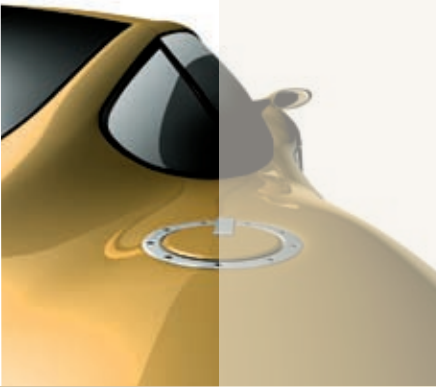


OLIVER WYMAN

Automotive



2015

car innovation

**A comprehensive study
on innovation in the
automotive industry**



MARSH MERCER KROLL
GUY CARPENTER OLIVER WYMAN

Contents

Executive Summary	4
Oliver Wyman's "Car Innovation 2015" study	
<hr/>	
Megatrends: Innovation Focus	6
Envision the long-term chances of innovations	
Cars for an aging population	
New cars for megacities	
Determine your individual innovation focus	
<hr/>	
Technology: Innovation Potentials	10
Recognize technology chances and manage the risks	
"Car Innovation 2015" technology roadmap	
Chances of and threats to hybrid power trains	
Choose and manage the right innovation projects	
<hr/>	
Customer: Innovation Acceptance	14
Include the customer's perspective	
Why innovations fail in the eye of customers	
Assessing the take rate of optional equipment	
Build customer understanding	
<hr/>	
Business: Innovation Economics	18
Keep the system from collapsing	
Basic figures on R&D	
The chances of low-cost designs	
Innovate your assembly concept	
Devise R&D activities to meet the cost agenda	
<hr/>	
Strategy and Organization: Innovation Management	22
Create an "Innovation Strategy Framework" that suits your needs	
OEM example: "Architectural revolutionizer"	
Supplier example: "System connector"	
Check your "Innovation Strategy Framework"	
Ten success factors	
Areas of action for innovation managers	
<hr/>	
Innovation Consulting	30
Five consulting services in innovation management	
<hr/>	

Introduction



The changing role of innovations in the automotive industry

Dear Reader,

In 2001, Mercer Management Consulting (now Oliver Wyman) published a comprehensive study titled “Automotive Technology 2010.” Since then, this study has become the basis for many strategy discussions in the industry and inspired many of our automotive consulting projects. Six years later, the new study, “Car Innovation 2015,” continues this trend-setting work and expands the technological perspective to all aspects of innovations, not just the technological ones.

“Car Innovation 2015” analyzes the complete framework of automotive innovations: societal and governmental influences, technology trends, the voice of the customer, innovation economics, and innovation management and strategies. For more than nine months, over 30 experts at Oliver Wyman have contributed to “Car Innovation 2015.” The study comprises an in-depth expert poll, a consumer panel, a strategic choice analysis, a thorough analysis of more than 300 innovations, a car dealer field study and intensive database research.

This brochure introduces the five topics that “Car Innovation 2015” addresses: megatrends, technology, customer, business, strategy and organization. It also contains recommendations and areas of action involving innovation management at automotive suppliers and car manufacturers. During 2007, we will publish special brochures covering each chapter – and, of course, there will be in-depth company presentations by Oliver Wyman experts to those interested in realizing some of the ideas presented in the study.

Yours truly,

Two handwritten signatures in black ink. The first signature is 'Jan Dannenberg' and the second is 'Jan Burgard'. Both are written in a cursive, professional style.

Jan Dannenberg and Jan Burgard
Oliver Wyman
Automotive

Oliver Wyman's "Car Innovation 2015" study

"Stagnation means regression" to innovation management in the automotive industry. All of the auto executives whom Oliver Wyman interviewed in the course of the study were convinced that innovation was one of the most important success factors to maintaining a strong competitive position in the auto market. Innovation is also a key to resolving most of the global challenges that the industry faces. Without innovations by the auto industry, the entire concept of individual mobility is put at risk.

In its analysis of more than 300 innovations, Oliver Wyman has identified the potential for commercial blockbusters, such as hybrids, sequential multistage turbochargers, light-emitting diodes, intelligent driver-machine interfaces or electro-mechanic braking technologies. Electronics remains the biggest enabler of and driver behind 60 percent of all innovations. But the focus is shifting from single to system innovations, i.e. new functions in a car through the networking of existing components and modules. Almost all areas of a car will improve: fuel efficiency (up to 30 percent), emissions, safety and security, seamless connectivity and infotainment, driving dynamics and performance, comfort, flexibility and room – and with more value for the money.

R&D spending

In 2005, the automotive industry invested EUR 68 billion in research & development. Through 2015, this number will rise to EUR 800 billion.

However, both OEMs and car suppliers do not always meet the needs of the end customer. Most car drivers want sound, reliable products at affordable prices. The total cost of ownership will remain the most important buying factor – a fact that limits the number of successful innovations in the auto industry. Today, the entire innovation process, from the customer, the car dealer and the OEM marketing department to R&D at both OEMs and suppliers, is highly inefficient and ineffective. Within the next ten years, approximately EUR 800 billion will be spent on R&D – roughly 40 percent of that money will be invested incorrectly. For this reason, every OEM and supplier must screen its innovation portfolio to identify the innovations that really promise to meet the driver's needs. An integrated and focused marketing plan will help position the concept of innovation in the driver's mind.

In 2005, the industry invested EUR 68 billion in R&D – that is 4.2 percent of sales, or EUR 783 per vehicle. The continuous cost pressure in the automotive industry created by legislation, competition, increasing risk and stagnating customer demands has a strong impact on innovation management. Traditional cost-cutting programs are not enough – our forecast shows an additional EUR 1,500 of cost reduction (or 11 percent of costs) must be implemented to make car production a profitable business in the future. OEMs and suppliers will have to significantly improve efficiency in all R&D processes to keep costs under control. Furthermore, the effectiveness of each innovation must be investigated. Cost-improvement measures, such as offshoring of engineering, complexity-reduction programs, standardization and modularization or the development of low-cost cars will help the industry control some of the cost increases produced by the growing number of functions.

Executive Summary



This will be accompanied by structural changes in the auto industry's R&D departments. OEMs will only slightly increase their R&D spending. While Western car manufacturers will cap their R&D investments, OEMs from China, India and South Korea will boost their spending on innovation. Overall, the supplier sector and engineering service companies will be the winners of this development with additional R&D spending of EUR 20 billion in 2015 (in 2005: EUR 46 billion). The concentration process in the supplier industry will improve innovative strength and networking opportunities with other partners – another way of cutting costs while increasing the quality of innovations.

Methodology of "Car Innovation 2015"

In addition to using the findings from over five years of project work, Oliver Wyman interviewed 700 people in a series of surveys, analyzed 315 of the most significant innovations in the automotive industry, and studied 500 suppliers and 15 OEMs.

Oliver Wyman has analyzed the innovation strategies of the industry's most successful auto companies. The study "Car Innovation 2015" identifies the levers that car manufacturers and suppliers must pull to become state-of-the-art innovation leaders. Depending on the business design of the supplier and OEM, four dimensions must be brought into alignment: innovation proposition, competence focus and collaboration, innovation business case, and innovation organization and structure. The leading suppliers in innovation management generate a 16 percent higher EBIT margin than their peers – all by employing a clear innovation strategy and balance along those four dimensions. The Oliver Wyman study "Car Innovation 2015" concludes with five recommendations for innovation management in the automotive industry:

- Increase customer orientation and marketing focus on R&D
- Generate a diverse innovation product & services portfolio
- Improve R&D effectiveness and efficiency; reduce innovation risks
- Enhance the innovation culture and organization
- Align innovation strategy according to Oliver Wyman's "Innovation Strategy Framework"

Innovation Focus



“Without innovations as an answer to the key challenges of global megatrends, the entire concept of individual mobility stands at risk.”

Envision the long-term chances of innovations

The worldwide megatrends in politics, societies, economies and technology define the requirements that future cars will have to fulfill – and these will affect almost every aspect of the automobile. “Car Innovation 2015” has identified 27 megatrends that will have a significant impact on the automotive industry. Innovation strategies must reflect the respective trends in order to meet technological standards, economic imperatives, customer needs and government regulations.

At first glance, many of these trends may seem all too familiar and fail to inspire any creative thinking. But long-range repercussions to innovation strategies are linked to each of these megatrends. Take the aging society. It is likely to have a powerful effect on fashion cycles, technology penetration and even societal ideals. In ten years, the average customer will be significantly older than today and will have a very different set of needs. In order to succeed, technologies must be both easy to use and easy to understand by older consumers.

