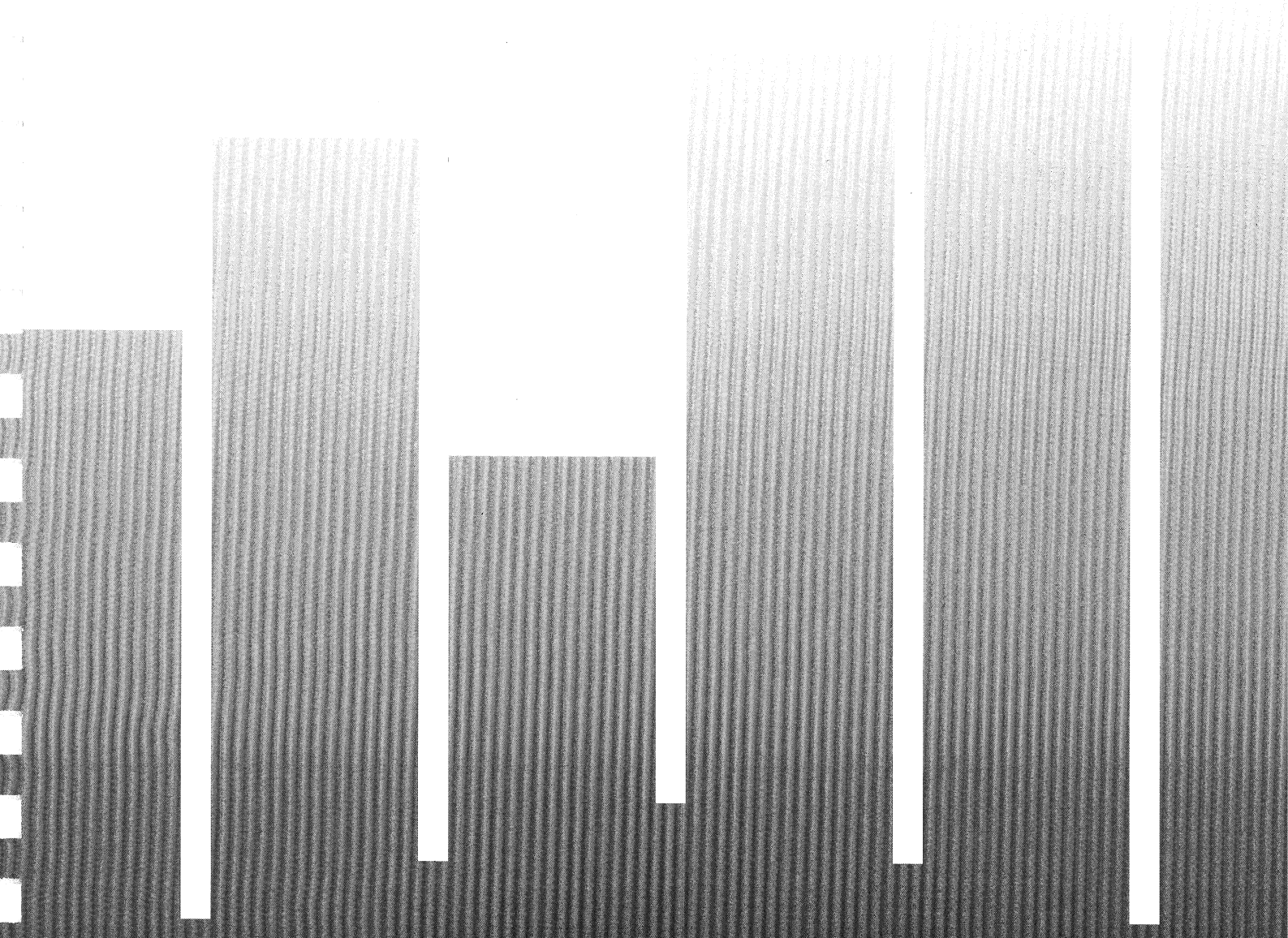
# Delphi VIII

FORECAST AND ANALYSIS OF THE NORTH AMERICAN AUTOMOTIVE INDUSTRY

***Marketing • Technology • Materials***



# Marketing

## VOLUME 1

*Office for the Study of Automotive Transportation*

University of Michigan Transportation Research Institute

# DELPHI VIII
# Forecast and Analysis of the North American Automotive Industry

## VOLUME 1: MARKETING

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# FOREWORD

## Introduction

Delphi VIII is a detailed analysis of forecasts by three separate panels of automotive industry executives, directors, managers and engineers who are expert in automotive technology, materials or marketing. These individuals were selected because they occupy positions of responsibility within the automotive industry and have strategic insight into important industry trends. In many cases they are in a position to influence these trends. This report, published in three volumes, is the eighth in a series of in-depth studies of long-range automotive trends, which began with Delphi I in 1979 and continued with Delphi II in 1981, Delphi III in 1984, Delphi IV in 1987, Delphi V in 1989, Delphi VI in 1992 and Delphi VII in 1994.

The Office for the Study of Automotive Transportation (OSAT) collects the data, and analyzes, interprets and presents the results. Since the forecasts are those of the panelists, Delphi VIII is essentially the industry's own consensus forecast. These forecasts are not "crystal ball" predictions but, rather, well-informed estimates, perspectives and opinions. Such forecasts present an important basis for business decisions and provide valuable strategic planning information for those involved in all areas of the North American automotive industry: manufacturers; service, component and materials suppliers; government; labor; public utilities; and financial institutions. We believe these to be the most authoritative and dependable North American automotive forecasts available.

A key point to keep in mind is that the Delphi forecast presents a vision of the future. It obviously is not a precise statement of the future but rather what the industry thinks the future will likely be.

As an industry-wide survey, the project also allows individual companies to benchmark their vision and strategy against consensus industry opinions.

## The Delphi method: general background

The study is based on the Delphi forecasting process. This process requires that experts consider the issues under investigation and make predictions about future developments. Developed by the Rand Corporation for the U.S. Air Force in the late 1960s, Delphi is a systematic, interactive method of forecasting based on independent inputs regarding future events.

The Delphi method is dependent upon the judgment of knowledgeable experts. This is a particular strength because, in addition to quantitative factors, predictions that require policy decision are influenced by personal preferences and expectations. Delphi forecast reflect these personal factors. The respondents whose opinions are represented in this report are often in a position to influence events and, thus, make their forecasts come true. Even if subsequent events result in a change of direction of a particular forecast, this does not negate the utility of the Delphi. This report's primary objective is to present the direction of technological, materials and marketing developments within the industry, and to analyze potential strategic importance.

## Process

The Delphi method utilizes repeated rounds of questioning, including feedback of earlier-round responses, to take advantage of group input while avoiding the biasing effects possible in face-to-face panel deliberations. Some of those biasing effects are discussed in this excerpt from a 1969 Rand memorandum:

> The traditional way of pooling individual opinions is by face-to-face decisions. Numerous studies by psychologists in the past two decades have demonstrated some serious difficulties with face-to-face interaction. Among the most serious are: (1) Influence, for example, by the person who talks most. There is very little correlation between pressure of speech and knowledge. (2) Noise. By noise is not meant auditory level (although in some face-to-face situations this may be serious enough) but semantic noise. Much of the "communication" in a discussion group has to do with individual and group interest, not with problem solving. This kind of communication, although it may appear problem-oriented, is often irrelevant or biasing. (3) Group pressure for conformity. In experiments at Rand and elsewhere, it has turned out that, after face-to-face discussions, more often than not the group response is less accurate than a simple median of individual estimates without discussion (see N. C. Dalkey, The Delphi Opinion. Memo RM 5888 PR, p. 14, Rand Corp., 1969).

In the Delphi method, panelists respond anonymously, preventing the identification of a specific opinion with any individual or company. This anonymity also provides the comfort of confidentiality, allowing panelists to freely express their opinions. Among other advantages, this process enables respondents to revise a previous opinion after reviewing new information submitted by other panelists. All participants are encouraged to comment on their own forecasts and on the combined panel results. The information is then furnished to the panel participants in successive iterations. This procedure reduces the effects of personal agendas or biases and assists the panelists in remaining focused on the questions, issues and comments at hand.

**Panel characteristics and composition**

The very essence of a Delphi survey is the careful selection of expert respondents. The selection of such experts for this Delphi survey is made possible by the long-standing association between The University of Michigan's Office for the Study of Automotive Transportation and representatives of the automotive industry. Lists of prospective experts were assembled for Technology, Marketing and Materials panels. Members were selected on the basis of the position they occupy within the automotive industry and their knowledge of the topic being surveyed. The are deeply knowledgeable and broadly experienced in the subject matter.

The names of the panel members and their replies are known only to our office and are maintained in the strictest confidence. Replies are coded to ensure anonymity. The identity of panel members is not revealed. Upon publication of the final Delphi report, all questionnaires and lists of panelists are destroyed.

The characteristics of the 317 member panels are as follows: 26 percent of the Technology Panel was composed of CEOs, presidents, or vice presidents; 22 percent were directors; 33 percent were executives, managers or supervisors; 18 percent were engineers (chief, assistant chief and staff); and 4 percent of the panel was made up of academic specialists and consulting technical-engineering specialists. The Marketing Panel was composed of 38 percent CEOs, presidents, or vice presidents; 26 percent directors; 30 percent managers; and 6 percent academic and consulting marketing specialists. Among Materials panelists, 7 percent were CEOs, presidents and vice presidents; 21 percent were directors; 51 percent managers and supervisors; 14 percent engineering specialists; and 7 percent academic and consulting materials specialists. Approximately 36 percent of the Delphi VIII panelists were

employed by vehicle manufacturers; 59 percent by components and parts suppliers; and 5 percent were specialists, consultants, academics, and representatives of associations and publications.

### Presentation of Delphi forecasts and analyses

**Data tables.** When a question calls for a response in the form of a number, responses are reported as the median value and the interquartile range (IQR). The median is a measure of central tendency that mathematically summarizes an array of judgmental opinions while discounting extremely high or low estimates; it is simply the middle response. The IQR is the range bounded at the low end by the 25th-percentile value, and at the high end by the 75th-percentile value. For example, in a question calling for a percentage forecast, the median answer might be 40 percent and the IQR 35-45 percent. This means that one-quarter of the respondents answered 35 percent or less, another one-quarter chose 45 percent or more, and the middle half of all responses ranged between 36 percent and 44 percent, with 40 percent as the middle response. That narrow interquartile range would indicate a fairly close consensus among the respondents.

In contrast, the percentage forecast for a different question might show a similar median forecast of 40 percent, but with an interquartile range of 20-70 percent, indicating less consensus and a considerable degree of uncertainty about the issue in question.

Uncovering differences of opinion is one of the major strengths of the Delphi method. Unlike other survey methods, where differences of opinion among experts are often obscured by statistical averages, the Delphi highlights such differences through the presentation of the interquartile range.

**Discussion.** Narrative discussions are presented to highlight and explain a particular set of data.

**Selected edited comments.** Selected, edited comments from the Delphi panelists are shown following each data table in order to provide some insight into the deliberative process by which panelists arrived at their forecast.

In a Delphi survey, respondents are encouraged to contribute comments to explain their forecast and to perhaps persuade other respondents to change their positions. Many of these edited comments are included. These replies may provide important information which is not evident in the numerical data. An individual panelist may have unique knowledge that planners should carefully consider. However, readers should be careful not to overemphasize a particular comment. It is possible for a well-stated contrary opinion to mislead the reader into ignoring an important majority opinion which is accurately reflected in numerical data.

**Manufacturer/supplier comparison.** Delphi VIII panelists include respondents from the North American automotive manufacturers; the major suppliers of components, parts, and materials for the industry; as well as consultants and academics. A concerted effort is made to obtain a relatively equal distribution of manufacturer and supplier panelists. Within the context of this survey, categorizations will refer simply to either Manufacturer (or for brevity in tables, OEMs—Original Equipment Manufacturers) and Suppliers.

For obvious competitive reasons, the automotive manufacturers seek to maintain a degree of secrecy regarding their design, engineering and marketing plans. While the relationship between the manufacturer and supplier is moving toward an increasingly closer degree of cooperation and integration, a considerable element of proprietary concern remains.

Additionally, the very size and complexity of the automotive industry works against optimum information transfer. Therefore, where it is considered relevant to a better understanding of or perspective on the forecast, our analyses include a comparison of the forecast from manufacturer and supplier panelists in an attempt to illustrate where significant agreements or differences exist.

