

Industry Outlook Report

New Paradigms for the Auto Industry Beyond 2000

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The automotive industry will ride a wave of dramatic change over the next decade as new technologies emerge, markets stagnate in developed countries and grow in emerging countries, buying patterns change, and customers become ever more demanding. The industry will respond to a wide range of political, social, and economic issues: How quickly will Eastern Europe and China develop? Which trade barriers will rise or fall? Will an environmental crisis or a medical discovery prompt citizens to demand „greener“ transportation – e.g., smaller cars and more public transportation? Will safety concerns trigger massive defections to safer means of transport – planes, trains, or buses?

One tool successful companies often use to help them describe possible futures and determine likely implications for their businesses is scenarios. We invite you to join us as we explore two scenarios for the future of the automotive industry – and look at future challenges and possible responses. We hope this exercise will stimulate useful discussions of vision and strategy among your teams.

Scenarios for the Automotive Industry

A group of Arthur D. Little consultants from around the world recently went through a scenario-building exercise and identified the driving forces that are likely to have the greatest impact on the industry. The group developed two scenarios for the year 2008, which we discuss below together with their implications for the competitive situation, industry structure, R&D management, marketing, sales and service strategy, and environmental strategies. In reality, the future will probably contain elements of both scenarios.

Scenario 1. Changing buying patterns and new customer lifestyles characterize this first scenario. In general, 10 years from now traffic will be heavier than ever (in some cities in rapidly emerging countries it will become a nightmare!), but advanced traffic control systems will allow for higher traffic density without the need for additional road capacity in established markets. However, more people will choose to telecommute and use mass transportation, especially in metropolitan areas. Rather than owning a vehicle, some people will choose to go to a transportation agent and rent a vehicle appropriate for their purpose: e.g., a fancy sedan for a night out, a four-wheel-drive sports vehicle for a hunting trip, a convertible for a ride to the sea, or a van for a school trip. (The advantages are many: e.g., you can frequently change your image, and you won't lose time getting your car serviced. We are already beginning to see members of developed communities sharing the use of cars in this way.) New ways to buy cars will become widely accepted: for example, directly from OEMs, via brokers, over the Internet, etc. Prices will be readily known to customers and easy to compare. Global pricing data will increase international competition in cars and parts, with brokers mopping up excess stocks.

In emerging markets there will be opportunities for car manufacturers who offer customers creative new financing models (e.g., the „timeshare“ approach).

In general, new-car sales will hold steady or decline in most regions because of the new technologies, greater vehicle durability, and falling standards of living. There will be a shift to smaller cars and more „niche“ cars, but also a stable market for luxury cars.

Scenario 2. The main force driving the second scenario is an increasing concern about the environment and auto emissions, based on new medical evidence about the effects of pollution on health. In this scenario, the populace will force tougher legislation (which leads to higher fuel prices and taxes), and will demand more efficient vehicles. These demands will lead to advanced technological breakthroughs in alternative fuels, batteries, and engines, and also in sensors and safety features. New powertrain concepts – e.g., those involving fuel cells that allow use of the existing fuel infrastructure – will be prominent. In addition, consumers will limit emissions by telecommuting and by increasing their use of public transportation.

A number of factors in Western Europe, and to some extent in the United States, will lead to greater dependence on smaller cars: lower average disposable income, an increase in fuel and ownership taxes, the promotion of public transportation, the partial closures of inner cities, and more parking restrictions. Demand will grow in emerging markets, but for low-cost and efficient cars.

Future Challenges

What these quite different scenarios have in common is that they exacerbate the industry problem of global overcapacity and they require more energy-efficient vehicles. What can companies do to spur growth? How can they influence supply and demand? How can they use new technology to meet customers' requests?

Higher Volumes to Recapture Investments.