Megatrends

More than 20 megatrends are having a strong impact on the automotive industry. Functional and cost innovations are the answer to most of them.

The ongoing specialization in engineering and manufacturing will cause technological product differentiation among manufacturers to continuously decrease. As a result, the value proposition in the automotive industry will continue to move downstream, with even larger amounts of production – and of R&D – shifting to suppliers. Modularization is a necessary technique to better control the increasing complexity of cars. Car manufacturers will focus their innovation efforts on module interfaces and on modules’ brand-defining features (for example, security for Volvo, comfort for Mercedes-Benz, reliability for Toyota), and will outsource the safety issues to suppliers.

Overcapacities in all manufacturing areas will continue to exert enormous cost pressures on the industry. At the same time, raw materials prices will become increasingly volatile, making flexible pricing a necessity. While the polarization in wealth distribution will not lead to a collapse of the middle, it will support the success of low-cost cars as the vehicle segment with the fastest growth worldwide. Toyota was the first to recognize the chances of new low-cost designs as an enabler to new materials, methods of production and design principles. Such “cost innovations” will become a major R&D focus driving the industry beyond 2015.

Example: Cars for an aging population

In the majority of markets, the average new-car buyer is 40 years old. By 2015, that age is expected to increase by four years. Developing cars for this target group does not mean building “old-age cars.” It means equipping cars with design and handling features that the target group will find useful, exciting and desirable – without sacrificing the model’s overall statement. A car designed for an older target group might feature:

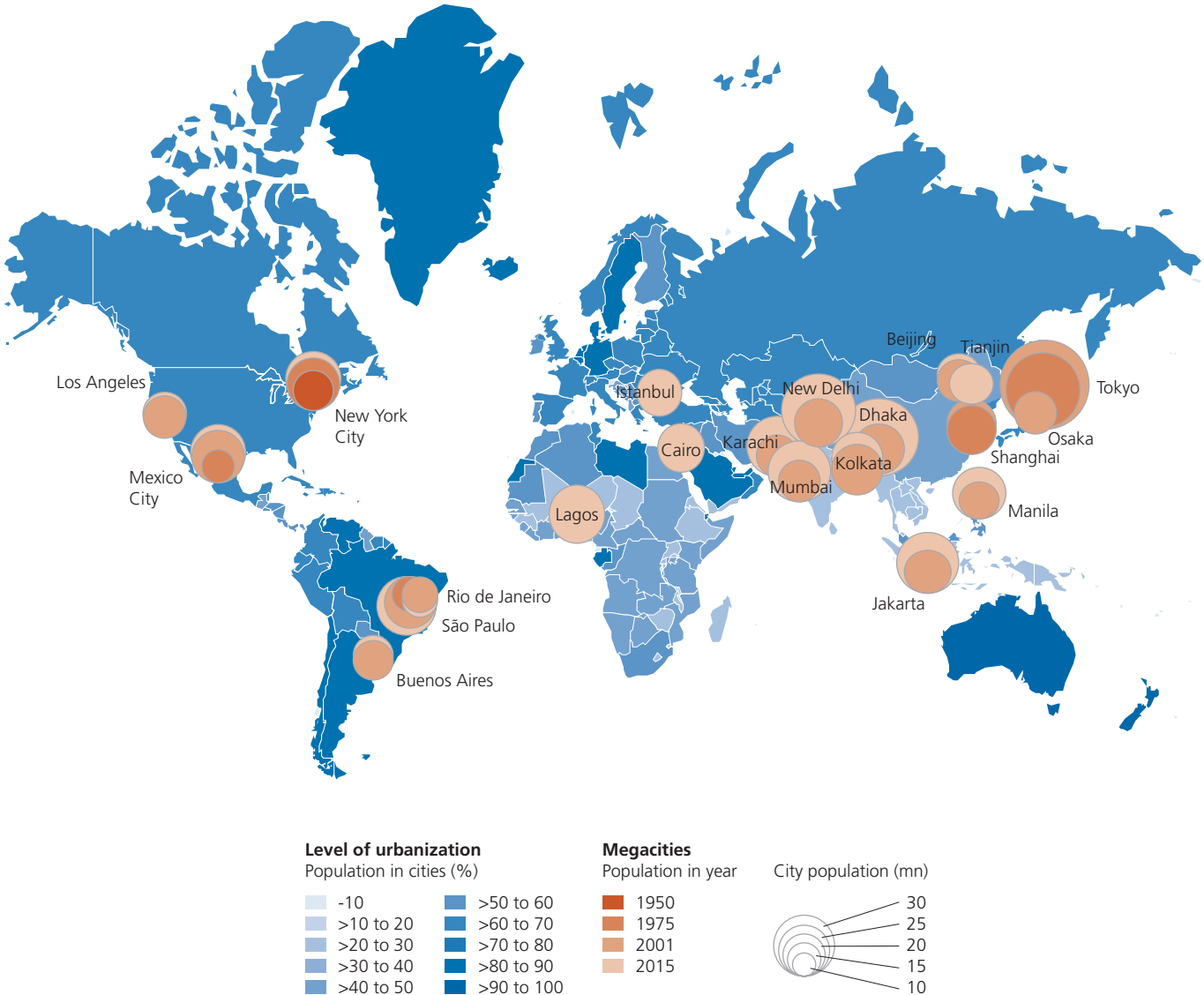
- Ergonomically designed boarding, loading and seating solutions
- Visual aids for better night and rain vision
- Easy-to-use functions even for complicated devices
- Timeless design features
- Speed and special attention recommendation displays
- Side and rear-view cameras
- Customized mobility services

Example: New cars for megacities

In 2015, 40 percent of the world population will live in cities with more than one million residents, 17 percent will live in megacities with more than five million residents. The cruising speed in these cities will average not more than six miles per hour while the typical driver will use his or her car three hours a day. Car design for this environment will take a very different approach from that of current vehicles. Some new focal points will be:

- Easy switching between relaxation and driving positions
- Emphasis on passenger entertainment and information systems
- Automation of stop-and-go traffic situations
- Concealment of passengers from outside viewers
- Protection of passengers from attacks
- Effective smog protection and air conditioning
- Nearly zero emissions

Emergence of megacities



Implementation: Determine your individual innovation focus

“Car Innovation 2015” takes a general approach to megatrends, trying to identify the developments that apply to the automotive industry as a whole. Individual companies should analyze these trends with a focus on their specific product range and aims. In the past, this approach has led to radical shifts in company and innovation strategies by Oliver Wyman clients.

Our project experiences have shown: Analyzing the direction and speed of market changes, and anticipating future customer needs will shift the focus of the entire organization: Long-term corporate targets become clearer and far more important, and the innovation focus widens from incremental improvements to system innovations.

One example: For its future range of products, an electric and electronics producer in the European car industry has identified an increasing customer need for mobility, safety, comfort, seamless connectivity and ease of use. Despite strong growth in China and India, the company’s main markets will remain Europe and the United States. Based on these assumptions, the company developed a vision of the future driver interface, defined the types of electronics it wants to produce in 2020 and devised a strategy to gradually evolve its current product range from the traditional focus on cockpit electronics to integrated driver interfaces (Human-Machine Interfaces) and security systems. A key element in this strategy is a strong collaboration with consumer electronics partners and a R&D joint venture to integrate procured infotainment functions.