**Comparison of panels.** The three groups of Delphi panelists (Technology, Marketing and Materials) are asked questions that specifically focus on their respective areas of expertise. However, a few questions are considered common to two or more panels. For example, the fuel-price question (see MAT-1) is considered so basic that it was submitted to all three panels.

At times, the panels will give differing responses to these questions. This may reflect the makeup of a particular panel and the panelists' subjective perception of the issue in question. Where differences do exist between the panels, serious consideration should be given to whether the difference reflects the composition and proprietary interest of that particular panel or whether there exists a substantial degree of uncertainty regarding the issue in question. We try to highlight both the differences and similarities.

**Trend from previous Delphi surveys.** A single Delphi survey is a snapshot which collects and presents the opinions and attitudes of a group of experts at a particular point in time. Some questions, in various forms, were asked in previous Delphi surveys, and thus provide trend data. The fact that forecasts for a particular question may exhibit considerable variation over the years does not diminish their relevance and importance to strategic planning, because they reflect the consensus of expert opinion at the time. These opinions and forecasts are predicated on the best information available at the time. However, market, economic and political factors do change. Trend data can reveal the stability or volatility of a particular market, material or technology issue. A careful analysis of trend data is an important consideration in strategic business planning decisions.

**Strategic considerations.** Based on the replies to a particular question, other relevant Delphi VIII forecasts, other research and studies, and OSAT's extensive interaction with the automotive industry, this report makes inferences and interpretations as to the core issues in questions and their potential impact on the industry. By no means are they exhaustive statements of critical issues. Rather, they are points that the reader might consider useful.

## Marketing Contents

## EXECUTIVE SUMMARY

The 1996 Delphi VIII Forecast and Analysis of the North American Automotive Industry combines the predictions of nearly a hundred automotive industry participants to fashion a model of the future of industry. These participants, who participate as panelists in a series of questionnaires about the industry's future, come from both manufacturers and suppliers, and occupy positions from lower management to chief executive officer, primarily with a focus on sales and marketing. Consequently, these panelists are knowledgeable about marketing trends and changes in the future and may even be in a position to influence events affecting the industry. Using 2000 and 2005 as base years, this forecast examines strategic planning factors, sales and production, vehicle design and features, vehicle marketing and manufacturer-supplier issues. More than just a forecast, however, this survey attempts to build a consensus opinion among industry thought leaders of where the auto industry is headed.

### I. STRATEGIC PLANNING FACTORS

Strategic planning involves many factors. In both the short and long terms, panelists predict that, among other things, energy prices are expected to increase, as are manufacturing competitiveness, the corporate cost of capital and industry R & D expenditures. At the same time, the trade deficit and the federal budget deficit are thought to decrease somewhat (MKT-1). Of the factors that affect new vehicle demand, quality, technology, pricing and styling are among the ones considered likely to increase the most (MKT-2). The price of gasoline, at least in the long term, will increase, due to tightening supplies and increased fuel taxes (MKT-3). Panelists predict that the number of independent companies manufacturing vehicles will decrease (MKT-4), but the number of passenger car models selling fewer than 50,000 units will increase (MKT-8). Government regulation of the industry is predicted to increase, with the greatest changes occurring, in the short term, in occupant safety, vehicle crashworthiness and emissions (MKT-6).

### II. VEHICLE PURCHASE AND OWNERSHIP

Consumer purchasing decisions vary by vehicle segment (MKT-10, 11). Entry level vehicle buyers, for example, are expected to look for low purchase price and operating costs, and good fuel economy in the future. All buyers are forecast to value quality. In general among cars, interior and exterior styling, and pricing, offer the greatest opportunities for product differentiation (MKT-25). Truck buyers have their preferences, too. They tend to look for similar attributes even in different segments: interior space, purchase price, brand reputation and product quality. Safety has become so important to consumers that they will exclude a vehicle from consideration if they believe it lacks the latest safety features (MKT-24).

Prices for both cars and trucks are thought to increase significantly in the future. Excluding inflation and remembering that price increases vary by segment, prices for some vehicles are seen as increasing approximately 10% from 1995 to 2000, and another 10% in the five years following that period (MKT-13). The average transaction price, for example, of a domestic vehicle in 2005 is predicted to be about $22,000, a figure which does not include the effects of inflation (MKT-14). The form of ownership is thought to change, too, with personal leases growing significantly in the next ten years, and loans and cash transactions shrinking (MKT-16).

At the retailer, there are expected to be a number of changes. For one, panelists predict greater use of "one-price, no negotiating" selling (MKT-18). To some buyers, that will be an improvement in the buying process. Other improvements at the dealer include using technology to provide more information to the customer, sales advisors with better selling skills and more product knowledge, and more dealer services (MKT-19). Many of these improvements are predicted to

enhance owner loyalty, as are high quality, appealing styling and safety (MKT-22). Dealerships are likely to grow larger in size and fewer in number (MKT-20).

## III. VEHICLE DESIGN AND ENGINEERING

Panelists predict a continued reduction in the amount of time it takes to develop new vehicles, whether a reskinning or a new design. That time varies by manufacturer but generally the Japanese are considered to require the shortest time today and in the future. The Americans are second and the Europeans third (MKT-27). For shorter design cycles, manufacturers will have to make better use of technology, develop earlier and closer relationships with suppliers and reward the team behavior (MKT-28).

Although it differs by segment, design cycle times are also shortening for a vehicle to maintain competitive. By 2005, most vehicles are expected to require a facelift every two years and a complete redesign every four, according to panelists (MKT-29). A redesign is thought to be most important for sporty and luxury models, relatively less important for entry level cars and pickup trucks (MKT-30). Exterior styling of the future is predicted to continue to emphasize aerodynamic themes, with more complex shapes and more exotic materials. Interior design will offer improved ergonomics and greater use of electronic devices (MKT-52).

## IV. LIGHT VEHICLE SALES AND SEGMENTATION

Panelists are optimistic about light vehicle sales in the U.S. and Canada in 2000 and 2005. They predict sales in 2000 to be 4.2% higher than in 1994 and 2005 to be 7.7% higher (MKT-31). However, panelists predict that new vehicle buyers will keep their vehicles longer than in the past, about a half a year longer by 2005 compared to today. At the same time, the average age of cars and trucks on the road is expected to increase about the same amount (MKT-35).

## V. WORLDWIDE PRODUCTION AND EXPORTS

Manufacturers move production plants to new locations to take advantage of lower wages, provide local production and other reasons. Panelists predict that some vehicle components, like electrical parts and interior trim pieces, are likely to be sourced from the U.S. to Mexico in the future. The least likely to be sourced in Mexico are predicted to be transmissions and body/chassis parts (MKT-36). Production among major vehicle-producing nations is predicted to be stable over the next ten years. The U.S. is expected to increase production significantly, particularly in trucks, as are emerging markets like China and Brazil (MKT-37). In the U.S. and Canada, the Big 3 will build 75% of the cars assembled in 2005, down slightly from 78% in 1994. The balance is expected to be produced mostly by Japanese and European manufacturers. European manufacturers, nearly without U.S. and Canadian production facilities before 1994, are predicted to produce about 200,000 vehicles there by 2005 (MKT-38). Many of these manufacturers are expected to export vehicles to the U.S. from other countries. Of the almost four million vehicles expected to be imported into the U.S. in 2005, about a third will come from Canada and another third from Japan. The balance is forecast to come from several European countries, Korea and Mexico (MKT-39). About half the exports from the U.S. are expected to go to Canada and about 10% to Europe as well as to the Middle East. Exports to Japan are thought to increase greatly although the number of units is still relatively small (MKT-40). To promote sales in Japan, panelists recommend designing vehicles to meet the needs of Japanese consumers, improving their distribution system and enlisting government support for reducing Japanese import restrictions (MKT-41).

## VI. VEHICLE ATTRIBUTES AND FEATURES

Despite concerns about fuel economy and exhaust emissions, panelists predict that alternate power sources will not be put into widespread use in the next ten years. Alcohol-mixed fuels may increase and electric vehicles are expected to come into use, but their percentage of the market will be negligible. Diesel-powered trucks, the most common alternative fuel, are forecast to become slightly more common by 2005 than in 1994 (MKT-42). Many vehicle features or equipment are expected to become more common in the future. Multivalve engines, already common today, are forecast to become more common over the next ten years, as are anti-lock brakes (MKT-43, 44). The use of keyless entry systems is expected to more than double in ten years (MKT-50). Essentially unused today, many Intelligent Transportation System (ITS) features, such as collision warning or navigation systems, are expected to be adopted in the next ten years (MKT-45). But there are limits to what consumers will pay for these kinds of features. For example, panelists predict that buyers would pay only $200 for a navigation information system (MKT-48). Development of electric vehicles is being spurred more by government decree than by consumer demand. Still, for consumers to buy them, these vehicles will have to address concerns about driving range, service availability, purchase price and other parameters (MKT-46).

## VII. SUPPLIER AND SOURCING ISSUES

Relationships are changing between auto manufacturers and their suppliers. Panelists identified several features of "partnering" that are critical: trust and honesty and long-term commitment are a few (MKT-53). When outsourcing components, auto manufacturers are likely to be driven mostly by cost concerns but are also expected to consider important the competence of the supplier and access to expertise and technology (MKT-54). With the exception of price, all of the criteria that manufacturers use to evaluate suppliers will be more important in the future (MKT-55). Panelists agree that manufacturers adequately evaluate suppliers for important attributes but may disagree somewhat that suppliers are adequately compensated for their abilities (MKT-56).

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**MKT-1.** **Strategic planning involves many factors. The following question presents a partial list of political and economic factors affecting the external business environment. Please indicate your trend forecast for each factor considering the periods 1996-2000 and 2001-2005. Unless otherwise indicated all factors refer to the United States.**

Scale: 1 = sharply increase 3 = no change 5 = sharply decrease

| Political and Economic Trends | Short term 1996-2000 | Long term 2001-2005 |
|---|---|---|
| Manufacturing competitiveness | 2.0 | 2.2 |
| Annual producer price index | 2.1 | 2.2 |
| Energy prices | 2.3 | 2.1 |
| Annual GNP | 2.4 | 2.1 |
| Corporate cost of capital | 2.5 | 2.6 |
| Industry R & D expenditures | 2.5 | 2.4 |
| Government investment incentives | 2.7 | 2.7 |
| Unemployment rate | 2.7 | 2.8 |
| Trade value of United States dollar | 2.7 | 2.7 |
| Personal savings rate | 2.8 | 2.6 |
| Business taxation rate | 2.9 | 2.9 |
| Personal taxation rate | 3.1 | 2.8 |
| Political stability | 3.1 | 3.1 |
| Trade deficit | 3.3 | 3.5 |
| Federal budget deficit | 3.4 | 3.6 |

**Selected edited comments**

- The critical issues are: 1) High cost of America's underclass (drugs, crime, welfare, unemployment); 2) Federal debt (value of the dollar will remain low until we balance the budget); 3) Our reliance on cheap imported petroleum is out of control; 4) U.S. economy's bias toward consumption is not sustainable. A shift toward investment incentives is already underway–it will be tough on durable goods producers, including the auto industry.
- Personal taxation rate will increase somewhat if balanced budget amendment is passed.
- The United States economy is cyclical around a long-term growth rate of about 2 percent. Nothing is likely to change this over the next decade. The only major macro change is likely to be an increase in savings rate as the population ages, making capital readily available and keeping corporate costs of capital low.
- I'm predicting Republican president and Congress in the short term which will be pro-business (hold the line on taxes) and won't be able to manage the deficit as the Reagan/Bush administration couldn't.

- With a continuous flow of emerging Third World economies and a truly open market in the United States, I expect a trade deficit for the next 50 years.
- I believe a flat tax will be implemented–lower overall personal taxes but, in total, more collected–to reduce budget deficit, allow business taxes to stay constant and improve dollar value.
- Short term: I don't see the political system responding in the "short" term (five years) to have a significant impact on the federal budget deficit. Short/long term: I believe that in the business segment we will see increased taxes to help alleviate the budget deficit.
- The general lack of economic understanding by U.S. populace, coupled with lack of appetite control for things and services, will continue current trends.
- Trade value: As lesser developed countries play a larger role in the global economy, the U.S. dollar and U.S. trade will be impacted favorably.

**Discussion**

The tables show the trends in ascending order by rating. Please bear in mind that "increasing" and "decreasing" do not imply some degree of "goodness" or "badness" in and of themselves. An increase in corporate cost of capital is generally not good; a decrease in the trade deficit is not necessarily bad. An increase in energy prices is probably bad if you sell high-performance luxury cars but good if you sell small, fuel-efficient compact cars.