Automobile manufacturers need to sell higher volumes to recapture increasing investments. How can they gain market share in a market that's not growing? The average platform investment ranges between \$1 and \$2 billion, requiring manufacturers to sell 0.7-1.2 million units to recapture this investment. Naturally, manufacturers are eager to reduce the number of platforms they use (Exhibit 1) and to increase the number of cars they sell based on each platform, to leverage economies of scale. For example, the Volkswagen group will produce the VW Golf IV, the new VW Vento, the VW Beetle, the Audi 13, the Audi TT/TTS, the Skoda Oktane, and the new Seat Toledo – all based on the same platform. Multiple use of a single platform allows VW to reduce the number of parts in the drive shaft from 58 to 40. Horns will be reduced from 46 to 2, sun visors will be reduced from 77 different models to only 10. This will allow big cost reductions in terms of materials handling, stock, and working capital. For example, using one common outside mirror for the new Golf and the new Passat reduces mirror costs about 25 percent compared to the old Golf and 45 percent compared to the old Passat.

GM is taking a similar approach. In 1996 GM had 14 platforms in North America. Early in the next decade, various small cars, including replacements for the current Saturn models, Chevrolet Cavalier, Pontiac Sunfire, and Opel Astra, will be built on the same platform. By 2005, GM hopes to be building cars on just seven platforms worldwide, with three (the Gamma, Delta, and Epsilon platforms) engineered mainly in Europe and four in the United States (called Mid/Large, Global Rear-Wheel Drive, Luxury, and Sport/High).

During the past few years, most of the European luxury car producers realized that the sale of luxury cars alone cannot guarantee their companies' long-time survival. Higher volumes are needed to recapture investments in R&D, marketing, and distribution systems. BMW and Daimler-Benz, for example, intend to double their output by expanding their product lines downward. By introducing the A-class and the SMART cars, Daimler-Benz plans to increase its output from some 700,000 in 1997 to more than 1,100,000 in 2000. BMW's purchase of Britain's Rover will allow it to increase its output by nearly 50 percent to some 750,000 units in 2000.

Exhibit 1

Planned Reductions in Numbers of Platform Concepts

| | Present | Planned | % Reduction |
|----------------|---------|-------------|-------------|
| Volkswagen | 17 | 4 | 65% |
| General Motors | 21 | 7 (in 2005) | 66% |
| Toyota | 14 | 10 | 28% |
| Ford | 32 | 16 | 50% |

It's not just luxury car producers who are increasing volume. VW is planning to sell 5.2 million vehicles in 2002, boosting its global market share to 13 percent from 10.4 percent in 1997, the highest level in its history. The Korean car industry plans to almost double its capacity to around 6 million cars in 2002, which will mean a capacity for export of more than 4 million cars.

New Players. In the early 1980s, industry analysts predicted a consolidation at the OEM-level to four or five global players. Despite the slipping market, however, the number of players has increased. Newly developing countries have started to establish auto industries of their own. Indonesia and Malaysia, for example, chose to follow the successful steps of Japan and Korea to develop, sometimes under a joint-venture with a foreign partner, their own brand-name vehicles. They see this as a way to secure a local industrial base and protect the industry with high trade barriers that discourage imports and encourage tariff-jumping investments. Local buyers in Malaysia pay more than they would pay in Europe for the same car – these high prices subsidize the growth of exports – just as happened in Japan when it was growing its auto industry.

Other emerging-market countries, such as Brazil and Mexico, have developed their automotive industries by encouraging foreign firms to produce locally and by establishing local content requirements to spur the development of a domestic auto parts industry. The major global players are attracted by high growth rates. In the emerging Asian markets, for instance, more than \$16 billion will be invested by 2000 (Exhibit 2). Most of the worldwide capacity will be added there and in South America (Exhibit 3).

European overseas investments, combined with the huge investments of Asian producers in Western and Eastern Europe, will also affect the import/export balance and excess capacity problems in Europe. Nearly 30 percent of the global excess capacity will be found in Europe in 2001, surpassed only by the Asia/Pacific region, where an overcapacity of more than 10 million cars in 2001 will account for around 60 percent of worldwide excess

capacity then.

The emerging markets, with much lower vehicle densities than the established markets, are often perceived as a solution to overcapacity and the stagnant market in developed countries. But despite the strong predicted growth rates, these emerging regions count for only a part of the total market (Exhibit 4). The more saturated a market is – and the US. market, for instance, is quite saturated – the more cyclical it is. Strong fluctuations in demand put a heavy strain on the financial performance of car producers. In 1991, at the lowest point of the most recent cycle, the US. automotive industry suffered an aggregated loss of \$5.8 billion.