Impact of megatrends on automotive innovations

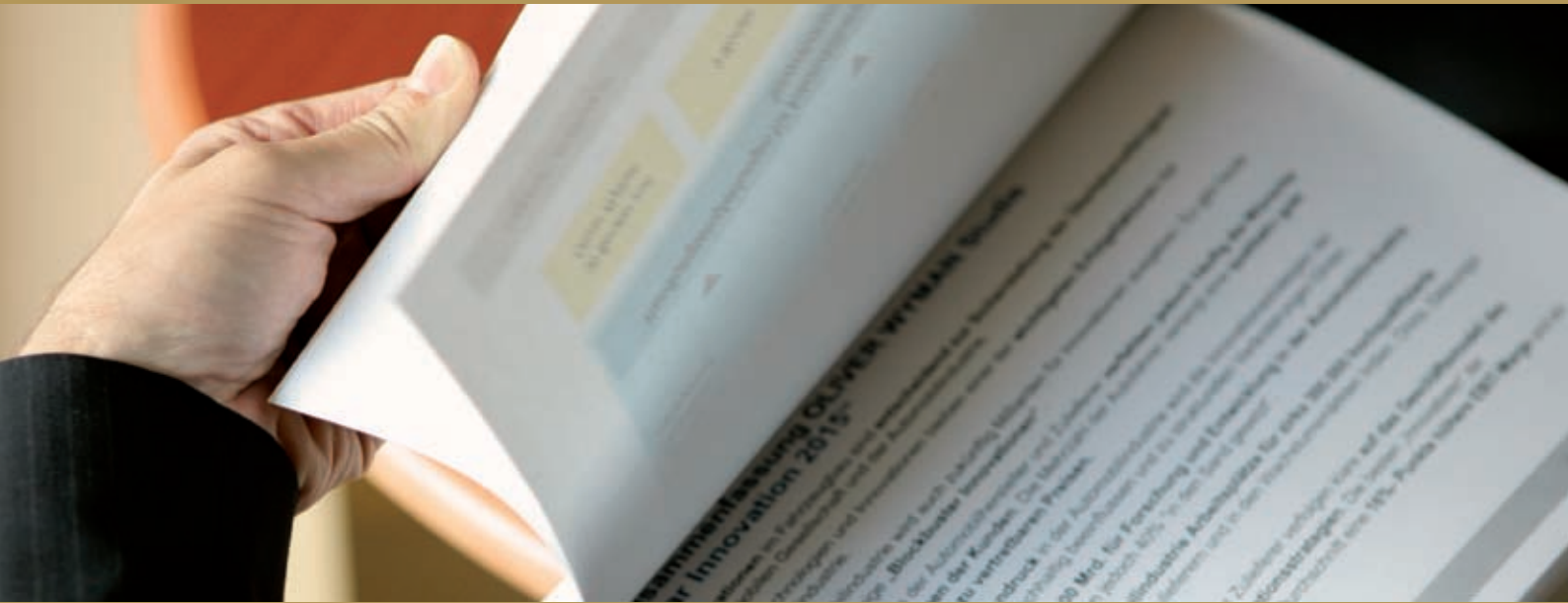
Top megatrends and their impact on ...

... innovation objectives		Extension of environmental protection	Stagnating population growth	Emergence of megacities	Aging, more active population	Polarization of income distribution	Increasing demand for mobility	Demand for connectivity, simplicity	Increasing demand for safety	Individualization of demand	Increasing technological complexity
Functions	Safety & Security	High	Low	Low	High	Low	Low	Low	High	High	Low
	Comfort	High	Low	Low	High	Low	Low	Low	High	High	Low
	Performance & Dynamics	Low	Low	Low	High	Low	High	High	Low	Low	Low
	Infotainment & Connectivity	High	Low	High	High	Low	Low	High	High	High	Low
	Flexibility & Space	High	Low	High	Low	Low	High	High	High	High	Low
	Design & Feel	High	Low	High	High	Low	High	High	High	High	Low
	Simplicity	High	Low	High	High	Low	High	High	High	High	Low
	Emissions	High	Low	High	High	Low	Low	High	High	High	Low
Costs	TCO ¹ / Fuel	High	Low	High	High	Low	High	High	High	High	Low
	Materials	High	Low	High	High	Low	Low	Low	High	High	Low
	Energy	High	Low	High	High	Low	Low	Low	High	High	Low
	Labor	Low	Low	High	High	Low	Low	Low	Low	High	High
	Assets	Low	Low	High	High	Low	Low	Low	Low	High	High

¹ TCO = Total Cost of Ownership

■ no / low impact
 ■ some / medium impact
 ■ high / very high impact

Innovation Potentials



“Automotive companies must increasingly focus their innovation efforts on a very limited number of promising innovation projects.”

Recognize technology chances and manage the risks

A closer look at R&D spending by both OEMs and suppliers shows that around 40 percent of all investments go into innovations that never make it into the car or are never produced in sufficient numbers due to a lack of market acceptance. Of the remaining 60 percent, 20 percent is for necessary serial development. Another 20 percent is for innovations that fulfill legal requirements but do not add to a product's distinctiveness. Usually, these innovations do not pay off either. That leaves only a small remainder of 20 percent that represents profitable innovation investment. And more and more technologies are fiercely fighting over this sweet spot.

Innovation portfolio

Oiver Wyman's "Car Innovation 2015" brought to light that only ten percent of all innovations have the potential to become a real blockbuster. OEMs and suppliers must scrutinize the innovation portfolio to identify the right ones.

Only around ten percent of the automotive technologies under development at the moment have the potential to become blockbuster innovations. These technologies combine the two most relevant categories: The first category, market potential, consists of functional purpose, customer acceptance, regulation compliance and price level. The other category, a high degree of innovation, creates technological differentiation in the market, better intellectual property protection, high margins and a long harvest period.

However, blockbuster technologies come at a high risk. The bigger the innovation step, the higher the development risks. And market potential is a moving target. Take the fuel cell. It certainly is highly innovative compared with existing power-train concepts. But it has a very low market potential at the moment, given its still questionable road capability, uncertain price position and dependence on special fuels. However, this situation could change with time and turn the fuel cell into a true blockbuster.

Automotive companies must increasingly focus their innovation efforts on a very limited number of promising projects. In order not to place their bets blindly, they have to carefully assess the potential and risks of the technologies they want to explore and regularly reassess them.

Existing technologies, as well as technologies under development, always face the possibility of being pushed aside by alternative developments. In order to assess the technological and market potential of a given technology, its respective car module must be analyzed in terms of the key technologies being used, current trends and future innovations. The chances and risks of a given technology are also influenced by the different market structures, competitors and business models in each segment. Innovation cycles are constantly shortening while development costs are rising due to the higher complexity.

“Car Innovation 2015” technology roadmap

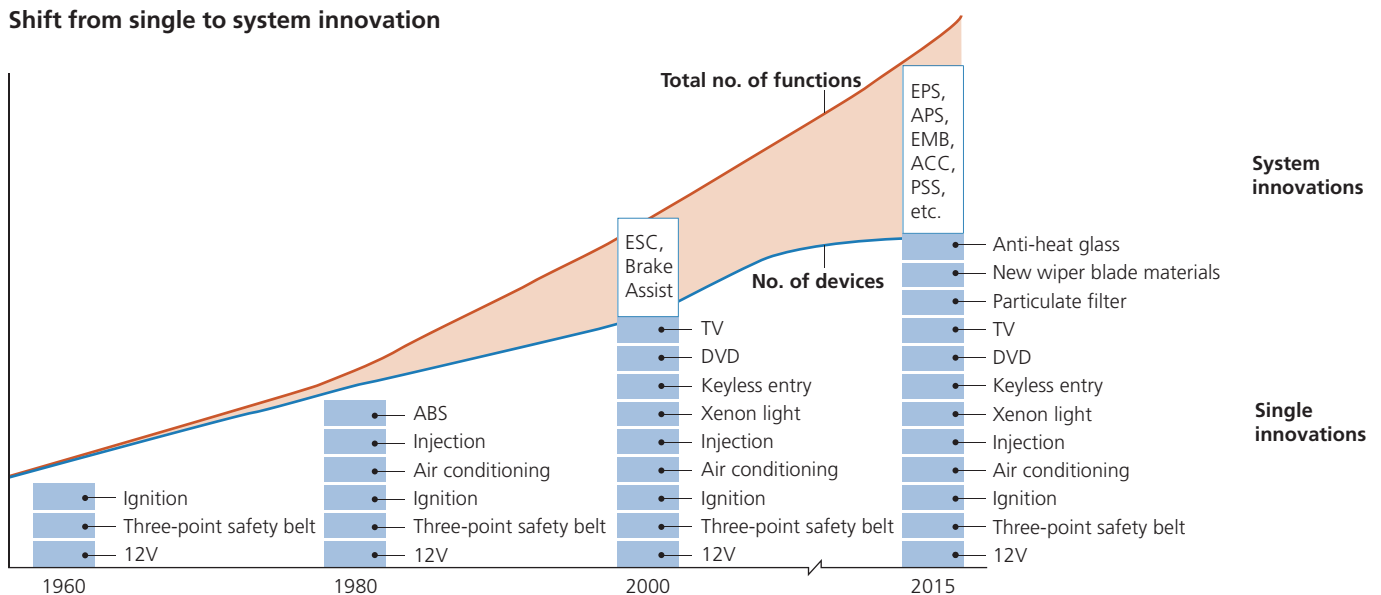
In “Car Innovation 2015,” Oliver Wyman has examined a representative sample of 315 automotive innovations in terms of their innovativeness and their market potential. This analysis suggests that little more than half of all current innovation projects in the automotive industry has a high likelihood of succeeding in the market. Besides producing a comprehensive industry innovation map and database, “Car Innovation 2015” has identified three technology trends through 2015:

Electrics and electronics will remain the most important enabler of automotive innovations through 2015 and beyond, and will grow by six percent annually. The sweet spots with a revenue growth of eight percent and more will be software, semiconductors, displays and power generation. Still, electronics will also face increasing cost-optimization pressures. Significant shifts will occur toward functional integration and carry-overs, and toward further standardization.

