessary system integrator capabilities. It is now a matter of stepping on the accelerator, learning the necessary lessons, and bringing the service bundle to the customer.
WARRANTY IMPROVEMENT: THE DRIVE TO ZERO

There is a single lever that can improve customer satisfaction, reduce cost and become a source of competitive sustainable advantage. It is eliminating warranty. Impossible? Maybe. But simply making the effort can significantly cut auto manufacturers’ costs and make customers happy.

Auto manufacturers set aside nearly 3 to 5 percent of annual revenue to pay for mistakes. That’s as much as the entire annual research and development budget of a typical automotive original equipment manufacturer. The release of warranty reserves from the balance sheet also improves asset productivity and frees up capital to be re-employed more productively elsewhere in the organization or returned to shareholders.

Warranty is similar to quality improvement, and some of the improvement levers are the same, but there is an important difference. Warranty costs occur when there is a breakdown within the organization that leaks outside to the customer. Quality costs are non-conformance costs when mistakes are caught before they make it into the customer’s hands. Warranty costs run the gamut from paying the price for design short comings and defective parts to servicing warranty in a less-than-cost-effective manner.

A NEW WARRANTY PARADIGM

Most companies view warranty and quality costs as a cost of doing business. Auto manufacturers compare their performance to their peers. Instead, warranty and quality costs are better seen, as the Japanese say, as muda, or waste. Waste should be eliminated. The goal of actually reducing warranty costs to zero might be unattainable. But organizations must set the objective and strive to achieve it, in order to move off of their current warranty performance plateaus.

Warranty elimination is difficult to do because it requires a seamless integration across the value chain. A holistic view of product development and costs, coupled with true cross-functional collaboration, is the only way the various elements of an enterprise can look beyond narrow functional metrics to reduce overall enterprise costs.

Andy Chien, John Lucci, Joern Buss

3-5% of annual revenue OEMs set aside to pay for mistakes.
Plenty of barriers stand in the way of eliminating warranty reserves. Auto manufacturers are selling customers extended warranties and service contracts, and customers expect immediate repairs. As vehicles become more complex, reliability issues mount. Internal barriers within companies also frustrate the drive to eliminate warranty, such as the mind-set that warranty is an acceptable cost, a lack of experts to solve the problem, the difficulty to create cross-functional teams, and the dealers who rely on profits from warranty repair work.

STARTING THE DRIVE TO ZERO

The key to pushing warranty costs to zero is a systematic and integrated introduction of tools for short-, medium- and long-term change. The following framework provides a view of such tools and techniques. While many of these tools have been applied in isolation or by function, it’s better to use them all at once.

Some warranty elimination tools and techniques will have immediate impact, particularly those aimed at improving the way warranty is managed and administered. For example, reducing the cost of parts with more efficient packaging and shipping, establishing systems to better handle claims and
evaluate dealers, and creating an early detection and response system. Changes for long-term impact involve designing vehicles to meet customer expectations, paying attention to quality, reliability and durability engineering. The process can also include reducing product complexity and better managing supplier quality. The short-term changes can produce immediate benefits, but the long-term changes will potentially have a greater magnitude of impact.

Create enablers for warranty improvement within the organization. These can include setting up cross-functional warranty metrics that provide a common set of objectives for each function, making continuous warranty improvement part of each executive’s management objectives, and elevating warranty oversight to an executive position that reports directly to the chief executive.

It’s worthwhile to ask the question: What do we need to do from an organization and tools perspective to start the drive to zero and eliminate warranty? Sustained continuous improvement on warranty can cut costs and boost revenue. Equally important, low tolerance for warranty costs can become a competitive advantage that is difficult for competitors to match.

**Warranty by source and RYG cost recovery status**

Warranty cost recovery on components where suppliers have primary design/integration responsibility lags at most OEMs

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### Supplier recovery observations

- Up to 40 percent of warranty costs are borne by OEMs vs. being recovered from suppliers with primary design/integration responsibility
- Supplier design/integration warranty recovery has lagged for a host of issues
  - Unclear responsibilities/poor communication
  - Lack of robust root cause analysis pinpointing reason for failure (vs. source of failure)
  - Not consistently prioritized/lack of functional accountability to pursue recovery

### Supplier recovery best practices

- Well-defined design and integration RASICs that are mutually exclusive, collectively exhaustive
- Neutral entity focused on rigorous root cause analysis to avoid perception of finger pointing
- Functional organization tasked with pursuing and resolving supplier warranty recovery issues (included as part of their objectives)
- Pragmatic settlements that still allow full warranty recovery over time vs. large one-off payments
- Supplier warranty recovery metrics
As 2013 gets started, western Europe’s automotive industry finds itself in a state of upheaval. Southern European markets have been hit particularly hard by the debt crisis. This is not only true for manufacturing countries such as France, Italy and Spain, but also for Portugal and Greece. Only Germany and the UK have been able to maintain their market level—more or less. However, Western Europe’s importance as an automotive sales market has begun to dwindle. After a loss of 9 percent in passenger car and 10 percent in commercial vehicle sales in 2012, we can expect a continued, albeit slower, decline in these figures this year.