Exhibit 2

Estimated Sales and Investments in Emerging Asian Markets¹



¹ China, Indonesia, India, Thailand, Taiwan, Philippines, Malaysia, Singapore, Sri Lanka, Vietnam, Pakistan, Bangladesh, Hong Kong, and Korea

Source: Arthur D. Little

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Break-Even Points. To weather the low points in those cycles, companies try to increase their war chests and lower their break-evens through new methods of financing and cooperation with their suppliers (risk-sharing). Break-even points are influenced by prices. A lethal combination of excess capacity, stagnating demand, and increased pressure from imports drives prices down and break-even points up. To remain profitable, car makers will have to reduce costs in line with expected lower prices in a more competitive global market. With fixed costs of about 30 percent, the more rapid model changes still require important investments in re-tooling press-shops, Body-In-White shops, and final assembly lines. The proliferation of new segments and shorter model life-cycles means that development and tooling costs have to be written off over shorter intervals, thereby increasing the share of fixed costs in the total cost of a car.

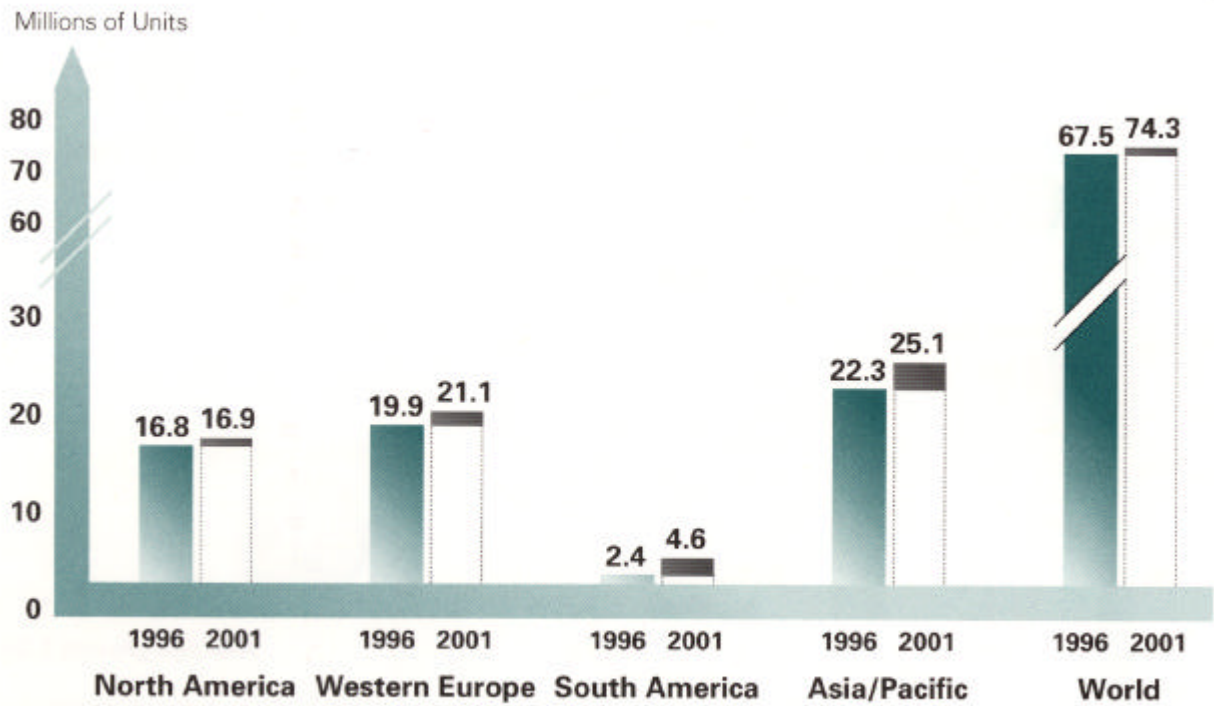
In addition, the trend toward smaller and cheaper cars puts more pressure on the margins. Japanese OEMs have already reacted to this trend by significantly improving their operating margins and break-even points in the last few years (Exhibit 5).