As more and more automotive functions become interlinked, a noticeable move from single innovations to system innovations is occurring. Whereas one device used to have one single function in the past, more and more devices will be used for two and more purposes in the future. One example of this evolution is the Mercedes-Benz PRE-SAFE system. It links existing systems like crash sensors and ESP with seat controls, seatbelts and the sunroof, adding safety functions to existing components.

The single most important innovation focus of the industry lies in emissions / fuel efficiency / weight, with new power-train concepts and architectures evolving. Through 2015, the production of power trains that use the traditional fuel of gasoline will decline 0.3 percent annually from 48.5 million units in 2005 to 46.5 million. Diesel engines will experience annual growth of 2.1 percent, from 12.6 million to 15.8 million, while alternative-fuel vehicles (biofuel, natural gas) will grow up to 3.8 million units per year through 2015. The strongest growth will be in hybrid power trains, with a compound annual growth of 21.4 percent, reaching 11 percent of all power-train concepts through 2015 (micro 70 percent, full 24 percent, mild six percent). Fuel-cell power trains will reach significantly less than one percent of production.

Shift from single to system innovation



Please note: ABS = anti-lock braking system, ESC = electronic stability control, EPS = electronic power steering, APS = adaptive power steering, EMB = electro-mechanical braking, ACC = adaptive cruise control, PSS = predictive safety systems

Example:

Chances of and threats to hybrid power trains

Key enabler electronics

The biggest technology challenge is still the ability to handle the complexity of electronics in the development process and in vehicle technology. Electrics and electronics remain the No. 1 enabler of automotive innovations.

Hybrid power trains will experience an annual growth rate of more than 21 percent through 2015, making this one of the premier automotive growth markets. In 2015, 11 percent of all cars will be hybrid. But full hybrids will account for only 24 percent of this market, due to the high additional costs and weight. 70 percent of all hybrid cars will be so-called micro hybrids, which are limited to recovering braking energy for use during acceleration and a start-stop function. Market acceptance will be high for hybrids in urban areas around the world, and the technology can be communicated easily, especially for micro hybrids. Hybrid technology is very versatile and, therefore, very universal: It can be used with all sorts of combustion engines – gasoline, diesel, natural gas and alternative fuels. Additionally, the architecture and components for hybrid cars are very similar to those of fuel-cell vehicles and electric cars. Hence, hybrid developments will position companies well in the potentially vital fuel-cell market of the future.

Implementation:

Choose and manage the right innovation projects

As mentioned, around 40 percent of all innovation spending is predetermined by compulsory developments due to legislation and by necessary serial development. The fundamental R&D question for automotive companies is to choose the right technologies and to define the right targets for them in the right time frame.

The first step for R&D optimization is to evaluate the future market potential of all ongoing innovation projects, to define the threats they face from other technologies in the same area and to model price scenarios. If other technologies are needed as helping or enabling technologies, will they be available and what is their market potential? For example, a battery management system for fuel-cell and electric cars needs available technologies in place to have a market. Which regional markets will be likely to embrace the technology?

For example, the Asian market is much more interested in infotainment systems than the European market. The next step is to ensure a proper marketing and business strategy for each innovation project. Many innovations fail because they are not explained properly to dealers and end customers or because there is no adequate business design to make an attractive offer and to capture the value. The story of General Motors' OnStar shows how important the business model can be for the success of an innovation. The OnStar information system was first introduced in 1996 as a dealer-installed accessory that was an exclusive GM feature. GM managed to attract only 105,000 users and generate a turnover of USD 49 million within the first three years. In 1999, the business model was changed significantly:

The value proposition was enlarged, offering safety and security features as well as remote diagnostics, information, entertainment and other services. Instead of charging a sales price for the device, OnStar started a subscription business, opened the system to all car brands and factory-equipped all new GM models with its device. By 2002, the number of users had jumped to 2.2 million, generating turnover of USD one billion.

Innovation Acceptance



“All too often innovations fail to address customer needs.”

Include the customer's perspective

All too often innovations fail because OEMs and suppliers know too little about customer requirements and do not pay adequate attention to innovation marketing. Only about one out of six innovations offered is actually purchased.

There are too many complicated innovations on the market to be received by the customers in the traditional intuitive way. Fewer and fewer drivers know about all functions in their cars. Even well-established functions remain hidden to many customers: 70 percent of German and U.S. car drivers know about ABS but only 40 percent are familiar with ESC.

Marketing focus

The car driver faces a flood of innovations. In addition to excellent functional improvements in innovations, the marketing process must be streamlined.

Even though many former optional features have become serial equipment, optional features have multiplied: In the BMW 7 series, the total rose from 14 extras in 1986 to 92 in 2006. Today's customers are overwhelmed by the sheer number of serial and optional equipment. Complicated feature names and acronyms often make it difficult for the customer to even guess what function a given extra could possibly deliver. 35 percent of all Lexus GS features use acronyms and abbreviations.

Different customer groups have different perceptions of the benefits of automotive innovations. To a large extent, the success of innovative features also depends on regional differences: Asian car buyers, for example, are much more interested in infotainment electronics than their American counterparts. Most car buyers have only a limited budget for optional equipment, but their price sensitivity is largely unknown to OEMs.

The customers' limitations and differences in knowledge, desire and budget lead to a very low order rate for new car features. Once a new function has been bought, however, customers are very content with it.

A visit to 50 car dealers uncovered little interest in selling innovations and even less knowledge about their nature and benefits. Regarding innovations that are non-core to the specific car brand, only two percent was actively sold to the customer.

In the future, OEMs and suppliers must test the chances for success of their innovations much more thoroughly. They need to know in advance what innovations are desirable to which groups of customers of which brand. And they need to develop models that explain which innovation can succeed against which traditional function within the total features portfolio.

Why innovations fail in the eye of customers

Consumer polling

The voice of the customer will help to identify the most valuable innovations. Simple and clear messages should explain the advantages of an innovation to the end user.

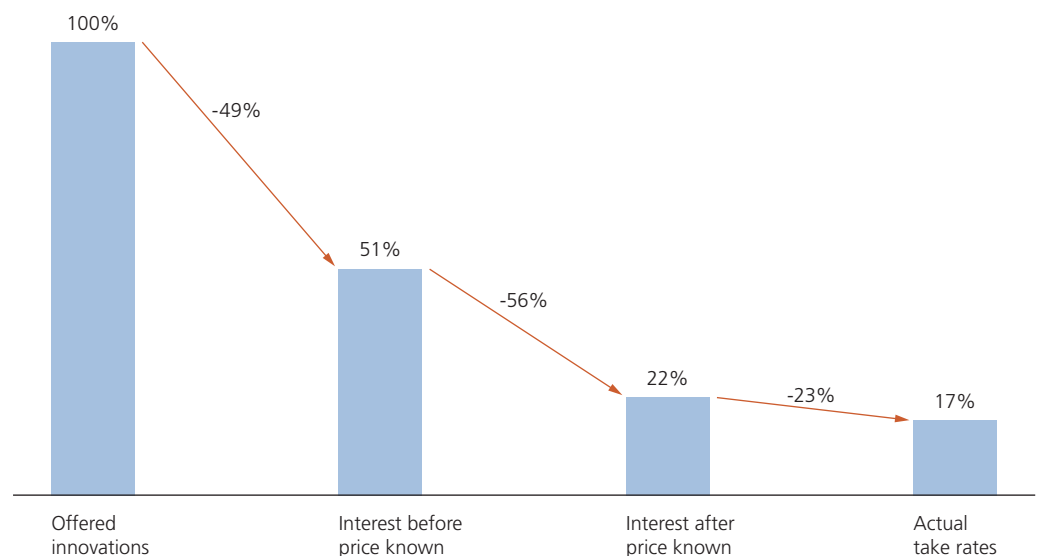
For “Car Innovation 2015,” Oliver Wyman polled 550 new-car customers in two big automotive markets: Germany and the United States. The customers were asked about acceptance and budget restrictions. A sophisticated marketing science tool (strategic choice analysis) was used to explore customer preferences about passive safety systems in connection with budget restrictions. Additionally, statistics on consumer behavior in the two countries were analyzed, and dealers’ knowledge and explanation of car innovations were checked in 50 test situations. Expert interviews were conducted at the OEM and supplier level to learn about the industry’s perspectives on key innovations. The results show that drivers feel overwhelmed by the huge number of innovations. In particular, the massive number of company specific names (4Matic, dynamic drive) and abbreviations (HCCI, JDLS) create confusion. “Car Innovation 2015” found one strong customer focus was the total cost of ownership. Customers overwhelmingly said they wanted a high level of mobility at an affordable price. This answer from consumers in two very highly developed automotive markets surely cannot be interpreted to mean that they just want a basic car. But the research does show that their basic focus is not on innovations but on mobility.