Panelists generally view the near and long terms as not too different from the present, except for issues relating to pricing and costs such as energy prices or the corporate cost of capital. These are expected to increase. Trade and federal budget deficits are forecast to decrease somewhat. Other factors that have an impact on the general economy, like the unemployment rate or the personal savings rate, are predicted to remain about the same.

**Manufacturer/supplier comparison**

Manufacturers and suppliers generally agreed on these trends, except for the short-term business taxation rate, for which manufacturers forecast a slight decrease while suppliers predict a slight increase.

**Trend from previous Delphi surveys**

*Short term:* The current forecast is very similar to the previous one. However, panelists in the 1994 Delphi VII forecast, whose short term was 1994-1998, predicted that the unemployment rate would increase slightly, that the personal taxation rate would increase significantly and that the federal budget deficit would increase.

*Long term:* As in the short term, the long-term forecast is very similar to that of the previous Delphi forecast. The previous panel predicted for 1999-2003 and believed that the personal tax rate and the unemployment rate would decrease slightly. It also predicted that the business tax rate would increase and the federal budget deficit would stay the same.

**Strategic considerations**

Businesses competing successfully in the United States today will likely be able to compete successfully in the future. Several factors are predicted to improve and therefore exercise a positive influence on the economy in general and the auto industry in particular. One of the most striking predictions is the increase in manufacturing competitiveness. Domestic manufacturers have given considerable attention to manufacturing prowess, and that attention appears to be

paying off. The result has been improved fit and finish, greater reliability and fewer labor-hours required for each vehicle; in general, greater efficiencies. Other favorable predictions include slight improvements in both the trade deficit and the federal budget deficit. Some of the improvement in the trade deficit could be due to fluctuations in currency exchange, but it would surely also benefit from the auto industry's growing commitment to exports as witnessed by significant increase in production of right-hand drive models, for example. At the time of this writing, rancor between the president and Congress over budgets and debt ceilings has grown to new proportions. Despite the enmity, both sides seem genuinely interested in addressing the issue. If a balanced budget results, it would probably have a favorable impact on interest rates.

However, panelists predict that several important cost-related inputs are likely to worsen, making it potentially more expensive to manufacture vehicles. They predict the Annual Producer Price Index will increase, as well as energy prices and the corporate cost of capital. Higher fuel prices would also make it more expensive to operate vehicles and could therefore effect a change in consumer buying patterns and tastes.

The remaining trends are thought by the panelists to remain fairly constant, which is interesting information in itself. For example, the personal savings rate is forecast to remain the same in the future. If so, it is not likely that additional sources of capital will be available from aggregate savings. The unemployment rate is predicted to remain close to what it is now, although there is some evidence to suggest that skills needed by the auto industry in engineering and manufacturing may be in short supply in the future.

**MKT-2.** **Many factors influence the level of new vehicle demand. The following question presents a partial list of economic, social and consumption factors affecting new vehicle sales volumes.**

Scale: 1 = sharply increase 3 = no change 5 = sharply decrease

| Factors Affecting Vehicle Demand | Mean Rating | |
|---|---|---|
| | Short term: 1996-2000 | Long term: 2001-2005 |
| Vehicle quality/reliability | 2.0 | 2.0 |
| Technology/technological advances (e.g., airbags, ABS) | 2.1 | 1.9 |
| Real transaction price of new autos | 2.2 | 2.3 |
| Real transaction price of new light trucks | 2.2 | 2.3 |
| Styling changes | 2.2 | 2.3 |
| Vehicle insurance premiums | 2.2 | 2.3 |
| New vehicle offerings | 2.3 | 2.5 |
| Price of gas and oil | 2.3 | 2.1 |
| Used car prices | 2.3 | 2.5 |
| Used light truck prices | 2.3 | 2.5 |
| Vehicle miles | 2.4 | 2.6 |
| Age of operating fleet | 2.5 | 2.3 |
| Personal loan interest rates | 2.5 | 2.8 |
| Maintenance costs | 2.9 | 2.8 |
| Consumers' economic confidence | 3.0 | 2.9 |
| Real disposable personal income | 3.0 | 2.9 |
| Use of mass transportation | 3.1 | 2.8 |

**Other responses:**

Short term

Vehicle recyclability—2; Regulations/costs—2; New vehicle "status"— 4; Electronic gadgetry—2; Government regulations—3; Period of ownership of new vehicles—2

Long term

Vehicle recyclability—1; Electronic gadgetry—2; Government regulations—2

### Selected edited comments

- An aging population should result in fewer miles drive for the 60+ age group and means they will be keeping their vehicles longer. There will be fewer two- and three-car households.
- Flexible manufacturing is likely to make quick styling changes feasible (e.g., every model year).
- In the short and long term, leases will be more dominant since monthly payment is the issue (versus the transaction price).

## Discussion

Panelists forecast a large number of changes in the future that will affect new vehicle demand. Many factors are predicted to increase in importance and virtually none are thought to decrease. The factors forecast to increase the most were vehicle quality and reliability, technology, prices, styling changes and insurance premiums. Most of the remaining factors are also predicted to increase, although to a slightly lesser extent. Four factors are forecast to remain about what they are today: vehicle maintenance costs, consumers' economic confidence and real buying power, and the use of mass transportation.

The forecasts for short- and long- term are extremely similar.

## Manufacturer/supplier comparison

In both the long- and short- term, manufacturers and suppliers mostly agree. There are a few factors where they disagree, all of which occur in the long term. On maintenance costs, manufacturers predict a reduction in the future while suppliers predict an increase. The difference could stem from manufacturer intentions to build lower maintenance vehicles, plans for which have not yet been made available to suppliers. Manufacturers forecast that styling changes will increase significantly while suppliers predict only a modest increase. This could be due to the fact that manufacturers, who bear the greatest responsibility for styling, are more aware of market requirements for styling changes. Finally, manufacturers predict even greater increases in vehicle quality than do suppliers.

## Trend from previous Delphi surveys

*Short term:* The current forecast is very similar to the previous one. However, panelists in the 1994 Delphi VII forecast, whose short term was 1994-1998, predicted that the number of new vehicle offerings would not change from the base period and consumer economic confidence would increase over the base year.

*Long term:* As in the short term, the long-term forecast is very similar to that of the previous Delphi forecast. The previous panel predicted for 1999-2003 that the number of new vehicle offerings would not change from the base year.

## Strategic considerations

This question looks at how certain vehicle and market attributes, commonly thought to have an effect on new vehicle sales, will change during the next 10 years. Each of these has a positive or negative effect depending on whether it is increasing or decreasing. Some have a greater effect on purchasing new vs. used vehicles, while others have more effect on whether a vehicle is purchased at all. Panelists were very consistent between short- and long-term forecasts.

According to the panelists, most of the attributes that will likely change the most over the next five to 10 years to encourage car sales are in the hands of the automakers themselves. The attributes that showed the greatest potential for change, in our panelists' view, were factors such as advances in technological features, vehicle quality and the overall price of new vehicles. Styling, too, remains a powerful force in promoting new car sales.

In both the long- and short-term, panelists forecast that technology and technological advances, and vehicle quality and reliability, will increase the most. Advances in vehicle technology are forecast to have a favorable effect on new car sales. Consumers are drawn to new features that make cars safer, easier to control, more economical and more comfortable. They will replace an older car with a newer, technologically more advanced one. Vehicle quality and

reliability, however, could make it possible for consumers to delay new purchases. Vehicles that last longer or have fewer or less frequent maintenance requirements can accumulate more miles before they need to be scrapped and replaced. It is interesting that, with most new vehicles of such uniformly high quality, panelists believe additional quality gains could be substantial.

The increasing price of fuel has an effect on vehicle demand if the increase is substantial enough and motivates consumers to buy more economical vehicles. Increasing prices for new vehicles would, of course, tend to have a damping effect on new vehicle demand.

Increases in styling changes and new model offerings are likely to spur demand, since consumers often respond to new styling and product offerings. So, too, will an aging fleet of vehicles that may accumulate miles more rapidly in the future.

Based on these responses, industry marketing executives expect a reasonably stable future. It would be impossible to summarize the net effect on vehicle demand of all these factors. Readers should consider their own research and position in the industry to determine how they will be affected.

**MKT-3. Please estimate United States retail fuel prices, per gallon, for the following years. (Please do not adjust for inflation.)**

| Unleaded Gasoline | 1994* | Median Response | | Interquartile Range | |
|---|---|---|---|---|---|
| | | 2000 | 2005 | 2000 | 2005 |
| Unleaded regular | $1.10 | $1.30 | $1.50 | $1.25/1.40 | $1.34/1.65 |
| Unleaded premium | 1.30 | 1.54 | 1.75 | 1.50/1.60 | 1.65/1.85 |

*Source: United States Energy Information Administration

**Selected edited comments**

- Assuming that we will see a spike in energy prices, then a drop. Not sure about the timing.
- Due mainly to increased state and federal taxes.
- Estimate based upon increase in crude oil prices which will be driven by increased consumption in emerging markets in the Far East. Tax increases are not considered here.
- Heighten scarcity value and expand consumption.
- If we don't begin to tax fuel consumption more heavily, tightening supplies will drive up the price.
- Most of increase due to increased federal and state taxes.

**Discussion**

Panelists predict that the price of gasoline, excluding inflation, is likely to increase about 18 percent by 2000 and about 15 percent in the five years after that. This is equivalent to an annualized rate of about 3 percent from 1995 to 2005. The increases, according to the survey, are due largely to fuel taxes, with some increase due to growing worldwide demand and a possible oil crisis caused by oil-producing nations.

**Manufacturer/supplier comparison**

There is no statistically significant difference in responses between manufacturers and suppliers.

**Comparison of forecasts: TECH-1 and MAT-1**

There is no statistically significant difference in responses between the marketing, technology and materials panelists.

Results for the marketing, technology and materials surveys are in general agreement, and are summarized in the table on the following page.

| Unleaded Gasoline | Est. 1994* | Median Response | | | | | |
|---|---|---|---|---|---|---|---|
| | | 2000 | | | 2005 | | |
| | | Mkt.. | Tech. | Mat. | Mkt. | Tech. | Mat. |
| Regular | $1.10 | $1.25 | $1.25 | $1.25 | $1.45 | $1.40 | $1.50 |
| Premium | $1.30 | 1.49 | 1.45 | 1.50 | 1.68 | 1.65 | 1.73 |

*Source: U.S. Energy information Administration. This was provided to panelists as a baseline.

### Trend from previous Delphi surveys

| | Retail Fuel Price Expectations: Previous and Current Delphi Forecasts | | | | | |
|---|---|---|---|---|---|---|
| | Unleaded Regular Median Response | | | Unleaded Premium Median Response | | |
| Year | Delphi VI | Delphi VII | Delphi VIII | Delphi VI | Delphi VII | Delphi VIII |
| 1998 | | $1.45 | | | $1.60 | |
| 2000 | 1.25 | | 1.30 | 1.40 | | 1.54 |
| 2003 | | 1.70 | | | 1.90 | |
| 2005 | | | 1.50 | | | 1.75 |

### Strategic considerations

Although the price of fuel is predicted to increase, it is not predicted to increase so much that it would have a serious impact on consumer buying or driving behavior. Assuming annual usage of 15,000 miles per year and 20 miles per gallon, a consumer spends $825 per year on gasoline at today's $1.10 per gallon. At $1.50 per gallon, the annual cost of gasoline is $1,125. That increase is not inconsequential, but it is probably not so great as to cause major changes in vehicle purchase or driving behavior. One panelist pointed out that fuel prices have been relatively inelastic in the past, and it is true that annual vehicle miles driven (per vehicle) have actually been increasing steadily since World War II despite fuel price rises.

Although market forces may have some impact on price, survey respondents believe that political considerations, such as balancing the federal budget (and doing so by raising fuel taxes), may have more impact on fuel price than do market pressures.

Another interesting aspect of the fuel economy issue is that, while great improvements have been made in fuel consumption in the past, the rate of improvement in the future is likely to be much lower. Reductions in fuel consumption due to technological improvements to the vehicle are likely to cost much more in the future than in the past. In other words, the least expensive solutions have already been accomplished. Future gains in fuel efficiency may rely on exotic (and expensive) lightweight materials and costlier components. If government continues to mandate increased fuel efficiency levels, it may affect vehicle prices significantly.