Demanding Customers. Another major issue for the industry is that customers want more for less. Additional packages and more expensive integrated systems, such as traction control or electronic stability programs, are becoming standard even in smaller cars. However, customers won't accept price hikes. New buying patterns and a more segmented customer base also mean that cars are treated more as consumer goods. Both are trends that we have observed in other industries in the past, for example in white goods, where large retail groups took control over the distribution channel, thus putting increased price pressure on the

manufacturer.

Exhibit 3

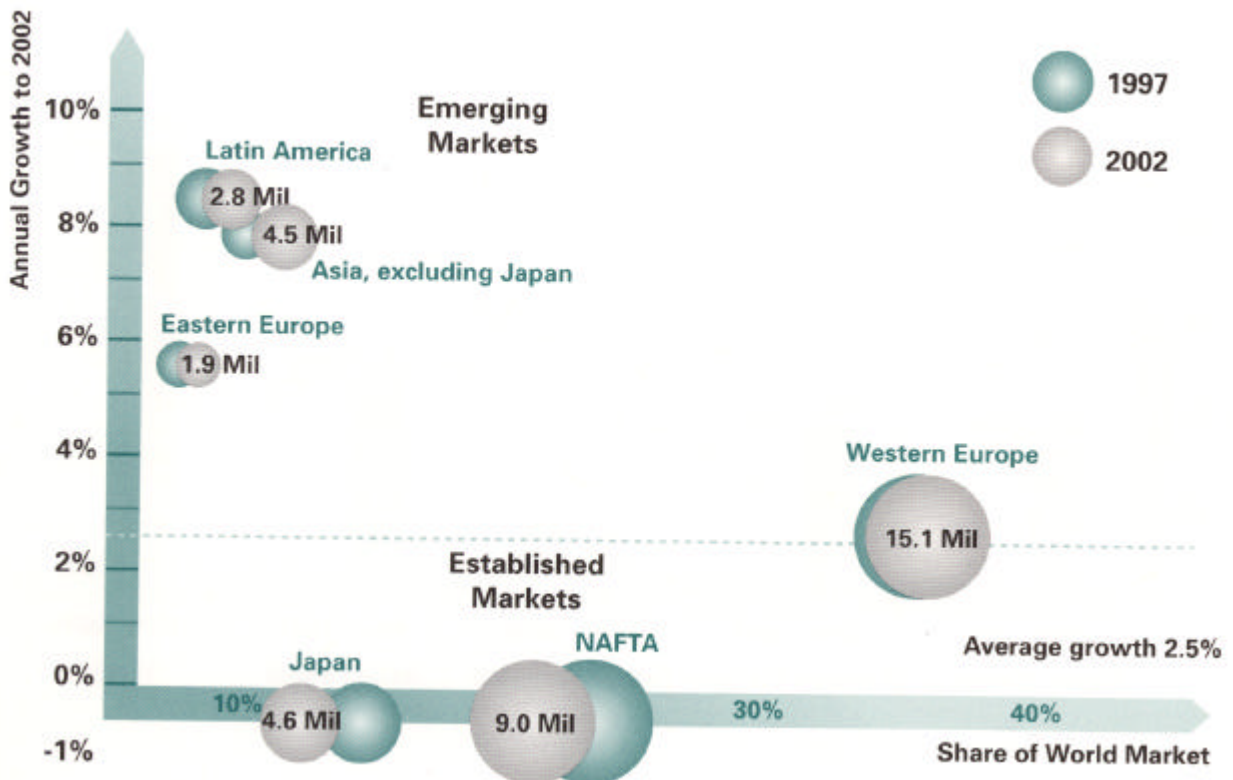
Total Light-Vehicle Capacity by Region, 1996/2001