The dealer remains a primary information source in the sales process. “Car Innovation 2015” found out that some dealers take 12 minutes to explain innovations while others ignore them entirely. The average was five minutes. Mercedes-Benz dealers spent the least time on innovations, Lexus dealers the most. There was little connection between the emphasis that the brand put on innovation and the time that the dealer spent explaining or offering certain innovations.

The OEMs’ innovation marketing is clearly linked to the number of available innovations. Comfort and safety made up 46 percent of the OEM innovation portfolio during the “Car Innovation 2015” research. They also were the focus of the companies’ innovation marketing, with 56 percent of references. The topic “total cost of ownership” was among the lowest priorities in OEM innovation marketing (eight percent of references in marketing material), despite a share of 14 percent in the total number of innovations.

Only 17 percent of innovations are bought by the customer

Sales success of innovations¹



¹ Germany / U.S., based on 14 innovations in buying simulation

Example:

Assessing the take rate of optional equipment

Most automotive innovations are developed by suppliers – and most begin as optional equipment in new cars. As a result, it is hard for suppliers to adequately estimate how often their product will be ordered – the first uncertainty is how well the car will be received. And the second is how attractive the innovation will be to the customers of the new model. The estimates that the OEMs provide to suppliers tend to be overly optimistic and should not be used as a gauge for production planning.

In analyzing the buying intentions of car customers, “Car Innovation 2015” found a core set of extras that consumers tended to buy. Consumers will buy non-core extras only if they still have money in their budgets after they have bought the core set. However, the chosen extras differ not only by budget, but also by age group and region. For example, 45 percent of European customers over 55 years would like an automatic, while only 21 percent of younger customers want that extra. In Germany, 55 percent of all customers would order side airbags as an extra. But internationally only 46 percent would do so.

Using Oliver Wyman’s “Strategic Choice Analysis,” suppliers can determine in advance the range of the take rate for their extra. And what is more, they might adapt pricing, configuration or naming in ways that would increase their product’s chances of success.

Implementation:

Build customer understanding

Involve your people

The OEM or supplier must involve every employee and put him or her into the position of the end customer.

The results of “Car Innovation 2015” show that OEMs as well as suppliers need more knowledge about customer acceptance of innovations. That knowledge is vital feedback for prioritizing innovations, for conducting realistic planning and for improving innovation marketing.

Customer research on innovation knowledge and acceptance can best be conducted by choice analysis, identifying the preferences and price sensitiveness of complex buying decisions. The many questions to be answered for different markets include:

- How are innovations understood and valued in different markets?
- Which market demands which serial configuration and which extras?
- Which innovations highlight and strengthen the brand image? Which have the power to create differentiation in the market?
- How can dealers be motivated and supported to actively sell innovations?

Innovation Economics



“No. 1 challenge in innovation management?
Fulfill the cost imperative.”

Keep the system from collapsing

In industrialized countries, the price of the average new car has risen by 100 percent over the past 20 years while average income has increased only by 50 percent – and the gap between new car prices and incomes has continued to grow from year to year. The reason for this development is the increasing technological complexity that drives development and manufacturing costs, and the growing number of functions needed to differentiate the brands. This trend cannot continue much longer. Otherwise, customers could go back to smaller cars, a development that is not in the interest of the industry.

Cost innovations

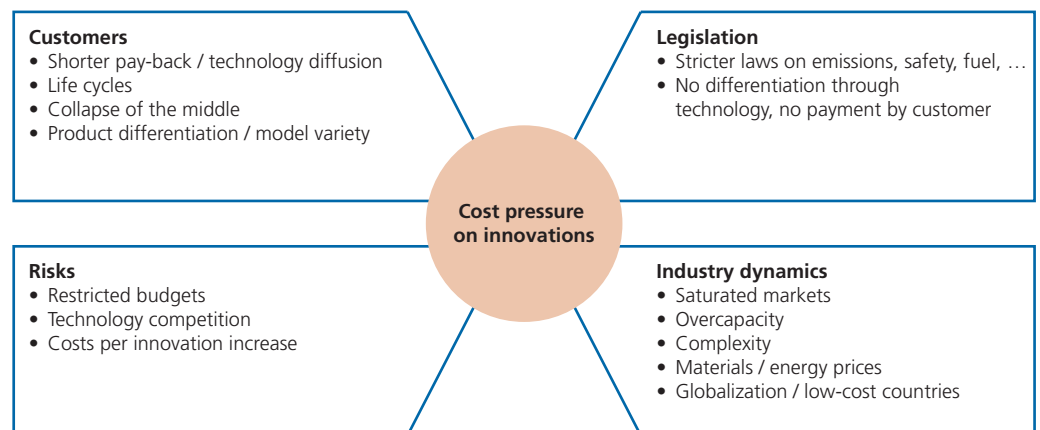
The automotive industry must put a much stronger focus on cost innovations. Otherwise, cars will become too expensive for customers.

Therefore, cost innovation is a central goal in the automotive industry, just as important as the traditional differentiation of functional innovations is. The heads of R&D at OEMs and suppliers have already embraced this new imperative. But it is difficult to change an innovation culture in an industry that is fascinated with functional enrichment.

The solution to cost-saving lies in a series of issues that the automotive industry must tackle simultaneously: The use of new and more cost-efficient materials needs to be explored in order to cut material and processing costs. Flexible manufacturing concepts will enable utilization of assembly plants to be improved. Future software will have to work in several models. Intelligently devised bundles of optional extras can reduce the number of possible configurations and eliminate expensive complexity from manufacturing processes.

At the same time, development costs must be lowered. All big automotive companies have launched R&D offshoring initiatives to lower engineering costs and help fuel localized development. Module approaches will reduce R&D costs per unit and enable companies to cope with a larger variety and shorter cycles of models. New design and test-bed software will also help lower the real-world costs of developing automotive components. These are just a few examples of the many initiatives needed to keep cars affordable for the broad public. Cost innovations and lower R&D costs will play a crucial role for the future growth of automotive companies and for the industry as a whole.

Cost pressure on innovations



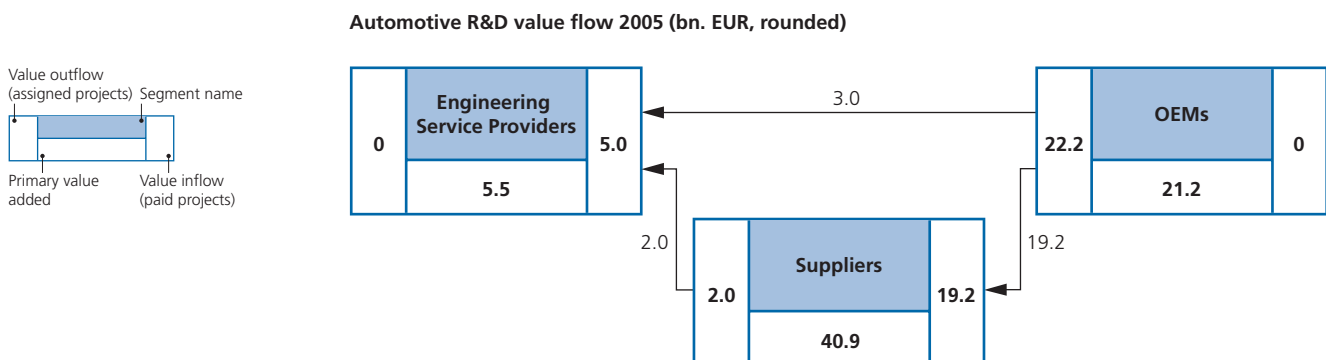
Basic figures on R&D

“Car Innovation 2015” has thoroughly analyzed the economics of technological innovations in the automotive industry. The figures are based on the financial data of 14 OEMs and 107 selected suppliers, covering about 90 percent of the automotive industry’s turnover worldwide. The 100 largest suppliers account for 75 percent of the total R&D expenditures of the supplier industry.