**MKT-4.** **Auto industry structure in the United States evolves in many ways. Companies may enter or exit the marketplace in certain regions (e.g., Kia or Peugeot in the United States). Other firms may continue to market vehicles while under the ownership of another firm (e.g., Jaguar). Still other firms may limit or expand the number of individual nameplates (e.g., Chevrolet Lumina or Eagle Vision) receiving engineering and marketing support.**

| Scale: 1 = sharply increase | 3 = no change | 5 = sharply decrease |
|---|---|---|

| Industry Structure, 1995-2005 | Mean Rating |
|---|---|
| Number of nameplate offerings | 2.9 |
| Number of manufacturers marketing vehicles | 3.2 |
| Number of independent companies | 3.7 |

### Selected edited comments

- All of them may be consolidated.
- Some of the Europeans will try to re-enter. Likely to be a consolidation, however, since a market centralization will kill the weak ones.
- We are likely to see the emergence of yet another wave of companies, mostly Asian (e.g., Chinese, Indian, Malaysian, Indonesian) wishing to export to the United States and Europe.
- Will Samsung be the last volume OEM?

### Discussion

Panelists predict that the number of models (nameplates) will stay about the same through 2005, as will the number of manufacturers marketing vehicles. The number of independent companies, however, may decrease somewhat in that time period.

### Manufacturer/supplier comparison

There is no statistically significant difference in responses between manufacturers and suppliers.

### Trend from previous Delphi surveys

This question was asked in the 1994 Delphi VII forecast. At that time, panelists predicted a moderate decline in the number of nameplate offerings and the number of companies marketing vehicles in the United States (3.4 and 3.5, respectively). They predicted a fairly significant decline in the number of independent companies worldwide (3.9).

### Strategic considerations

The most notable finding of this question is the prediction of fewer independent manufacturers. Equity arrangements, assembly plant sharing, even model sharing are quite common in the industry. In fact, it has become an important aspect of the global automobile industry. The most common arrangement has been for a large manufacturer to take over (buy a significant portion of equity) a smaller one, as is the case with Ford and Mazda, or General Motors

and Saab. Companies buy into other manufacturers in order to expand or complement a product line, obtain technology or technical expertise, create economies of scale or other reasons.

By predicting that the number of nameplates is not likely to change, panelists may believe that there are not going to be any new vehicle segments in the next 10 years. If a new segment were to develop, it may merely replace one that already exists.

Similarly, panelists predict that the number of manufacturers marketing vehicles in the United States is not likely to change. This could mean that there will be no new players in the United States, or that for any manufacturer who enters the U.S. market, one leaves. In either case, the United States is quickly becoming a low- or no-growth market, with manufacturers fighting for market share and where one company's gain is another company's loss. For a company to make money in the United States, it must be able to sell a significant number of vehicles in order to recoup the costs of designing or altering its vehicles to meet U.S. specifications. For newcomers to the U.S. market, the costs of setting up a distribution system can be prohibitive. Several developments may change these impediments. One is a growing call for unification of standards among international markets. If that happens, it will become easier for a manufacturer, even one with low sales volumes, to sell in different countries. Another development in the United States is the potential success of national distribution systems like CarMax or AutoNation USA. If these companies take on distribution of new cars (CarMax has signed an agreement with Chrysler), then there is a ready-made distribution channel for a manufacturer not already in the United States

**MKT-5.** **Many countries have the potential of becoming important in vehicle and component manufacturing so as to offer significant market opportunities. Please indicate your opinion of the manufacturing and marketing environment in these countries by 2005.**

SCALE: 1 = strongly agree 3 = neither agree nor disagree 5 = strongly disagree

| Country | Will Approach 2005 World Cost and Quality Standards | | Will Be a Profitable 2005 Market |
|---|---|---|---|
| | Vehicle Production | Component Production | Vehicle Sales |
| Mexico | 2.2 | 2.1 | 2.1 |
| Taiwan | 2.4 | 2.2 | 2.3 |
| Thailand | 2.6 | 2.4 | 2.4 |
| India | 3.0 | 2.8 | 2.8 |
| Hungary | 3.1 | 2.9 | 2.9 |
| China, Peoples Republic of | 3.5 | 3.0 | 3.2 |
| Confederation of Independent States (C.I.S.) | 3.7 | 3.6 | 3.6 |

**Selected edited comments**

- Among the developing countries in Asia listed here, only Thailand is promoting the large scale local production of the main parts (engine and transmission). So I predict only Thailand will have the cost competitiveness in component production. Concerning vehicle sales, if a maker doesn't have the local source, it won't be profitable anymore.
- Asia will explode, Eastern Europe won't.
- Taiwan: too small, crowded, and expensive. Russia and C.I.S.: too fragmented, hostile and poor. Thailand: government protection to decrease overtime with assemblers becoming competitive. Mexico: reform and United States support will turn the corner. China: good chance if government will step aside–big "if," high risk.
- The country is only an issue regarding whether or not it can attract world class facilities. The issue from a country's perspective is political and economic stability, not technological capability or economic size.
- China is a big question mark. I believe the level of understanding regarding China is very weak among North American-based manufacturers.
- Asia will become a major source of vehicle production (beyond Japan, Korea and Taiwan today). Markets not listed also will emerge, such as Vietnam. Huge uncertainty about Russia.
- The emerging market in Asia seems to be Korea. I am involved in numerous automotive projects with Korean firms. Their plan is to out-produce Japan by 2000. Additionally, Korean automotive companies are setting up joint ventures throughout the world. They may be the ones to watch.

- Government is the problem in China. Too little infrastructure in the C.I.S.
- Marketing and distribution will be more complex than vehicle production which, with partnerships, can be addressed. However, distribution and marketing systems are more culturally based.

**Discussion**

Panelists believe most strongly that Mexico, Taiwan and Thailand will approach world quality standards for component and vehicle production by 2005. These two countries are also thought to be capable of becoming profitable markets for vehicle sales. The Confederation of Independent States is not considered likely to develop into a world-class manufacturing or sales market by 2005.

Panelists neither agree nor disagree that India and Hungary are important manufacturing and market opportunities. They are equally ambivalent about China, although there is slight disagreement that China will reach world-class quality standards in vehicle production.

**Manufacturer/supplier comparison**

There is no statistically significant difference in responses between manufacturers and suppliers.

**Trend from previous Delphi surveys**

Of the countries included in the 1996 Delphi VIII forecast, only Hungary, the Peoples Republic of China and India are included in the 1994 Delphi VII forecast. The 1992 Delphi VI forecast includes only Hungary and the Peoples Republic of China. Delphis VI and VII targeted the years 2000 and 2003 respectively, instead of 2005.

Hungary is thought to be improving slightly from the previous forecasts in its ability to reach world class standards for vehicle production and to become a profitable market. Panelists remain neutral in their opinion of its ability to approach world-class standards for component production.

The People's Republic of China has improved significantly in the perception of its ability to meet world-class quality standards for both component and vehicle production. However, that means that panelists are now neutral (components) or mildly disagree (vehicles) with China's ability to reach world standards. They remain neutral on China's ability to become a profitable market.

Panelists are significantly more optimistic about India's prospects as both a manufacturer and a market than they were in Delphi VII. However, as with China and Hungary, they have merely moved from doubt to neutrality.

**Strategic considerations**

Many nations are poised to become major light vehicle manufacturing centers as well as growing markets for light vehicles. The reasons for a country joining the ranks of vehicle manufacturers include: growing number of educated and skilled workers, rapidly developing industrial infrastructure, proximity to already developed car-consuming nations, supportive government policy, and others. Similarly, a developing market requires a population with an appropriate level of income, a good road system, and probably a sophisticated banking and credit system. For both manufacturing and marketing, a stable political climate contributes to growth. Some nations have indigenous manufacturers. Others have developed manufacturing plants due to foreign manufacturers who sought out lower manufacturing or transportation costs or are meeting requirements for local consumption with local production.

As production of vehicles becomes more global, the engineering expertise required to design and build vehicles will also spread. This has important implications for worldwide competition because emerging nations will be able to compete with advanced nations, particularly in entry level vehicles. In fact, emerging nations may become providers of low-cost, low-tech vehicles while advanced nations move upscale, using higher technology processes and features to differentiate their vehicles.

**MKT-6. Please indicate your view of the trend in United States federal regulatory and legislative standards over the short term (1996-2000) and long term (2001-2005). Also, list any likely new areas of legislative activity.**

Scale: 1 = much more restrictive 3 = no change 5 = much less restrictive

| Legislation/Regulatory Activity | SHORT TERM 1996-2000 | LONG TERM 2001-2005 |
|---|---|---|
| **Alternate fuel/power source** | | |
| Passenger car | 2.6 | 2.0 |
| Light truck | 2.7 | 2.1 |
| **Antitheft** | | |
| Passenger car | 2.6 | 2.3 |
| Light truck | 2.6 | 2.4 |
| **Fuel economy standards (CAFE)** | | |
| Passenger car | 2.4 | 1.9 |
| Light truck | 2.3 | 1.9 |
| **Occupant restraint/interior safety** | | |
| Passenger car | 2.2 | 2.0 |
| Light truck | 2.1 | 1.9 |
| **Product liability** | | |
| Passenger car | 2.8 | 2.5 |
| Light truck | 2.8 | 2.5 |
| **Regionalization of national standards** | | |
| Passenger car | 2.8 | 2.6 |
| Light truck | 2.8 | 2.5 |
| **Vehicle integrity/crashworthiness** | | |
| Passenger car | 2.2 | 1.9 |
| Light truck | 2.0 | 1.8 |
| **Vehicle emission standards** | | |
| Passenger car | 2.3 | 1.8 |
| Light truck | 2.1 | 1.8 |

**Other responses:**

Recycling

Crash/collision avoidance

Light truck bumper standards

**No comments**

**Discussion**

The legislative activities can generally be classified into three categories: occupant or vehicle integrity, environmental and political. Overall, our panelists see government taking an even

more active role in regulating motor vehicles in the future than now, more so in the longer term than in the shorter term.

Interestingly, no regulatory standards were considered likely to become less restrictive. Several areas are thought to stay about the same as now: regionalization of national standards and product liability standards. Everything else will get more restrictive.

*Short term*

Panelists think that occupant restraint/interior safety and vehicle integrity/crashworthiness standards will be significantly more restrictive in the future. In fact, these two parameters were considered the most likely to become more restrictive of all the parameters we asked about.

*Long term*

We asked panelists to distinguish between light trucks and passenger cars for their answers. The mean ratings, however, showed that there is remarkable consistency in responses for both kinds of vehicles. This is striking considering that there exist today some fairly disparate standards for cars and trucks. At the same time, there is within the industry and from Washington growing consensus that separate standards are not justified because so many people buy trucks to convey people rather than things.

**Manufacturer/supplier comparison**

Manufacturers and suppliers are in general agreement on this issue. However, their opinions differ on the level of legislation regarding passenger car occupant restraint/interior safety. While both groups agree that legislation in this area will become more restrictive, manufacturers believe it will become more restrictive than do suppliers.

**Comparison of forecasts: MAT-6 and TECH-14**

Most of the differences between panels occur in the short term. Those differences are summarized in the chart on the following page. In the long term, the marketing panel forecasts more severe legislation than does the materials panel for cars (2.3 versus 2.6) and for trucks (2.4 versus 2.6). For vehicle integrity/crashworthiness, the marketing panel mean forecast is 2.4 compared to the materials mean forecast of 2.6.

Technology panelists forecast somewhat more restrictive standards than do materials or marketing panelists for the items noted.

| SHORT TERM 1996-2000 | | | |
|---|---|---|---|
| **Legislation/Regulatory Activity** | **MKT** | **TECH** | **MAT** |
| Fuel economy standards (CAFE) | | | |
| Passenger car | 2.4 | 2.2 | 2.6 |
| Light truck | 2.3 | 2.1 | 2.5 |
| Vehicle emission standards | | | |
| Passenger car | 2.3 | 1.9 | 2.5 |
| Light truck | 2.1 | 2.0 | 2.4 |
| Theft | | | |
| Passenger car | 2.6 | 2.6 | 2.9 |
| Light truck | 2.6 | 2.8 | 2.9 |
| Occupant restraint | | | |
| Passenger car | 2.2 | 2.2 | 2.4 |
| Light truck | 2.1 | | 2.3 |
| Regionalization of national standards | | | |
| Passenger car | 2.8 | 2.6 | |
| Light truck | 2.8 | 2.6 | |
| Vehicle integrity | | | |
| Passenger car | 2.2 | | 2.5 |
| Light truck | 2.0 | 2.2 | 2.4 |
| Emissions | | | |
| Passenger car | 2.3 | 2.0 | |
| Light truck | 2.1 | | 2.4 |

**Trend from previous Delphi surveys**

In the short term, this forecast does not differ significantly from the 1994 Delphi VII forecast. Panelists still believe that regulations are likely to get more stringent. In the long term, they believe that regulations for light truck occupant restraint/interior safety will get even more restrictive than they predicted in Delphi VII, but light truck product liability will not get so restrictive as previously predicted.