Sources: Autofacts, Arthur D. Little

Exhibit 4

Size and Growth of Automotive Markets, 1997-2002

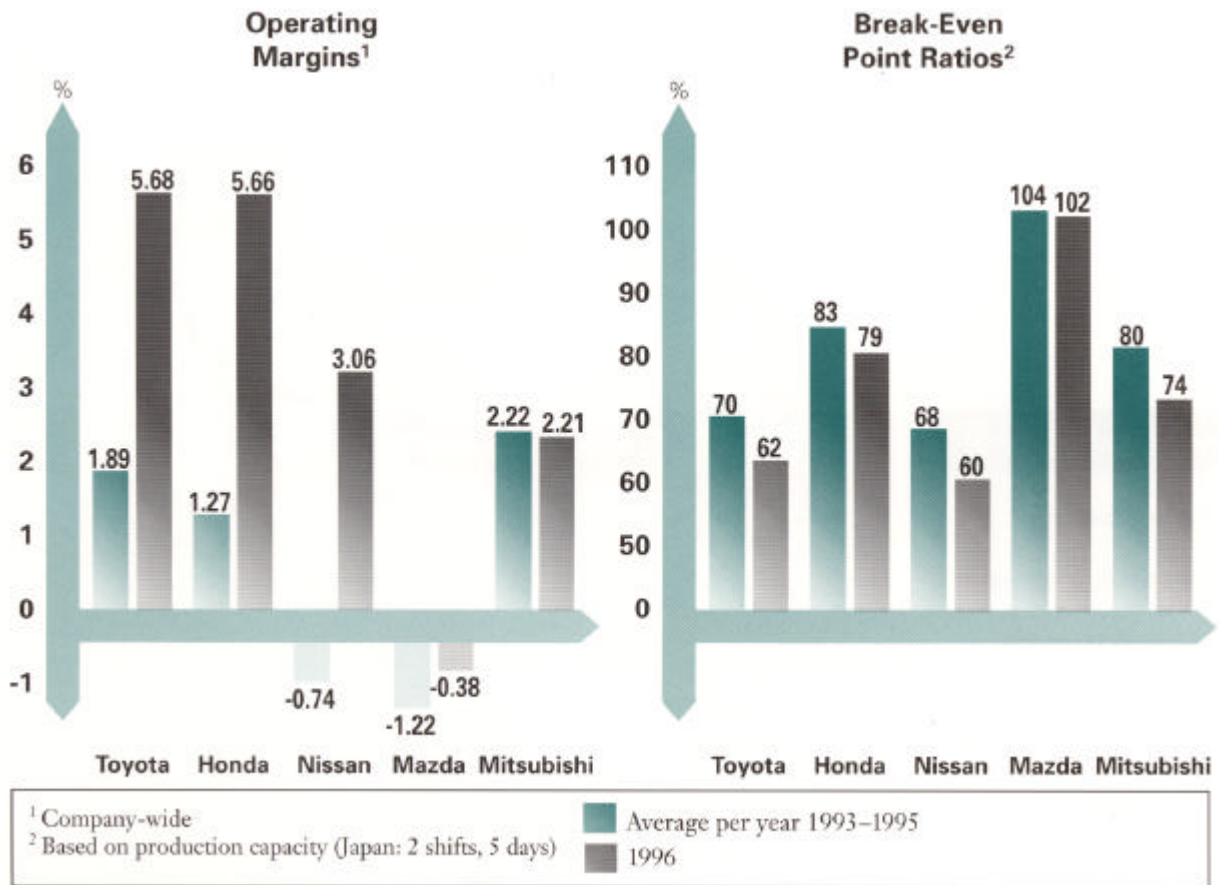


Source: DRI

Another industry challenge will be addressing the public's increasing concern about the environment, emissions, and possibly safety issues. Meeting this challenge will require more cooperation, not only among manufacturers and their partners in the value chain, but also among R&D, engineering, marketing, sales, and service departments, which must align their strategies.