Between 2001 and 2005, the automotive industry showed a compound annual growth rate of 3.5 percent for OEMs and of 5.7 percent for suppliers (exchange rate fluctuations eliminated). During that time, R&D spending rose by 4.4 percent at OEMs and by 5.5 percent at suppliers, reflecting an increase in R&D outsourcing by OEMs. In 2005, the industry spent EUR 67.6 billion on R&D. By percentage of revenue, the figure was 4.3 percent for suppliers and 4.0 percent for OEMs. 60.5 percent of all R&D was done by suppliers, 31.4 percent by OEMs and 8.1 percent by engineering service providers.

The highest OEM R&D spending per car produced between 2001 and 2005 was by BMW, DaimlerChrysler and Honda. The lowest was by Suzuki, Renault-Nissan and Hyundai. Top spender BMW (EUR 1,796 per car) spent 15 times more than Hyundai (EUR 120 per car). The average was EUR 783.

Suppliers spend twice as much on R&D as OEMs



Example: The chances of low-cost designs

In 2015, about ten percent of all automobiles in Europe, China and India will be low-cost cars with sales prices between EUR 3,000 and EUR 7,000. Naturally, the segment is under enormous cost pressure and promises only small profits. However, most OEMs will want to have a low-cost design in their portfolio to serve as an “entry model,” and all big companies are working on low-cost models. R&D in an all-new low-cost model will probably never pay in terms of regained sales profits – but it holds tremendous promise for OEMs: To develop revolutionary materials, modules and processes that radically lower costs. Once in a mature stage, future low-cost techniques will help revolutionize other models, too. Low-cost cars could have new features such as:

- Reduced metal content to save on raw-material costs
- Foamed lightweight structures
- Low-cost module design
- Integrated small-engine power-train concepts (i.e. like motor scooters)
- Coated polymer windows
- Reduced assembly needs
- Centralized car electronics and simplified wiring

Example: Innovate your assembly concept

Worldwide, the automotive industry is plagued by overcapacities. The inflexible output of the car manufacturer's capital-intensive assembly lines creates the need to sell a more or less fixed number of models each year. However, assembly represents only 12 percent of total vehicle costs for development and production, and one third of the OEM's contribution to it. The current pressure to sell certain models at huge discounts is largely homemade. A more flexible vehicle assembly concept could change this situation fundamentally.

- Reduce complexity to gain flexibility: An increasing number of models with more and more production variants are the driving forces of complexity and costs. A Volkswagen Golf has more than 10²³ possible configurations compared with only 1,740 for a Toyota Corolla. Reducing the number of variants will help increase the number of models produced in one plant, making the system more flexible.
- Outsource assembly peaks: Currently, more than 99 percent of assembly value creation is in the hands of manufacturers. Outsourcing niche models to specialized suppliers (for example Karmann, Magna Steyr, Pininfarina, Valmet) would enable OEMs to adapt more smoothly to fluctuations in demand.

Implementation: Devise R&D activities to meet the cost agenda

Improvement of R&D economics

Within the next ten years, the automotive industry will spend EUR 800 billion on innovations. A close look at the effectiveness and efficiency of the innovation portfolio is needed.

There are two ways to enliven the automotive industry's cost imperative in R&D: develop technologies that make cars affordable and slash the rising costs of R&D itself.

Encourage cost innovations: Developing new and exciting functions is still the dream of any car engineer. Doing the same things more cost-efficiently is not, and probably will never be.

- Add regular screening of new materials to the R&D program to find materials that can be bought or processed at lower costs
- Introduce an incentive program to recognize extraordinary endeavors that lower costs
- Set cost reduction targets at 30 percent to find completely new ways of fulfilling the function of the module
- Broaden engineering scope, including components that lie up- or downstream of a company's own value chain

Bring down innovation costs: An average of five percent of total vehicle costs are spent on R&D. Due to cars' increasing technology and complexity, R&D costs tend to be about 4.5 percent per year. In order to at least stabilize R&D costs per unit, all R&D cost levers have to be combined:

- 40 percent of all R&D spending is on products that do not yield a sufficient return. Rigorous screening and quality management can stop futile projects sooner.
- R&D offshoring and outsourcing can be applied to ten to 15 percent of the total automotive R&D budget in the long term. Savings of ten to 50 percent are possible.
- New possibilities for virtual tests will help keep rising test costs under control.
- The bookshelf approach for modules will shorten development cycles for new models and considerably lower development costs per module.

Innovation Management



“Successful innovation development needs a system of elements that fit together like pieces of a puzzle.”

Create an “Innovation Strategy Framework” that suits your needs

Successful innovation development needs a system of elements that fit together like pieces of a puzzle: a clear innovation strategy that is closely connected to the company’s overall business model, the right team that has the culture to put the strategy to work, an organization that can effectively and efficiently steer the necessary innovation processes and an intelligent business case that enables innovations to be turned into tangible profit.

Oliver Wyman calls such a system the “Innovation Strategy Framework” (ISF). It consists of four elements: innovation proposition, business case, organization & culture, and competence focus & collaboration. There is not one ISF that is suited for all situations. Instead, typical success patterns are suited for different kinds of companies. Six innovator archetypes have been identified for OEMs and six for suppliers. Each describes a typical ISF profile in which the different elements fit together to form a coherent system.

Four elements

The Oliver Wyman “Innovation Strategy Framework” consists of four elements: innovation proposition, business case, organization & culture and competence focus & collaboration.

The innovator archetypes for OEMs and suppliers serve as models to understand, check and improve the different aspects of innovation: strategic R&D fit, organization and culture, competence profiles and cooperation needs, organization and leadership, effectiveness and efficiency, value capture by innovations, and strategic barriers against copycats. Many companies follow two or more innovation strategies at the same time – suppliers with different product ranges and OEMs with different brands.

In addition, innovation archetypes are not static role models, but evolve with time. Companies take typical development paths. Gentex, for example, started off as a niche performer with its photochromatic dimming mirrors in 1989. The company added climate controls and hands-free phone features in 2000, generating much higher market potential for its mirror lineup and becoming a functional enricher. The concept aims to integrate more functions to its mirrors in order to stay ahead of the competition and to capture more value with the core product. In 2005, Gentex introduced its SmartBeam headlights controller, a new niche innovation. In 2006, it integrated LED technology into exterior mirrors, further strengthening its position as a functional enricher.

Johnson Controls, as another example, began as a traditional functional enricher, upgrading traditional front seats with high-tech items. The company then moved on to provide complete interiors including cockpits, an archetype called system connector. At the same time, though, Johnson Controls continues its old role model, with such products as the HomeLink garage door opener.

OEM example: “Architectural revolutionizer”

This innovator type primarily focuses on process innovations that enable innovation of the product architecture. Examples of this type are Toyota or Volkswagen. Traditionally, the orientation was on pure mass-market cars. But a consumer-driven shift has occurred, bringing a new emphasis to a broad selection of customer-specific markets (low-cost, luxury, family, sports, etc.). Although architectural revolutionizers are largely cost-oriented, they try to deliver a high-end product that enables them to get a price premium. Limited R&D outsourcing helps them maintain control over the quality of their innovations.

Six OEM innovation archetypes

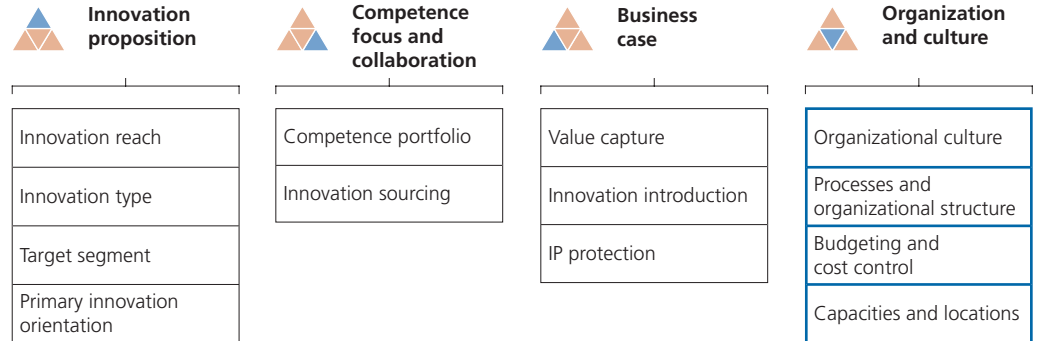
The archetypes serve as models to understand, check and improve the different aspects of innovation.