Comparison to Delphi VI is difficult because the structure of the question was different. That question used a three-point scale instead of a five-point scale. In general, panelists in Delphi VI predicted (for 1992 to 2000) more restrictive legislation for vehicle emissions standards, fuel economy standards, crashworthiness and occupant safety.

**Strategic considerations**

If the government continues to take an active role in regulating motor vehicles, the implications for the manufacturer and the consumer are considerable. For the consumer, the high cost of personal transportation is likely to get even higher. Additional safety equipment will make cars and trucks even more expensive. There is already speculation of an affordability crisis with the potential to alter buying and ownership habits significantly. That is not to imply that government regulation does not benefit the consumer: Improved safety equipment and higher fuel economy, for example, have had quantifiably positive results for individuals and for society. However, some buyers may postpone buying a new vehicle because of high cost which relegates them to older, less advanced safety technology.

For manufacturers, the cost of adding safety equipment and other devices to meet regulations is not likely to decrease. The cost of developing and installing equipment is only part of the story. It takes a great deal of engineering expertise to meet these regulatory demands. It diverts attention from other competitive engineering factors like quality or innovation. It is not an

exaggeration to say that government has had unprecedented influence in shaping today's motor vehicle. Fortunately, many consumers are willing to pay for safety features like airbags or antilock brakes. Panelists predict that the car and truck of the future will likely be influenced by even greater government input.

**MKT-7. Research consortia provide effective, efficient means to accomplish specific research goals. In 1994, consortia exist to further knowledge in electric batteries, composite materials, recycling and others. In the future, what other areas does it make sense to consider joint automotive research activity?**

| Description | Number of responses |
|---|---|
| Safety & crashworthiness/avoidance | 29 |
| Alternate fuels/fuel efficiency | 23 |
| ITS/IVHS/navigation systems | 19 |
| Emission controls | 9 |
| Technological issues/development | 6 |
| Commonization/standards | 5 |

**Other single responses:**
Design for disassembly; materials development; plant assembly processes; workforce training.

**No comments**

**Discussion**

Panelists cited three areas most prominently for combined research: safety, fuels and fuel economy, and navigation.

**Manufacturer/supplier comparison**

These comparisons are not made for open-ended questions.

**Trend from previous Delphi surveys**

In the 1994 Delphi VII forecast, panelists saw cooperative research efforts in alternative fuels/fuel efficiency as offering the greatest opportunity for "Big Three" cooperation. Current survey results show that safety and crash avoidance are the areas mentioned most frequently for cooperation. Still highly regarded as an area suitable for joint research, fuels and fuel efficiency now rank second.

**Strategic considerations**

Jointly pursued general research that results in solving a problem or improving vehicle performance is laudable. It can eliminate the costly duplication of effort that might result when the Big Three, for example, all pursue research on alternate fuels, do the same experiments and end up reaching the same conclusions. Also, there is an elimination of wasteful duplicative spending, especially capital-intensive spending. Another advantage of consortium research, especially if the government encourages it, is that vehicle manufacturers might be more disposed to voluntarily pursue safety issues, pollution abatement strategies, etc., since the cost to do so would be significantly lower.

If there is an inhibiting aspect to corporate joint efforts, it is that governmental authority tends to be sensitive to interactions that promote anticompetitive situations such as monopoly or collusion. In the "real world," it is likely that the car makers will stop short of cooperating too greatly on joint research (and in fact may be legally constrained) because, at some point in the process, they will feel they are surrendering a competitive advantage. However, in the interest of improving

private transportation, the government has not interfered with, and has encouraged, unified industry research in recent years.

Standardization is one research area in which all manufacturers can benefit, although it did not receive a strong mention from the panel. There are many parts common to an automobile or light truck that need not be uniquely designed for a particular make or model. Parts like electrical connectors, alternators and many others do not add differentiated value to a vehicle yet are often designed as unique parts for a vehicle. These kinds of parts should be commodity items, available "off the shelf." One advantage to identifying parts and components that can be made common to many vehicles is that less engineering and design time is allocated to those parts by each company. Another advantage is a reduction in cost of these parts and ultimately a lowered price to the consumer.

Overall, the advantages of research cooperation come from reduced costs and eliminated duplication of effort. While companies continue to be concerned about competitive advantage, duplicated research efforts across companies do not serve the industry's interests.

Panelists in the 1994 Delphi VII forecast ranked fuel research above safety research. Why the change? We think this is driven by the priorities of the federal government. Not long ago, the domestic manufacturers, arguably more than importers, were struggling to achieve government-mandated fuel efficiency requirements. Now most of those requirements have been achieved. The government seems to have turned to safety issues and our respondents' answers may be reflecting that shift. Airbags, side impact standards and head protection standards, all demonstrate a renewed focus by government agencies on occupant protection.

**MKT-8.** **In 1994, more than 100 passenger car models (e.g., Firebird, Tracer) sold fewer than 50,000 units in the United States and Canada. Please forecast how the *number of models* selling fewer than 50,000 units annually will change by 2000 and by 2005.**

| SCALE: | Greatly increase: 5 or more models over 1994 | Somewhat increase: 2 to 4 models over 1994 | No change: 1 more model to 1 fewer model | Somewhat decrease: 2 to 4 fewer models | Greatly decrease: 5 or more models fewer than 1994 |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |

| Year | Mean Rating |
|---|---|
| 2000 | 2.3 |
| 2005 | 2.1 |

### Selected edited comments

- Lean manufacturing lowers break-even point for manufacturing. More models by fewer companies (who centralize their marketing and distribution clout).
- Manufacturers will learn mass customization as the next level of competition and the number of less-than-50,000-unit passenger cars will increase dramatically.
- Niche market opportunities will grow in importance to OEMs.
- Niche marketing coupled with flexible/agile manufacturing will keep pressure on model mix trend.
- Niche marketing real. Companies to find profitable ways to meet low-volume demands.
- There may be more differentiation, but these cars will be built off common/similar platforms (i.e., minivan off Neon).
- To utilize the company's resources (including marketing resources) more efficiently, many companies will reduce the number of platforms and car nameplates.

### Discussion

Panelists were fairly consistent in predicting a greater number of models, slightly more so in the distant future than in the near-term.

### Manufacturer/supplier comparison

There is no statistically significant difference in responses between manufacturers and suppliers.

### Trend from previous Delphi surveys

This question was posed in the 1994 Delphi VII forecast and got a different response. At that time, respondents told us to expect fewer models in the future. Said one panelist, "cost reduction efforts will require the consolidation of platforms."

**Strategic considerations**

Panelists believe that there will be an even greater number of relatively low-selling models in the future. There are a number of forces in the industry and in the market to support this prediction. First, there are likely to be more manufacturers participating in North America. Second, consumers have become accustomed to having a large number of choices and may be using their vehicles to express their individuality more than in the past. This reinforces the pressure for manufacturers to have models for many different tastes. Third, there will likely be more joint development of platforms between manufacturers.

More manufacturers will want to participate in the North American market in the next 10 years. Newcomers from Asia, like Daewoo and Samsung, will join absent European manufacturers, perhaps Peugeot or Renault. North America will be an important market, but not the primary one for them. Consequently, they may view sales in the United States and Canada as merely supplemental to sales in their home markets. That and other factors suggest their volumes will be low.

Constantly shifting consumer tastes make the development of new models and new model segments nearly irresistible for most producers. The proliferation of models available to customers may reflect a desire for greater individuality or a propensity to acquire a vehicle that matches a particular life phase. Exacerbating this is the increased popularity of leasing which allows a customer to change vehicles easily in a relatively short amount of time. Consequently, with more frequent turnover, some customers will be seeking out that specialized vehicle (a convertible? a sports car?) for the two-year term of the lease.

Several panelists noted that there will be more nameplates, but there may actually be fewer platforms. Building multiple models from one platform is likely to become more common as will the sharing of platforms between divisions of large manufacturers and between separate companies. The latter practice, nearly unheard of 15 years ago, has become commonplace (Mercury Villager/Nissan Quest, Mitsubishi Eclipse/Eagle Talon, etc.) in an effort to improve economies of scale.

The implications for continued niching in the market are many. Manufacturers will lose the traditional economies of scale that accompany higher production volumes. If there are more models selling fewer units, it may make it more difficult to operate factories at optimum capacity—unless those factories are flexible or the models built there share the same platform or significant componentry. Unless manufacturers can design production systems that can accommodate lower volumes while maintaining efficiency, higher vehicle prices could result. This clearly is a significant challenge to the industry.

**MKT-9. The new Congress is, for the first time in 40 years, controlled by a Republican majority. What effect, if any, do you think the new Congress will have on the auto industry? Please consider such issues as regulations, taxes, trade, etc.**

**By 2000**

- A slightly slower rate of tightening on emissions, safety and fuel economy regulations. Beyond that, none.
- Congress will try to reduce government involvement but they will not be successful.
- Fewer regulations. Lower corporate and personal taxes. Open but fair trade.
- Less aggressive position on trade deficit with Japan. Probably increase in CAFE.
- Less emphasis on CAFE and other regulations. In general, less government intervention. More stable personal and business taxation rates. Enforced CAFE regulations for imports. Increased international trade.
- Less political. More understanding of auto industry issues and problems. More people interested in working together for the good of the country and the manufacturing industry.
- Less regulation and more protectionism.
- Less regulations on safety, CAFE, air/emissions. Lower taxes on businesses and individuals. More emphasis on "fair and balanced" trade, especially with Japan.
- More pro-business. Less regulation. Tougher on trade.
- Reduce or minimize new regulations and reopen existing, particularly in the emissions area. Taxes will increase slowly to decrease deficit and trade battles will escalate–China and Japan as chief combatants.
- Reduction in corporation tax. Greater incentive to explore new markets. More emphasis on connection of trade imbalance.
- Status quo on regulations. Slight increase in taxes to help deficit–perhaps a gasoline tax. Some modifications in trade if foreign governments do not cooperate.

**By 2005**

- By this time Congress will be forced to reduce pollution, thus creating more strict CAFE and emission requirements.
- Continued regulations. Tax increases to rebuild infrastructure used by vehicles and to cover the cost of new systems to support smart highway and crash avoidance technologies.
- Cooperation will increase drastically to meet the global challenge. Although the desire to provide tax relief will be positive, deficit reduction needs prevent any relief.
- Fewer regulations. Lower corporate and personal taxes. Open but fair trade.
- It is too early to tell if the GOP will remain in control long enough to significantly influence the long term.
- Light truck requirements will (and should) reach parity with cars. We should replace CAFE with fuel taxes–but I don't think America has the political will to make this happen.

- The Democrats will be back in control and the auto industry will be back on its heels. Much ground will be lost as regulations and taxes dominate vehicle manufacturers' strategies.
- Totally depends on whether the world or global trend has worked effectively to improve overall business outlook in the United States.

**Discussion**

In general, panelists believe in the short run that government involvement in the industry may be scaled back with fewer regulations, less emphasis on CAFE, and lower taxes. In the longer term, even if Republican control of the Congress remains, changing environmental and global challenges may require renewed governmental intervention.

**Manufacturer/supplier comparison**

Manufacturer/supplier comparisons are not done for open-ended questions.

**Trend from previous Delphi surveys**

This question was not asked in previous Delphi surveys.

**Strategic considerations**

Panelists had definite ideas about the potential for changes coming from Washington. Much of the thinking may revolve around the belief that Republican politics favor business and generally dislike regulation. In this traditional role, the Congress would help the auto industry by easing regulations on emissions, safety and fuel economy standards. Any new regulations would be scrutinized more closely for a better cost/benefit trade-off. In addition, Congress may eliminate the luxury tax on high-priced cars.

Surprisingly though, many people thought the laissez faire nature of Republican politics might hinder the auto industry. For one, there could be a stronger emphasis on free trade. This could result in elimination of tariffs on imports, particularly for trucks, and an even more competitive marketplace. Also, the government might make fewer funds available for technological research and development. Finally, with the states' rights movement growing, Congress may be willing to let states assume greater responsibility for regulations. We are already seeing this in pollution standards (California, the Northeast) and, potentially, the setting of highway speed limits. Regionalization of vehicle standards or requirements could be more burdensome for automobile manufacturers than federal regulations.