The weak economy in Western Europe has not affected German automotive manufacturers quite as much because of their global orientation—a strategy that they implemented and pushed ahead during better times. First and foremost, the German companies have been helped by their production plants in China, but they have also benefited from their factories in Latin America, as well as their stepped-up involvement in the U.S., Russia and India. These actions have helped German manufacturers increase their market penetration in these growth regions. Moreover, exports contribute to stabilizing domestic manufacturing. By contrast, manufacturers in other European countries that mainly target the European market and have substantially fewer production plants in Asia or America are today struggling to cope with heavy losses. In light of global competition, it is more crucial than ever to have the right product portfolio and market positioning. Companies that failed to rigorously pursue the right strategy early on are now forced to take steps they shied away from in recent years—namely, to adapt their capacities. Looking at European manufacturers as a whole, it becomes clear that it is not a matter of general overcapacities, but of non-competitive capacities. These need to be phased out—a necessary step that is not only painful for the affected OEMs, but might also plunge them into a full-blown fight for survival.

Our FAST 2025 study reveals why German automotive manufacturers are so successful—they have taken the right road. The shrinking European market has not prevented them from maintaining their value creation level in Germany or from increasing their global production. However,
in view of ever stronger competition among geographic locations, certain politico-economic conditions need to be considered. Today, German OEMs are the winners, and they are poised to benefit, especially from the rise of China, if they adapt to the growing wishes and requirements of Chinese customers. By doing this, they can fully realize their growth potential—despite tougher competition, especially from other Asian countries. Consequently, a liberal trade policy with truly open markets is of utmost importance to the German automotive industry. It is crucial that all markets are accessible in the same way that European countries are.

But there is another vital prerequisite. It is not enough to just meet the market’s requirements. The German automotive industry has successfully fought off international competition in the past, and continues to do so today, largely by partnering along the value chain. German automakers and their competitors agree that the country’s auto industry draws its strength from the collaboration of OEMs and independent suppliers with a sharp eye on product and process innovation. Both large and medium-sized companies make important contributions. Because of the latter, Germany’s supply structure is distinctly different from that in other countries. Mid-sized suppliers, notably family-run companies, play a particularly important role in Germany. In the last two decades, i.e. after the recession at the beginning of the 1990s, mid-sized suppliers have significantly improved their position. Not only have they boosted their revenue and staff numbers, they also improved their efficiency, technology, quality and international positioning.

German suppliers are active in all the world’s relevant production regions. Moreover, in recent years, they have aggressively expanded their positions in Eastern Europe, Latin America, the United States and China. This strategy has helped them to also strengthen their locations in Germany. Last year, the German supplier industry’s overall revenue rose to an all-time high of 70 million euros while the number of people working at component makers rose to more than 290,000. Thus, the industry is in better shape than ever—both in the national and international arenas.

However, the supplier industry must also have enough funds to finance its investments and innovations, and this means that it needs to achieve profitable margins over the long term. But more and more often, suppliers fail to do so. The pressure customers exert on costs causes margins to shrink, making it more difficult for many companies to strike the right balance to manage their risks. Even if international competition is fierce, it is essential not to put too much strain on the supply chain’s economic performance. It seems that this lesson is once again being taken more seriously. VDA sees it as one of its primary tasks to publicize this insight for the benefit of all of its members. Partnerships based on trust and fairness make or break the performance of the entire automotive value chain. Only if we maintain our ability to perform over the next decade will we be able to fully benefit from the growth markets’ potential—and secure the future of Germany as a location for automotive production and development.
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Oliver Wyman’s global Automotive Practice supports clients with strategic topics like brand management, customer orientation, corporate and business strategies, market, competitive and technology analyses, product development, innovation management, sales strategies and after-sales programs. Operational optimization includes purchasing, production optimization, efficiency improvement programs, reengineering, turnaround management and restructuring. In addition, Oliver Wyman offers the whole range of mergers & acquisitions consulting services, from partner search to evaluation, transaction support and post-merger integration.

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