Exhibit 5

Japanese OEMs' Operating Margins and Break-Even Point Ratios



Sources: EIU and Arthur D. Little

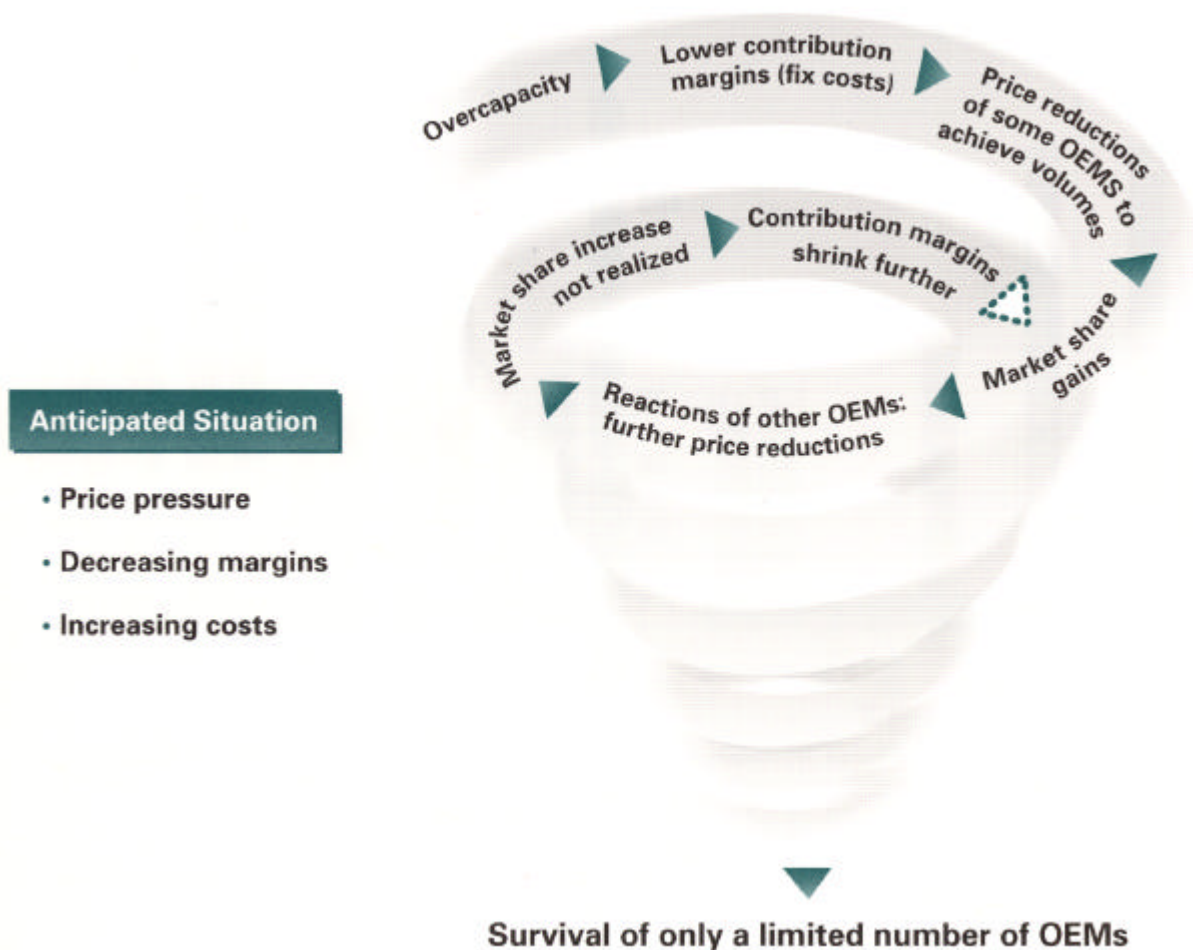
Despite the industry's problems of overcapacity and price wars (Exhibit 6), we don't think a major shakeout will occur, although there will be further consolidation in the industry. One reason we don't expect radical solutions is the importance of the industry to most national economies and work forces. Also, in the history of the industry too few mergers and takeovers have made economic sense to encourage this trend. (Partners in most of the tried mergers ignored the problem of combined excess capacity and underestimated cultural problems.) The more likely scenario is a smooth transition to a more grouped industry structure.

Strategic Actions

To be competitive, successful companies must achieve economies of scale. Therefore the automotive players of the next century will likely consist of large groupings rather than single companies. They will be truly global players linked in financial and/or operational alliances around, for example, GM, Ford, VW, and Toyota, without „sharp“ borders. (However, some independent companies will still exist, with strong capabilities in specific segments or regions.) By a smooth transition, we mean a gradual increase in joint ventures and alliances in specific fields such as R&D, distribution and marketing, or development and production of parts and subsystems.