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**MKT-10.** **Please select from the following list the five most important considerations that influence current passenger car-buying decisions in each segment. Please do not attempt to rank these attributes. Simply check the five characteristics you believe are the most important initial considerations to the customer in 2000 and 2005.**

| Passenger Car Attributes | 2000 | | | 2005 | | |
|---|---|---|---|---|---|---|
| | Entry level | Intermediate /family | Luxury | Entry level | Intermediate /family | Luxury |
| Purchase price | **91%** | **62%** | 8% | **88%** | **56%** | 10% |
| Fuel economy | **69** | 13 | 0 | **66** | 22 | 4 |
| Operating cost | **62** | 16 | 0 | **61** | 19 | 1 |
| Incentives/rebates | **45** | 14 | 2 | 24 | 7 | 1 |
| Product quality | **45** | **53** | **57** | **46** | **46** | **47** |
| Exterior styling | 39 | **44** | **70** | **36** | **41** | **62** |
| Safety | 27 | **48** | 26 | 31 | **43** | 23 |
| Dealership experience/relationship | 17 | 18 | 22 | 17 | 18 | 25 |
| Passenger space | 16 | **52** | 9 | 14 | **54** | 1 |
| Comfort/convenience | 15 | 41 | **51** | 13 | 40 | **52** |
| Division/make reputation | 8 | 5 | 24 | 11 | 7 | 17 |
| Resale value | 7 | 8 | 19 | 4 | 8 | 11 |
| Corporate reputation | 6 | 8 | 14 | 4 | 8 | 11 |
| Performance | 6 | 15 | **52** | 11 | 16 | **47** |
| Company's country of origin | 2 | 1 | 4 | 1 | 0 | 2 |
| Interior styling | 2 | 12 | **43** | 4 | 14 | 43 |
| Status appeal | 1 | 2 | 42 | 1 | 2 | 32 |
| Cargo space | 4 | 28 | 0 | 4 | 23 | 0 |
| Country where vehicle is assembled | 0 | 3 | 0 | 1 | 0 | 0 |
| Product technology | 0 | 5 | 41 | 9 | 9 | **45** |

**Selected edited comments**

- Acceptable safety will become the price of entry—usually considered as one of top three reasons in all segments today. As cars become more expensive and less affordable, entry-level cars will have to provide better cargo and passenger space.
- Aging baby boomers and the new generation are more pragmatic, loyal to value. In 2005 more emphasis on service, less on product, even at entry level. Brand loyalty in 2005 will result, even at luxury level, from service.
- Everyone wants safety.
- Quality will be consistently good and thus not be a differentiator.

## Discussion

Consumers make their choices about a new car purchase according to a complex set of wants and needs. These vary by vehicle segment. For example, the entry-level buyer is much more concerned with price and operating cost than the luxury buyer. For the family midsized vehicle, value is critical with emphasis on price, quality and space. All three groups show varying degrees of interest in styling.

A desire for high quality runs across all vehicles.

## Manufacturer/supplier comparison

| Entry-Level Vehicles | | | |
|---|---|---|---|
| **Five most important purchasing decision attributes by type of panelist** | | | |
| **Ranked in descending order by number of mentions** | | | |
| **2000** | | **2005** | |
| **Manufacturers** | **Suppliers** | **Manufacturers** | **Suppliers** |
| Purchase price | Purchase price | Purchase price | Purchase price |
| Fuel economy | Fuel economy | Fuel economy | Fuel economy |
| Operating cost | Operating cost | Operating cost | Operating cost |
| Product quality | Incentives/rebates | Product quality | Product quality |
| Exterior styling | Exterior styling | Safety | Safety |

Entry level: Manufacturers and suppliers agree on the desired attributes for these vehicles for both 2000 and 2005.

| Intermediate/Family Vehicles | | | |
|---|---|---|---|
| **Five most important purchasing decision attributes by type of panelist** | | | |
| **Ranked in descending order by number of mentions, ties in ( )** | | | |
| **2000** | | **2005** | |
| **Manufacturers** | **Suppliers** | **Manufacturers** | **Suppliers** |
| Passenger space | Purchase price | Passenger space | Purchase price |
| Product quality (2) | Product quality | Safety | Passenger space |
| Purchase price (2) | Passenger space | Purchase price | Product quality |
| Safety (2) | Exterior styling (4) | Product quality | Comfort/convenience (4) |
| Comfort/convenience (5) | Safety (4) | Comfort/convenience | Safety (4) |
| Dealership experience (5) | | | |

Intermediate/family: For 2000, both groups agree, except that manufacturers included the dealership experience/relationship in their top five while suppliers did not. Instead, they included exterior styling. For 2005, both groups included the same five attributes in the top five.

| Luxury Vehicles | | | |
|---|---|---|---|
| Five most important purchasing decision attributes by type of panelist | | | |
| Ranked in descending order by number of mentions, ties in ( ) | | | |
| 2000 | | 2005 | |
| **Manufacturers** | **Suppliers** | **Manufacturers** | **Suppliers** |
| Product quality | Exterior styling | Product quality | Exterior styling |
| Comfort/convenience (2) | Performance | Comfort/convenience | Performance |
| Exterior styling (2) | Comfort/convenience | Exterior styling | Comfort/convenience |
| Status appeal | Product quality | Division/make reputation | Product technology |
| Division/make reputation | Interior styling | Passenger space (5) | Interior styling |
| | | Product technology (5) | |
| | | Safety (5) | |
| | | Status appeal (5) | |

Luxury: For 2000, manufacturers included reputation and status appeal in their top five while suppliers did not; instead, suppliers included interior styling and performance in the top five. For 2005, manufacturers included reputation, performance, safety and status appeal (the last three tied for fifth place in their ranking) which suppliers did not; suppliers included interior styling and performance.

### Trend from previous Delphi surveys

Panelists in previous Delphi forecasts have predicted the same priorities for the entry-level buyer. The priorities for the intermediate/family buyer have not changed significantly either. The same five attributes appear in the 1992 Delphi VI and the 1994 Delphi VII surveys as most important to the intermediate buyer, although in slightly different order. In Delphi VII, however, comfort options edged exterior styling out of the top five attributes expected in 1998. Luxury buyers, too, have not changed what is important to them, except that Delphi VIII panelists believe vehicle performance will become more important than status appeal vs. previous forecasts.

### Strategic considerations

Knowing what consumers desire in their new car is important both for making certain the vehicle offered is appropriately equipped and that design and engineering time is properly spent. By accurately assessing what vehicle buyers in different segments want, a company can properly allocate its resources. For example, it may not make sense to design a small, entry-level car with a powerful engine that uses more fuel since entry-level buyers value fuel economy and operating cost over performance. In this case, it would make more sense to design a vehicle with features and a level of performance that will help keep the purchase price and operating costs low.

It will be very interesting to watch the industry move to brand management in light of these data. Currently some manufacturers have not been paying as much attention to their customers as evidenced by their products' characteristics in comparison to the results to this question.

Panelists believe that the relative importance of attributes will not change much between the short term and long term. The intermediate/family buyer will consider the same traits important in 2005 as in 2000. The luxury buyer may place slightly less importance on interior styling and quality relative to other attributes by 2005. Panelists believe entry-level buyers will have nearly the same priorities in 2005 as in 2000.

Entry-level and intermediate-level buyers both show strong interest in vehicle price. Buyers in these two segments may make up to half of all buyers, so their interests and priorities are important. Their concern about price may reflect a potential affordability problem.

**MKT-11.** **Please select from the following list the five most important considerations you believe influence current personal use light truck buying decisions in each segment. Please do not attempt to rank these attributes. Simply check the five characteristics you believe are the most important initial considerations to the customer in 2000 and 2005.**

| Light Truck Attributes | 2000 | | | 2005 | | |
|---|---|---|---|---|---|---|
| | Minivan | Sport Utility | Pickup | Minivan | Sport Utility | Pickup |
| Passenger/cargo space | **68%** | 26% | **40%** | **65%** | 27% | **37%** |
| Comfort/convenience | **63** | 33 | 6 | **51** | **31** | 12 |
| Purchase price | **62** | **34** | **60** | **57** | **35** | **54** |
| Brand reputation | **40** | **35** | **50** | 27 | **31** | **45** |
| Product quality | **40** | **41** | **42** | **38** | 26 | **36** |
| Safety | 37 | 17 | 5 | **37** | 23 | 11 |
| Interior styling | 29 | 24 | 12 | 28 | 23 | 11 |
| Exterior styling | 25 | **58** | 35 | 31 | **54** | 32 |
| Fuel economy | 12 | 2 | 7 | 15 | 9 | 12 |
| Dealership experience/relationship | 11 | 6 | 11 | 14 | 12 | 10 |
| Product technology | 7 | 27 | 5 | 14 | 29 | 1 |
| Vehicle performance | 7 | 28 | **40** | 7 | 29 | **36** |
| Incentives | 4 | 2 | 3 | 3 | 1 | 3 |
| Operating cost | 4 | 1 | 19 | 6 | 5 | 19 |
| Towing capacity | 2 | 12 | 29 | 1 | 11 | 27 |
| Status appeal | 1 | **48** | 7 | 1 | **41** | 7 |
| Company's country of origin | 0 | 1 | 7 | 0 | 1 | 4 |
| Country where vehicle is assembled | 0 | 0 | 5 | 0 | 0 | 2 |
| Gross vehicle weight | 0 | 1 | 20 | 2 | 2 | 21 |

**Selected edited comments**

- Brand reputation will be important in the short term, but by 2005 minivans and sport utilities will be so common that the important points will be similar to those of passenger cars.
- Minivans require safety, space and travel convenience. Sport utilities require a macho image and performance. Pickups need to be practical yet more carlike inside.
- Product quality and safety–price of entry.

## Discussion

As with passenger cars, the attributes truck buyers consider important vary by segment but are expected to have much in common. Minivan, sport utility and pickup buyers all are forecast to consider price, brand reputation and quality important. Minivan and pickup buyers value passenger and cargo room, too. Sport utility buyers, however, are expected to consider subjective attributes like exterior styling and status appeal important. Finally, pickup buyers are forecast to want performance from their vehicles, according to panelists.

In general, truck buyers are viewed as relatively uninterested in fuel economy, where their truck was built or the relationship they have with the dealer. Despite the importance of purchase price, truck buyers are not expected to be much influenced by manufacturer incentives.

## Manufacturer/supplier comparison

| Minivan | | | |
|---|---|---|---|
| **Five most important purchasing decision attributes by type of panelist** | | | |
| **Ranked in descending order by number of mentions, ties in ( )** | | | |
| **2000** | | **2005** | |
| **Manufacturers** | **Suppliers** | **Manufacturers** | **Suppliers** |
| Comfort/convenience (1) | Passenger/cargo space | Purchase price | Passenger/cargo space |
| Purchase price (1) | Purchase price | Comfort/convenience (2) | Purchase price |
| Passenger/cargo space (3) | Comfort/convenience | Passenger/cargo space (2) | Comfort/convenience |
| Safety (3) | Product quality | Safety | Product quality |
| Product quality | Exterior styling | Product quality | Safety |

Minivans: For 2000, manufacturers included safety in their top five while suppliers substituted exterior styling. For 2005, the two groups predicted the same five attributes.

| Sport Utility | | | |
|---|---|---|---|
| **Five most important purchasing decision attributes by type of panelist** | | | |
| **Ranked in descending order by number of mentions, ties in ( )** | | | |
| **2000** | | **2005** | |
| **Manufacturers** | **Suppliers** | **Manufacturers** | **Suppliers** |
| Exterior styling | Exterior styling | Exterior styling | Exterior styling |
| Product quality | Status appeal | Comfort/convenience (2) | Status appeal |
| Comfort/convenience | Vehicle performance | Product quality (2) | Product quality (3) |
| Passenger/cargo space (4) | Brand reputation | Purchase price (4) | Purchase price (3) |
| Purchase price (4) | Comfort/convenience | Safety (4) | Product technology |
| Status appeal (4) | | | |

Sport Utility: Manufacturers and suppliers differed on several attributes. For 2000, manufacturers predicted space, quality, and price in their top five; suppliers did not but did include reputation and vehicle performance. For 2005, manufacturers included reputation, comfort/convenience and safety while suppliers included product technology and status appeal.

| Pickup | | | |
|---|---|---|---|
| **Five most important purchasing decision attributes by type of panelist** | | | |
| **Ranked in descending order by number of mentions** | | | |
| **2000** | | **2005** | |
| **Manufacturers** | **Suppliers** | **Manufacturers** | **Suppliers** |
| Purchase price | Purchase price | Purchase price | Purchase price |
| Brand reputation | Brand reputation | Brand reputation | Brand reputation |
| Product quality | Passenger/cargo space | Product quality | Passenger/cargo space |
| Towing capacity | Product quality | Towing capacity | Vehicle performance |
| Vehicle performance | Vehicle performance | Vehicle performance | Product quality |

Pickup: For both 2000 and 2005, manufacturers included towing capacity while suppliers substituted passenger/cargo space.