Architectural revolutionizers continuously drive the evolution of existing car concepts. Over the years, their focus has been on platforms and car modularization. Today, they produce many models on just a few platforms, and Toyota has even developed a “bookshelf” approach to its modules. The R&D competence portfolio of this archetype is quite specific: Toyota runs one separate R&D center for each of its platforms and its modules. A selected network of suppliers is embedded in the R&D portfolio, facilitating competence gaps in the OEM’s organization. R&D tends to be decentralized, with clearly defined processes. The motivation systems are strictly focused on increasing modularization. The future innovation focuses of architectural revolutionizers will be on standardizing car design by using strict “bookshelf” and platform strategies and devising new power trains. This innovator type will also be the most probable source for the next generation of low-cost cars.

OEMs

	Innovation archetype	Innovation proposition	Focus and collaboration	Business case	Company examples
1	Brand builder	Brand-oriented product innovations Mid-size volumes High-end customers	Specialized focus Strong supplier coops and R&D outsourcing	Brand image Premium Strong IP protection	BMW Mercedes-Benz
2	Fast follower	Improves innovations and brings them to the mass-market	Medium focus Selective coops Extensive R&D outsourcing	Low costs Fairly weak IP protection	Daewoo Hyundai
3	Mass-market adapter	Adapts and improves existing product innovations	Broad focus R&D outsourcing of whole systems Limited network	Low costs Weak IP protection Brand image	Ford GM
4	Architectural revolutionizer	Focuses largely on process innovation Shifts from mass- to niche-markets	Network builder Modularization Limited R&D outsourcing	Cost-oriented innovations Fairly strong IP protection	Toyota VW
5	High-end optimizer	Premium product innovations by systems and components enhancement	Specialized focus Very limited R&D outsourcing	Innovations Strong IP protection Brand image	Porsche Hummer
6	Cost and process specialist	Innovations based on new manufacturing processes Customer orientation	Broad focus Medium R&D outsourcing Formal partners	Low-cost product Fairly strong IP protection	Kia Dacia

Best-in-class OEM organizations and culture



Best practices	Performance by OEMs						Company
	Brand builder	Mass-market adapter	Fast follower	Cost & process specialist	Architectural revolutionizer	High-end optimizer	
Organizational culture <ul style="list-style-type: none"> Entrepreneurial, participatory continuous improvement systems High employee involvement, suggestion systems and rewards Client orientation 	●	●	●	●	●	●	Porsche
	○					○	BMW
Process and organizational structure <ul style="list-style-type: none"> Disciplined outside-in innovation strategy process <ul style="list-style-type: none"> Alignment to strategic technology roadmap Market-oriented implementation and monitoring process Efficient combination of <ul style="list-style-type: none"> Market-driven, regionalized application and adoption engineering (design-to-market) Technology-driven, deepening of core technological expertise Integrated engineering approach <ul style="list-style-type: none"> Cross-functional teams Co-engineering of product and process engineering department 	●	●	●	●	●	●	Porsche
	○					○	BMW
					○		Toyota
	○						Mercedes-Benz
Budgeting and cost control <ul style="list-style-type: none"> Stable, long-term oriented R&D budgets Utilization of cross-subsidizing of »star« by »cash cow« divisions Strict cost controlling 	○						BMW
	●	●	●	●	●	●	Toyota
					○		Toyota
Capacities and locations <ul style="list-style-type: none"> Hub-and-spoke organization in R&D division <ul style="list-style-type: none"> Centralized R&D offices at the headquarters Decentralized R&D in various countries and with networking partners 	○						BMW
	●	●	●	●	●	●	Toyota
					○		Toyota

Relevance for innovator archetype: ● Low ● High

Supplier example: “System connector”

System connectors integrate several existing components and modules into one functional system with optimized customer benefits. Examples are Hella and Harman/Becker. Their range of possible applications is very broad, as are their necessary skills. The R&D organization of system connectors tends to be decentralized and interdisciplinary. System connectors develop intensive innovation networks that enable them to integrate new systems, and they prefer open interfaces. Hella has repeatedly set industry standards in its fields, including with its joint venture of front-end systems, Hella-Behr-Plastic Omnium.

Network collaboration

Many supplier innovation archetypes draw heavily on the advantages of networking and partnerships.

This innovation archetype is primarily suited for mature technologies, enhancing them with intelligent interconnections. System connectors can deliver premium products as well as cost-sensitive solutions. However, as their work focuses on connecting mature components, they have little protection of their intellectual property. Product differentiation and barriers to competitors lie in the understanding of the end customer and in close cooperation with OEMs. Often, these innovator types also use customer brands to strengthen their position, as did Harman/Becker.

Suppliers

	Innovation archetype	Innovation proposition	Focus and collaboration	Business case	Company examples
1	Radical innovator	Replaces old systems or establishes new ones	Specialized focus Keeps know-how in-house	Price premium Strong IP protection	Siemens VDO
2	Functional enricher	Brings new functions to the market OEM and end customer focus	Functional integration focus Keeps know-how in-house	Price premium Strong IP protection	Gentex
3	System connector	Functional process or product optimization End customer focus	Expansion into new systems via coop networks Open interfaces	Price premium or low-cost Fairly weak IP protection	ZF Friedrichshafen
4	Process champion	Incremental process innovation to serve broader markets Adapts to customers	Process focus Open to coops	Low costs in mature techs Weak IP protection	ErlingKlinger
5	Niche performer	Product or process innovator serving niche markets End customer focus	Very specialized know-how Selective coops	Price premium Varying IP protection	Elmos
6	Module shaper	Focus on module design and processes Defines modules anew	Unique know-how combination Coop with OEM / system connector	Value capture from OEM Cost reduction for modules	Brose

Implementation: Check your “Innovation Strategy Framework”

Organization & culture

Innovation leaders in the automotive industry have a strong culture of creativity, openness and entrepreneurship. A quest to find new solutions through innovative technologies is a shared trait within these organizations.

Average OEMs and suppliers rarely think about changing their innovation strategies. Top performers regularly challenge the direction and means of their innovation management. A review using the “Innovation Strategy Framework” is done systematically.

- Analysis of the current innovation strategy according to ISF dimensions: A thorough analysis of the current innovation approach, the competence focus and existing collaborations, the business case of the innovation portfolio as well as the organization and culture is a crucial step to pinpoint the weaknesses of your company’s innovation strategy. This often leads to a complete overhaul of the innovation process and organization.
- Alignment of innovation strategy with business design: A clear understanding of a company’s own business design provides the context for the innovation strategy. A car manufacturer in the premium segment must align the innovation strategy to the position of the brand. A low-cost car producer will focus the strategy on cost innovations, not functions.
- Customer focus: A check should be done to determine how much influence the end customer has on your innovation organization. Improve the market research capabilities and create an innovation culture that incorporates the needs of your end customer.
- R&D efficiency and effectiveness: Each project in your innovation portfolio must prove that it adds value to the company. Reduce the number of innovation programs and encourage the organization to accelerate the innovation process. Support innovations that address substantial cost improvements.
- Open innovation and network collaboration: Explore the entire R&D organization and look for new ideas and engineers outside your company and even your industry. Develop alliances and networks with other OEMs and/or suppliers that will produce benefits (costs and intellectual capital) for both sides.

Ten success factors

Innovation proposition

- **Technological vision:** Top performers constantly scan their environment for long-term trends in the market and in technologies. They develop a long-term innovation vision and stick to it, no matter what the short-term trends are.
- **Customer knowledge:** Understanding customer preferences enables companies to better focus their innovation efforts on relevant issues. Customer research needs both a regional and a socio-demographic approach to be of value.
- **Strategy match:** Successful OEMs and suppliers match their R&D strategies at a very early stage, and very closely with the respective target OEM or supplier partner. This is especially true when the car architecture is affected, i.e. with module innovations.

Competence focus & collaboration

- **Competence focus:** The best innovators closely match their R&D competencies with their R&D strategy. OEMs and bigger suppliers with a diversified product range must continuously recalibrate their competencies to their strategic R&D targets.
- **Strategic partners:** With their increasing complexity, R&D networks are becoming a crucial success factor. Currently, it is mostly OEMs that are forming such networks. In the future, supplier-supplier and supplier-institution collaborations will increase.