Exhibit 6

Result of Overcapacity



Improving Cooperation. The need to offer a full range of mobility services, to lower break-even points, and to keep pace with technology development in all car systems puts increasing pressure on the whole industry to cooperate effectively and efficiently in all functional areas and regions. Recently, Ford Motor Company revealed it would invest \$420 million in an alliance with Daimler-Benz and Canada's Ballard Power Systems to jointly produce by 2004 up to 100,000 cars per year powered by fuel cells. This is also an example of the borders between vehicle manufacturers and first-tier suppliers starting to blur, as first-tier suppliers begin to take over the role of technology development and just-in-sequence-production related to whole systems or modules.

There are several implications to improved cooperation. New mechanisms need to be established to create closer coordination among OEMs and suppliers. There needs to be two-way sharing of ideas and information for the benefit of all involved. The OEMs have to learn how to manage „outsourced“ technologies, specifically how to meet tight deadlines when some crucial parts of the technology development are not in their control. OEMs and suppliers should establish protocols for ownership of intellectual property.

The suppliers should be recognized as a source of ideas and innovations and more firmly integrated into product development. They offer important perspectives on what can be improved. The OEMs must develop mechanisms to listen to the suppliers and benefit from this valuable source of innovation.

A result of this process was verified by a survey done in recent months in which suppliers in the United States and Japan were interviewed on what they expect and how they are dealing with this new partnership reality. More than 80 percent of the interviewed suppliers were expecting relationships lasting more than 5 years, hi Japan, approximately 40 percent of the suppliers expected relationships to last more than 10 years. In the United States, more than 50 percent of the suppliers work more closely with OEMs on cost-reduction processes than they did 5 years ago. In both regions, approximately 80 percent of the suppliers provide OEMs with a breakdown

of process steps, allowing a joint approach to overall supply chain improvement. Ten years ago this figure didn't reach 40 percent.

However, this kind of partnership development is not instantaneous. It has to be developed over time and supported with the appropriate learning-organization tools that stress the fundamental importance of an aligned vision between the parties, a common understanding of the objectives, and clear gain in the process for both parties.

Globalizing Engineering and R&D. Both external and internal drivers are pushing the need to globalize engineering and R&D. As mentioned above, being closer to customers is one strong reason. Another is that many OEMs permit their engineering and R&D functions to provide services to other customers (as long as it makes business sense to do so!). OEMs, especially in the developing countries, may provide a new source of revenues for a globalized engineering or R&D department.

The above two are revenue-related reasons for globalizing. There are also resource-related reasons. In many Western countries, there is a severe shortage of engineers and scientists, particularly in electronics, communications, and computer fields. Several developing countries (India, for example) can provide a source for these talents. Indian software writers are being effectively used by many firms. Companies must balance the trade-offs and decide how to access global resources: by establishing a physical engineering center or a „virtual“ one.

Companies may see globalization as a means to reduce costs through replacing the more-expensive North American, European, or Japanese engineers and scientists with less-expensive ones in Asia or Latin America. However, in our experience, the cost benefits do not always justify this move. On the other hand, cost reduction and efficiency improvement can be achieved by making already established foreign outposts work more closely together, as if they are all part of one global company.

Marketing. In a shrinking vehicle market, managing the brand will be key in the future – when new technologies will quickly become commodities; when key components are shared among different brands and sometimes the same car is marketed under different brand names; when international brand-building with consistent presentation is essential to sustain customer perception and interest, to charge premium prices, and to generate predictable cash-flows. Companies must appeal to the customer on a more subjective level by creating a car that surprises and delights and by developing a bundle of product and service offerings that appeal to a targeted customer base. They must please very small customer segments – even single customers – with products and financial packages.

Customization will increase and car manufacturers must address a variety of customer needs and desires in terms of different cultures, lifestyles, and behaviors. To reach the specific consumer with the right offer at the right time (for example, to give the passionate hunter a call – „Special offer: Rent a 4WD for the hunting trip“ – as a follow-up to a rifle purchase), the use of sophisticated customer databases and data-mining technologies will become much more important to the automotive industry than it is today.