### Trend from previous Delphi surveys

In the previous 1994 Delphi VII forecast, panelists predicted that minivan buyers will desire the same attributes in the future as did the current panelists. The current panelists predict that future sport utility buyers, however, will show less concern for vehicle performance and comfort/convenience options, and more for exterior styling, brand reputation and price. Pickup buyers are forecast to show an increased interest in brand reputation and less interest in operating costs and towing capacity.

### Strategic considerations

Trucks and trucklike vehicles are growing in popularity. Probably more than for cars, the role of trucks has changed and their uses expanded. In the past, trucks were mostly used for commercial or recreational purposes. Now, many people buy a truck instead of a car for personal, everyday use. For many of today's truck owners, this is their first truck. Although they have switched from cars to trucks, some of these buyers still want carlike features. For example, minivan buyers are thought to consider comfort/convenience important, an attribute also considered very important by luxury car buyers. One of the two most important attributes for sport utility buyers is exterior styling which intermediate/family car buyers will also consider important. The challenge for truck makers, then, is to design products that retain the traditional virtues of trucks while offering the features former car buyers like.

From 2000 to 2005, the importance of various features and attributes does not change greatly. Minivan buyers still want space and comfort at a reasonable price. By 2005, they may place less emphasis on brand reputation. Sport utility buyers will still want handsome styling and status but be less concerned about product quality. Pickup buyers, however, will want the same attributes in 10 years as in five.

**MKT-12.** **Vehicle sales figures suggest that consumers are moving from traditionally carlike vehicles to traditionally trucklike vehicles. What attributes of trucks do consumers find appealing? What attributes of cars do they find unappealing enough to draw them out of the car market and into the truck market?**

**Advantages of trucks**

*Practical benefits*

Four-wheel drive
High seating; better driving visibility
Greater cargo space
Possibly less expensive
Towing ability
More car-like virtues: nice interior, options
Cabin space
Multifunctionality
Low price of entry-level models
High resale value
Great second vehicle
Can handle anything you throw at them

*Emotional benefits*

Image of independence and toughness
Perception of being protected and safe
Ruggedness
Unique styling
Styling differentiation; more chrome on trucks
Increasing status
Image statement
Fun to drive; sporty appeal
More value-added; fulfills emotional needs: self-expression, status, sense of security
Sense that sport utility vehicles are safer
"Rugged elegance"

**Disadvantages of cars**

May be too expensive
Less versatile
Cars getting too much alike; too look-alike; cookie-cutter styling
Smaller interiors
Less product differentiation
Too small trunks
Boring
Not versatile enough to be the only household vehicle
Cars seem merely adequate to many consumers
Downsizing has made them smaller inside

## Discussion

The U.S. light vehicle market has seen a shift from cars to trucks in the past decade. Sport utilities, pickups (always strong sellers) and the like have amassed a growing following among traditional car buyers.

Panelists cited a number of reasons for the shift, based on the advantages of trucks and the disadvantages of cars. Some people have become reluctant to buy cars because cars have grown smaller, more expensive and less versatile. The appeal of trucks is both practical and emotional. On the practical side, they tend to be bigger and roomier than cars, with upright seating that promotes good visibility. The possibility of four-wheel drive is a plus as is superior towing ability. Buying a truck can be an emotional experience as well. Trucks often offer an image of independence and ruggedness. Before they became so ubiquitous, it was, for some people, a fashion statement to own a truck for personal rather than commercial reasons. In addition, some people believe that trucks are safer than cars, which may not be true.

## Manufacturer/supplier comparison

Manufacturer/supplier comparisons are not done for open-ended questions.

## Trend from previous Delphi surveys

This question was not asked in previous Delphi surveys.

## Strategic considerations

The car and truck markets have operated rather independently of each other in consumers' eyes. Rarely did a consumer vacillate between buying a truck and buying a car. Now many traditional car buyers are opting for trucks.

Understanding this phenomenon is important to any light-vehicle manufacturer. For builders of both cars and trucks, there are implications for plant capacity, allocating marketing and engineering resources, and the like. For anyone in the industry, understanding why buyers make the choices they make seems like it should be part of any competent marketing research effort. In this case, knowing why people who traditionally purchased cars are looking at trucks can be instructive. Perhaps trucks attract buyers because they offer features or attributes not available on cars. If so, a manufacturer might be able to adopt those features on a car and increase that car's popularity. Likewise, if one of the "emotional" attributes from above is appealing, maybe some of that appeal can be applied to a car.

**MKT-13.** **Please estimate in constant 1995 dollars the *manufacturers' suggested retail prices* (MSRP) in 2000 and 2005 of a base model in each of the given segments. Please turn to page 83 for the definition of segments.**

| MSRP | 1995** | | | Median Response 2000 | | | Interquartile Range 2000 | | |
|---|---|---|---|---|---|---|---|---|---|
| | Big Three | Japanese | European | Big Three | Japanese | European | Big Three | Japanese | European |
| **Passenger Car** | | | | | | | | | |
| Entry level | 10,452 | $11,493 | N/A | $12,000 | $12,689 | $14,000 | $11,000/12,475 | $12,000/13,500 | $12,500/15,000 |
| Intermediate/ family | 17,438 | 14,867 | 20,890 | 19,000 | 17,000 | 22,000 | 18,000/20,000 | 16,000/18,250 | 21,877/23,717 |
| Luxury | 27,425 | 30,260 | 27,346 | 30,000 | 33,000 | 31,000 | 30,000/32,000 | 31,000/35,000 | 30,000/33,000 |
| **Light Truck** | | | | | | | | | |
| Pickup | 14,403 | $10,969* | N/A | $16,000 | $13,000 | $15,000 | $15,000/16,648 | $12,000/14,000 | $12,375/17,000 |
| Sport utility | 18,461 | 20,533 | 37,400 | 20,100 | 22,000 | 39,000 | 20,000/22,000 | 21,000/24,000 | 35,000/41,396 |
| Van | 17,332 | 18,278 | — | 19,135 | 20,000 | 24,000 | 18,000/20,000 | 19,000/21,000 | 20,250/30,375 |

| MSRP | Median Response 2005 | | | Interquartile Range 2005 | | |
|---|---|---|---|---|---|---|
| | Big Three | Japanese | European | Big Three | Japanese | European |
| **Passenger Car** | | | | | | |
| Entry level | $13,000 | $14,000 | $16,000 | $11,250/14,500 | $12,000/15,800 | $12,500/17,500 |
| Intermediate/ family | 21,000 | 19,000 | 24,121 | 19,000/23,000 | 18,000/22,000 | 23,000/26,743 |
| Luxury | 33,500 | 36,000 | 35,000 | 32,000/37,800 | 33,000/41,000 | 32,000/40,000 |
| **Light Truck** | | | | | | |
| Pickup | $17,500 | $15,000 | $18,000 | $15,500/19,000 | $13,468/17,000 | $15,000/23,500 |
| Sport utility | 23,000 | 25,000 | 26,750 | 21,000/25,000 | 22,375/27,250 | 21,750/33,750 |
| Van | 21,000 | 23,000 | 20,000 | 19,000/23,000 | 19,625/25,000 | 19,000/21,326 |

*Compact only

** Source: Edmund's Van, Pickup, Sport Utility Prices, Nov. 1994

### Selected edited comments

- Assuming no alternate fuel/electric vehicles.
- Because of the appreciation of the yen, Japanese cars lowered their price competitiveness. But some Japanese makers, such as Toyota and Honda, will further increase the local production in entry-level and family class and even in vans. They will restore the price competitiveness toward 2005.
- European small/mini is due to come to North America (United States/Canada/Mexico).
- Generally, prices must stabilize with inflation or the market will outprice its buyers. New technology will add cost, but refined technology will control it. Vehicles will be somewhat lighter (fuel economy reasons). The Japanese are actively cutting costs. This will cause further downward pressure on competitive pricing.

- I presume equipment level is kept constant except for regulated changes.
- Increase all by 2 percent per year
- Prices of entry-level rise as CAFE impact/requirements are reduced, then drop as affordability becomes an issue.
- For Japan and Europe, dollar is a major factor (i.e., exchange rate). May be European "micro cars" in 2005.

**Discussion**

Prices for cars and trucks have been steadily increasing for years. This is due to regulatory compliance, the consumer's taste for upscale vehicles and vehicles with higher content, inflation, and other factors. According to our panelists, the upward trend is not likely to stall anytime soon. Even excluding the effects of inflation, vehicle prices from 1995 to 2000 are expected to increase from 4 percent to as much as 15 percent. From 2000 to 2005, they are thought to increase 2 percent to 15 percent for the period.

The interquartile ranges for most of the predicted prices are fairly tight. The exception occurs with European models for which panelists predict a broad range of prices. European sport utility models, for instance, have a median predicted price of $40,000 but the interquartile range is $34,500 to $47,300.

Changes vary by segment and manufacturers' country of origin. Panelists believe that import brands will generally command higher prices than domestic brands in the future, continuing a trend already in place today. The chart below shows the percentage changes for both.

**Manufacturer/supplier comparison**

The chart below compares the mean responses of manufacturers and suppliers. Prices are shown where there is a statistically significant difference. In every case, the mean of the suppliers' responses is higher than the mean of the manufacturers' responses.

| Mean Response - 2000 | | | | | | |
|---|---|---|---|---|---|---|
| | Big Three | | Japanese | | European | |
| Segment | Manufacturers | Suppliers | Manufacturer | Suppliers | Manufacturers | Suppliers |
| **Passenger Car** | | | | | | |
| Entry-level | $11,107 | $11,977 | $11,874 | $12,921 | | |
| Intermediate/ family | 18,353 | 19,281 | 16,579 | 17,662 | $21,220 | $22,602 |
| Luxury | | | 32,080 | 33,865 | 29,916 | 32,411 |
| **Light Truck** | | | | | | |
| Pickup | 14,775 | | 12,600 | | | |
| Sport utility | 19,448 | 20,999 | 20,463 | 23,162 | | |
| Van | 18,302 | 19,339 | 19,306 | 20,444 | | |

| Mean Response - 2005 | | | | | | |
|---|---|---|---|---|---|---|
| | Big Three | | Japanese | | European | |
| Segment | Manufacturers | Suppliers | Manufacturer | Suppliers | Manufacturers | Suppliers |
| **Passenger Car** | | | | | | |
| Entry-level | $11,653 | $13,642 | $12,436 | 14,676 | | |
| Intermediate/ family | 19,121 | 21,796 | 17,723 | 20,550 | $21,945 | $25,355 |
| Luxury | 32,517 | 35,693 | 34,034 | 38,792 | 32,470 | 37,676 |
| **Light Truck** | | | | | | |
| Pickup | 15,045 | 17,945 | 13,667 | 15,601 | | |
| Sport utility | 19,891 | 24,223 | 21,277 | 26,446 | | |
| Van | 18,996 | 21,946 | 20,206 | 23,377 | | |

### Trend from previous Delphi surveys

Prices predicted in the 1994 Delphi VII survey are in line with the prices predicted in the current Delphi VIII forecast. Prices are generally lower because Delphi VII used 1998 and 2003 as target years instead of 2000 and 2005. On a trend basis though, price predictions in Delphi VII are generally comparable to those in Delphi VIII.

### Strategic considerations

Pricing will always be an important marketing consideration—perhaps more so now than ever before. There has been a great deal of talk lately that vehicles are getting "too expensive," suggesting an affordability problem. Presumably, the price of new cars and trucks is outstripping the incomes of potential buyers. Logically, one might expect the average prices of new vehicles to decline at some point, as buyers start dropping out of the new vehicle market and switch to buying used vehicles. If this situation is so, it has yet to peak since prices are continuing to rise. These rising prices appear to have little impact on sales, as panelists predict sales years ahead (see questions MKT-31 and MKT-34).

Forecast predictions are without inflation, so the reasons for price increases must be due to higher vehicle content (currently available features and new ones), continued "upscaling" of vehicles, higher quality, regulations and other things. Exchange rate changes, specifically the German mark and Japanese yen getting stronger against the dollar, have contributed somewhat to higher prices on vehicles built in those countries (or vehicles built elsewhere but largely from components obtained from Germany or Japan) and sold in the United States. Competitive pressures, however, have forced German luxury manufacturers to rationalize their pricing strategies, often resulting in less costly models.