Business case

- **Investment focus:** R&D funding must be independent of current business needs. In the past, short-term changes in the R&D focus have often led to long-term problems. Catching up with past R&D cuts has often proven to be extremely expensive.
- **Trend focus:** Relying on megatrends contributes significantly to the soundness of R&D investments, as these trends are highly predictable. Interpreting these trends in terms of a company's own business model is a main conceptual challenge for automotive companies.
- **Cost focus:** Leaders in innovation always have a strong cost focus, with respect to R&D efficiency and effectiveness. Regardless whether it is a single component or an entire car, the reduction of unit costs is the center of their innovation efforts.

Organization & culture

- **Outside-in strategy:** Top performers concentrate on innovations that the market needs and end low-value projects early. Processes that strengthen this ability are a common understanding of innovation aims within the company and a standard quality process.
 - **People involvement:** Companies that involve people from all levels in their R&D are much more successful innovators. The keys to employee involvement are easy and motivating communications, low hurdles for submission of ideas, and efficient and transparent filters for the incoming ideas.
-

Areas of action for innovation managers

Oliver Wyman recommends five areas of action to improve innovation management in the automotive industry.

Stronger focus on customers and marketing

Innovations can succeed only if they address megatrends, legislation, competition or the customer. The majority of today's car innovations are based on the engineer's creative act of invention. Too few of them are driven by the car user. Both OEMs and automotive suppliers must align their innovation management according to the customer requirements and future market trends. The product portfolio, the innovation marketing process, pricing policy, market research, close-to-market R&D centers, customer-segment innovations (i.e. brands, clusters, etc.) are all ways of improving customer and marketing orientation for auto-industry innovations.

Active reshaping of the innovation portfolio

An imbalance in the innovation portfolio leads to future growth gaps. OEMs and suppliers have to analyze and reshape their portfolios to gain a good balance of innovations in terms of potential and importance of innovations, strength and degree of innovativeness, external/internal innovations, timing, added value and profitability, customer segments, functional versus cost innovations, etc. The innovation portfolio must deliver short-term value as well as cover solid returns in existing or new fields of business in the future.

Improvement of R&D economics and risk management

To remain cost competitive, suppliers and OEMs must continuously improve their innovation economics. Three fields of action must be emphasized: Improvement in the efficiency of your R&D organization, i.e. reduction of the overall process costs and increases in productivity. Enhancement of your R&D effectiveness, i.e. more and better innovations for your enterprise. And assessment of the future risks associated with new innovations for your company in order to protect your business from potential losses.

Support of open organization and culture

The auto sector must open up. It should embrace innovation trends from outside the industry, for example, from consumer electronics or telecommunications. OEMs and suppliers must also build innovation networks to enlarge their competencies and reduce costs. Management needs to create an open environment that strengthens a collaborative innovation culture, increases the competence level of its employees and supports entrepreneurial action in the R&D department.

Alignment of innovation strategy

Suppliers and OEMs should regularly check their overall innovation strategy. The Oliver Wyman ISF serves as a guideline to ensure that the key deliverables of an innovation strategy are met: improvement of competitive position and long-term profitability. The innovation proposition, the R&D organization and culture, and the competence focus and level of collaboration must all be aligned to build a strong business case for OEMs or suppliers.

Five consulting services in innovation management

Consulting experience

Oliver Wyman's Global Automotive Practice has a track record of successful innovation improvement projects for both suppliers and OEMs.

Based on our broad project experience in helping OEMs and suppliers improve their R&D management, Oliver Wyman offers five consulting services that cover most of the challenges that the auto industry encounters in innovation management.

Innovation strategy

This in-depth consulting program analyzes your entire R&D organization, market trends, your competitive position, your technology portfolio, and major strengths and weaknesses. Based on our "Innovation Strategy Framework," we identify the key levers that will enhance your innovation strengths. As a result, you will have a clear guideline about your future innovation highlights and potential blockbusters, and an organization that will implement a sustainable innovation strategy.

Innovation acquisition and divestment

With more than 50 automotive M&A transactions in five years, Oliver Wyman is the leading management consultancy for acquisitions and divestments in the motor-vehicle industry. We identify acquisition targets that significantly improve your innovation strength. We prepare and manage the entire M&A deal and make sure that the post-merger integration succeeds. Our high value divestment methodology ensures that you get a maximum return in case you are selling off technologies.

Customer-driven innovation

In-depth analysis of specific innovation projects with respect to market success and overall value for your company. We help create a detailed understanding of key customer requirements, product features, price elasticity, competitive dynamics, and the demand for your innovation. Customer-driven innovation helps you evaluate the success and profitability of your R&D projects years before market introduction.

R&D excellence

This Oliver Wyman program helps you improve the competence level of your R&D department while reducing overall costs. In a joint effort with your R&D managers, we streamline your engineering organization, enabling it to become both more effective and efficient in all of your R&D processes. Our benchmarking database helps us identify the biggest improvement levers to build an excellent R&D organization.

Rapid innovation improvement

Within six weeks, we identify the key areas of needed improvements in your R&D program. We make recommendations that will quickly fix major weaknesses and will help you save money.

Innovation Consulting



Expertise & knowledge

Our consultants provide industry expertise and know how in innovation management.

Oliver Wyman's automotive consultants have broad industry experience and a commanding track record of successful consulting projects. We offer consulting services along the entire value chain of the auto industry: R&D, manufacturing, purchasing, sales and channel management, financial services, spare parts, and technical services.

Within these areas, Oliver Wyman's Global Automotive Practice supports clients in the following fields: mergers & acquisitions, brand management, corporate and business strategies, market, technology, and competitive analysis, value sourcing, product creation improvement, innovation consulting, process and organizational reengineering, efficiency improvement programs, sales channel and pricing optimization, as well as turn-around management and restructuring.

If you would like to receive more information about Oliver Wyman's Innovation Consulting Services, we would be happy to send you the material or to make a personal presentation. Please contact one of our Directors at Oliver Wyman's Automotive Practice.

Barcelona
Marina 16, Pl. 38
08005 Barcelona
+34 93 50 79 00 0

Madrid
Paseo de la Castellana
216, Pl. 13
28046 Madrid
+34 91 531 79 00

São Paulo
Av. Das Nacoes Unidas,
12901
Torre Norte - 33° Andar
04578-903 São Paulo, SP
+55 11 5501 1100

Chicago
10 South Wacker Drive
Chicago, IL 60606
+1 312 902 7980

Mexico City
Paseo de la Reforma
No. 505
Col.Cuauhtémoc
C.P. 06500
+52 55 5063 9000

Shanghai
3601 Hongkong New
World Tower
300 Huaihai Zhong Road
Shanghai 200021
+86 21 6335 3358

Detroit
600 Renaissance Center
Suite 2100
Detroit, MI 48243
+1 313 393 6800

Munich
Marstallstrasse 11
80539 Munich
+49 89 939 49 0

Seoul
Youngpoong Building
33 Seorin-dong,
Chongro-gu
Seoul 110-752
+82 2 399 5533

Dusseldorf
Neuer Zollhof 1
40221 Dusseldorf
+49 211 311 32 0

Paris
28, avenue Victor Hugo
75783 Paris Cedex 16
+33 1 45 02 30 00

Zurich
Tessinerplatz 5
8027 Zurich
+41 44 208 77 77

Oliver Wyman is a leading global management consultancy, combining deep industry knowledge with specialized expertise in strategy, operations, risk management, organizational transformation, and leadership development. The firm works with clients across a range of industries to deliver sustained shareholder value growth. We help managers to anticipate changes in customer priorities and the competitive environment, and then design their businesses, improve their operations and risk profile, and accelerate their organizational performance to seize the most attractive opportunities.

Oliver Wyman's thought leadership is evident in our agenda-setting books, white papers, research reports, and articles in leading external publications.

The firm's capabilities and intellectual capital are enhanced by our deep industry expertise, geographic range, analytical rigor, and hands-on, collaborative approach. Our professionals see what others do not, challenge conventional thinking, and consistently deliver innovative, customized solutions. We also work side by side with senior executives to accelerate execution through a blend of behavioral and management approaches. As a result, we have a tangible impact on clients' top and bottom lines.

For further information, please contact your local Oliver Wyman office or visit our web site at:

www.oliverwyman.com

© 2007 Oliver Wyman. All rights reserved.