Not only car manufacturers but also suppliers have to develop strong brands. Suppliers of advanced technologies, for instance, should not only focus on technology but also try to build up a strong marque to tie the customer perceptions about the technology to their own brand name. If consumers ask, „Is there an **XX** converter inside?“ the supplier will probably be able to charge higher prices than for no-name products.

Distribution Channels and Services. Traditional vehicle distribution channels, which today account for around 30 percent of an OEM's total costs, will see a lot of changes. Continuing improvement in vehicle quality and durability will reduce after-sales opportunities, which currently provide 50 percent or more of dealer profit in most countries. Also, changing buying patterns, e.g., new technologies such as the Internet, will allow customers to find information and advice outside the showroom. New entrants, such as former consumer goods dealer-chains and software companies, also erode traditional dealerships, as does the need to reduce costs as prices are more readily comparable and subject to price wars.

While in most established markets, domestic brands are slimming down their dealer networks to increase service levels and cut down intrabrand-competition and distribution costs, the importers are building up their own networks, thus increasing the competitive pressure in the market. Strategies to improve direct sales to private and corporate users while maintaining margins even in fleet sales will become more important over the next few years. Another issue for manufacturers is to improve the car economy with a marketing and sales strategy for pre-owned vehicles that keeps price levels high and reduces depreciation.

Manufacturers must therefore carefully select the right distribution channel for each market and each model. To enter new markets, it might be appropriate to form alliances with well-established retail chains or to sell in superstores offering several brands. Another approach, as demonstrated by Daewoo in the United Kingdom, is for the manufacturer to build up its own distribution network and to ally with an independent, well-established

service provider.

At the same time, every manufacturer should make use of the new communication and information technologies, including the Internet. While the idea of selling new cars over the Web in Europe is still embryonic, the average American car dealer sold more than 60 new cars over the Web in the past year. One reason is that the American „Big Three“ have stronger Web sites, offering far more information for potential customers than most other manufacturers. Another reason is that American dealers are forced to increase their functionality by new entrants such as Auto-By-Tel (a California company that recently sold its one-millionth car as an Internet broker) or Microsoft with its CarPoint – a threat that European dealers will also face in the beginning of the next century.

Managing Environmental and Safety Issues.

Environmental concerns will certainly have significant impact on the industry in the future. Already, most of the industry has agreed that fundamental change is needed in engine technology. The chairman of General Motors, John F. Smith, Jr., predicts a slow phase-out of the internal-combustion engine in 20 to 30 years. Several industry participants are already racing to create the technology to replace current engine technology. In general, being more „green“ than competitors could be a distinct advantage.

How will companies achieve a greener image in the face of multiple alliances and globalization? Imagine a supplier with 400 small plants around the world making components for the OEMs – can it guarantee that all its plants are producing the greenest products possible, without burdensome management control? Companies will have to develop efficient low-cost approaches to managing environmental issues that will work across the globe and give them due diligence on any green claims that they make. And they cannot drop the ball as overcapacity forces them to cut costs, because consumers will be more sensitive to environmental and safety problems.

Companies must also develop efficient, low-cost approaches to managing product safety issues that will work globally and locally and still give them due diligence on any safety claims they make. As global companies develop more and more complex products for worldwide consumption, this increased complexity, together with rising concerns about the safety of the user interface, will make managing safety ever more difficult. A company must maintain high global standards and also address local user behavior, which varies from market to market. Safety tests and regulations are not standardized and are sometimes used as trade barriers.

Conclusion

The major challenges lying just ahead include changing buying patterns, different lifestyles and lower disposable incomes; increasing public concerns about environment and emissions; and increased pressure on prices caused by excess capacity. These issues will create new paradigms that will change the automotive industry's structure and processes. Crucial success factors for manufacturers include the ability to cooperate, the ability to coordinate R&D and engineering activities globally, the willingness to focus marketing and sales efforts on specific customer needs, and competence in managing environmental and safety issues. Also imperative to this industry's success is the ability to manage knowledge, which is covered in other articles in this issue of *Prism*.

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