**MKT-14. Please estimate the average transaction price in constant 1995 dollars for vehicles sold in the United States in 2000 and 2005.**

| Average Transaction Price | Est. 1994* | Median Response | | Interquartile Range | |
|---|---|---|---|---|---|
| | | 2000 | 2005 | 2000 | 2005 |
| **Passenger car** | | | | | |
| Big Three | $18,396 | $20,000 | $22,000 | $19,000/21,326 | $20,000/24,600 |
| Import | 24,200 | 25,250 | 27,500 | 24,845/27,000 | 25,200/30,000 |
| **Light truck** | | | | | |
| Big Three | N/A | $19,500 | $22,000 | $18,000/20,250 | $20,000/23,000 |
| Import | N/A | 20,000 | 22,000 | 19,000/21,000 | 20,875/24,000 |

* Source: AAMA 3rd quarter Economic Indicators

**Selected edited comments**

- Assuming no alternate fuel/electric vehicles.
- Compared to consumer's income, vehicle prices seem to have reached their peak. So, from now, real price increase follows real income growth (annually about 2 percent).
- I assume import means imported. Toyotas and Hondas, as well as others, will be slightly less with their local content vehicles.
- Moderating prices a must for new entrants, more difficult for imports.
- Safety/security will drive increases.
- Some decontenting by imports.
- Sport utility vehicles for imports to increase.
- These will increase 2 percent per year as well.
- I think domestic car/truck prices will go up less than inflation and imports will go up slightly more than inflation (both cars and trucks). U.S. transplants will increase substantially and prices for these vehicles will go up with inflation.
- The sport utility vehicle market continues to explode with major impact on light-truck pricing.
- I'm afraid the rising prices on trucks are going to eliminate the true truck owners from the market.
- Mix shift to luxury truck models and effect of continuing import duties on imports.
- Assumes utilities/sport/vans included which are biggest drivers of transaction price.
- Stronger U.S. dollar will moderate import transaction prices.
- The differences in price between the Big Three and imports should continue to converge as quality performance becomes equal and trade issues are resolved.
- Truck prices will be less price sensitive than passenger cars. There will be more restraint in passenger car prices due to used car growth. Trucks will continue on longer trade cycles.

## Discussion

Panelists predict that prices for Big Three passenger cars will increase by about 8.7 percent by 2000 and by 10 percent between 2000 and 2005. Imported cars' transaction prices will go up by 4.3 percent and 8.9 percent in those same periods, respectively. For trucks, we cannot calculate an increase over 1994 since we do not have base estimates, but the increase from 2000 to 2005 for Big Three trucks is 12.8 percent and 10 percent for imported trucks.

## Manufacturer/supplier comparison

Manufacturers and suppliers generally agree on transaction prices except for Big Three passenger cars. For both 2000 and 2005, suppliers predict that transaction prices for these vehicles will be significantly higher than do manufacturers. The table below illustrates the differences.

| Big Three Passenger Car | Mean Transaction Price | |
|---|---|---|
| | 2000 | 2005 |
| Manufacturers | $19,616 | $20,959 |
| Suppliers | $20,577 | $22,959 |

## Trend from previous Delphi surveys

Direct comparisons with previous Delphi forecasts are difficult because of the effects of inflation. Each previous forecast uses base estimates denominated with differing amounts of inflation: Delphi VII's 1992 estimates are in '92 dollars, Delphi VI's in '89 dollars. However, it is possible to use percentage increases as a basis for comparison. In the 1992 Delphi VI, for instance, panelists predicted a 10 percent increase five years out and 9 percent in the five years after that for domestic passenger cars. The 1994 Delphi VII panelists predicted 8 percent and 9 percent for those same time periods, respectively. Each of the three most recent Delphi forecasts has predicted that truck transaction prices will increase more, as a percent, than do those for passenger cars.

## Strategic considerations

One of the conclusions to be drawn from the results of this question is that the gap between import and domestic prices is not going to continue to grow at historic rates. Panelists predict that transaction prices for Big Three passenger cars will grow 8.7 percent by 2000 and 10 percent by 2005. But transaction prices for import makes will grow only 4.3 percent and 8.9 percent in the same periods. That would reverse a trend of import prices increasing faster than domestic prices.

Making generalizations here could be misleading. In the past, several medium-priced European manufacturers have quit the U.S. market, leaving only the high-priced manufacturers competing here. That may skew import prices some since there are fewer low- and medium-priced import models. In addition, several Japanese manufacturers have introduced more expensive models via luxury divisions, or moved existing models upscale, which raises the price.

Interestingly, the growth in retail prices and the growth in transaction prices are very similar, suggesting that panelists do not predict consumer resistance to increased prices, or new patterns or levels of financing and incentives.

**MKT-15. What do you expect will be the average new passenger car loan amount financed, in constant 1995 dollars, and the average maturity, in months, in 2000 and 2005?**

| Passenger Car Loans | Est. 1994* | Median Response | | Interquartile Range | |
|---|---|---|---|---|---|
| | | 2000 | 2005 | 2000 | 2005 |
| Average amount financed | $14,800 | $16,000 | $18,000 | $15,000/17,000 | $16,000/19,725 |
| Average maturity (in months) | 55 months | 58 | 60 | 55/60 | 55/60 |

* Source: AAMA Facts & Figures, 1994 p.57

### Selected edited comments

- Driven by lease options.
- If trend in leasing continues, this entire question becomes meaningless.
- Lease will offset loans going forward.
- Leasing will become more prevalent.
- More leasing...what comes after leasing?
- Nearly new (6 mos.–2 years) vehicles will continue to grow as an alternative for many consumers. The affordability squeeze is very real.

### Discussion

Panelists predict a small increase in both the amount of the purchase price financed and the number of months consumers will take to pay off a loan. The amount financed is predicted to rise 8.1 percent from 1994 to 2000, and 12.5 percent from 2000 to 2005. The average loan maturity is thought to increase also, to 58 months in 2000 and 60 months in 2005.

### Manufacturer/supplier comparison

There is no statistically significant difference in responses between manufacturers and suppliers.

### Trend from previous Delphi surveys

Evidence suggests that the length of the term of car loans, which leveled out at about 55 months from the late '80s to this past year, may be again on the rise. According to the 1992 Delphi VI survey, the average loan term for a new automobile in 1989 was 54.2 months. That has increased only slightly, to 55 months in 1994. However, panelists have been predicting longer terms for 2000 and beyond since Delphi VI, adding several months to the median term length.

Comparing amounts financed is difficult given the different dollar bases for previous Delphi forecasts. However, panelists in the 1994 Delphi VII survey predicted a large increase in the short term of 12 percent, and a much smaller increase in the long term of 5.2 percent. Current panelists predict the amount financed to grow less in the short term than in the long term.

### Strategic considerations

An increase in the length of car loans and the greater amounts financed reflects the fact that consumers are spending more on light vehicles than before. One argument is that cars are getting

more expensive with price increases outstripping consumers' growth in incomes. Because of this, some people predict that the number of new car buyers will diminish. Another argument, however, is that people want "more car" than before and are willing to pay for it. It is consumers, not the manufacturers, who are driving up prices. There is evidence for both sides of the discussion, and the truth is probably a synthesis of the opposing views.

Another key purchase factor for many customers appears to be the size of the monthly payment. Consequently, as prices increase, it is necessary to increase the length of the financing period in order to maintain affordable monthly payments.

Unquestionably, government regulation has also contributed greatly to higher vehicle prices. Legislated safety and emissions equipment has added hundreds, maybe thousands, of dollars to the price of a new car in the past 10 years or so. It is ironic that vehicles with these life- and environment-protecting features will be incorporated into the vehicle population more slowly if consumers cannot afford them. It is also unfortunate if advances in occupant protection are out of reach of poorer people who cannot afford to buy new cars.

**MKT-16. Please estimate in percent the payment method for new passenger car and light truck purchases in 2000 and 2005.**

| Payment Method | 1994* | Passenger Car | | | |
|---|---|---|---|---|---|
| | | Median Response | | Interquartile Range | |
| | | 2000 | 2005 | 2000 | 2005 |
| Personal loan | 50% | 45% | 42% | 40/50% | 35/50% |
| Cash | 25 | 20 | 20 | 20/25 | 15/25 |
| Personal lease | 25 | 35 | 39 | 30/35 | 30/45 |
| Total | 100% | | | | |

| Payment Method | Est. 1994* | Light Truck | | | |
|---|---|---|---|---|---|
| | | Median Response | | Interquartile Range | |
| | | 2000 | 2005 | 2000 | 2005 |
| Personal loan | 50% | 50% | 45% | 45/50% | 40/50% |
| Cash | 25 | 22 | 20 | 20/25 | 15/25 |
| Personal lease | 25 | 30 | 35 | 25/35 | 29/40 |
| Total | 100% | | | | |

*Source: Survey of Current Business, United States Dept. of Commerce; various OSAT estimates

**Selected edited comments**

- Generally, I believe disposable/available income will continue to decrease or remain the same while prices rise. Also, I believe leasing will become less popular as people drive more miles.
- Leases will be more common in the future as they will be needed to keep the industry running on downturn, especially after 2000.
- Leases will peak at 35 percent; cash will remain at 25 percent unless interest rates drop dramatically.
- Leasing is on the increase due to affordability.
- Personal leases will continue to replace personal loans. A larger share of wealthy individuals and businesses will "rediscover" cash as the best option, if they can afford it.

**Discussion**

Panelists predict significant increases over the next ten years in the level of leasing for both light trucks and passenger cars, to 30-40 percent, from 25 percent in 1994. The gains in leasing are expected to be offset by reduced use of personal loans and cash.

**Manufacturer/supplier comparison**

There are no significant differences between manufacturers and suppliers.

**Trend from previous Delphi surveys**

The previous two Delphi forecasts, VI and VII, predicted a growing use of leases for new cars (these forecasts did not ask about trucks). These forecasts were more conservative in their predictions, neither predicting more than 25 percent lease usage between 1995 and 2003. This forecast predicts usage of 35 percent for passenger car leases by 2000.

**Strategic considerations**

Panelists feel strongly that leasing, once a small part of the market and used primarily for business or tax purposes, will become an even more common financing method by 2000 and 2005. Some observers say that buyers are turning to leases because vehicles are getting too expensive to purchase with conventional loans. Others counter that leasing has merely allowed buyers to obtain more expensive cars than they otherwise could with conventional financing, thereby boosting the average price of a vehicle (See MKT-14, MKT-15). Many consumers are more concerned with monthly payments than total vehicle cost. Typically, a lease payment is less than a loan payment for the same vehicle, so buyers who determine what they can afford by calculating monthly payments may find leasing more attractive. Both arguments are probably correct, since different buyers choose leasing for different reasons.

The growing popularity of leasing brings up some interesting aspects of consumer behavior. Consumers who lease, which is really just renting for a longer term, do not own their vehicles. Their relationship with their vehicle is different in some respects than the consumer who owns. The vehicle lessee, for example, may be less concerned about caring for the vehicle and performing periodic servicing. Since the term of a vehicle lease is usually shorter than a vehicle loan, lessees will return to the market looking for another vehicle more frequently than buyers do. That may require that vehicles, especially those with high lease rates, get redesigned more often.

**MKT-17. What will be the source, in percent, of financing for retail passenger car and light truck purchases in 2000 and 2005?**

| Source of Vehicle Financing | Est. 1994* | Passenger Car | | | |
|---|---|---|---|---|---|
| | | Median Response | | Interquartile Range | |
| | | 2000 | 2005 | 2000 | 2005 |
| Commercial and savings & loans banks | 44% | 40% | 37% | 37/43% | 30/42 |
| Manufacturer financing | 33 | 35 | 40 | 35/40 | 35/45 |
| Credit union | 20 | 20 | 20 | 20/21 | 15/23 |
| Total | 100% | | | | |

| Source of Vehicle Financing | Est. 1994* | Light Truck | | | |
|---|---|---|---|---|---|
| | | Median Response | | Interquartile Range | |
| | | 2000 | 2005 | 2000 | 2005 |
| Commercial and savings & loans banks | 44% | 42% | 39% | 36/44% | 30/44% |
| Manufacturer financing | 33 | 35 | 40 | 35/40 | 35/45 |
| Credit union | 20 | 20 | 20 | 20/21 | 15/23 |
| Total | 100% | | | | |

*Source: "Automotive Finance Study", conducted by the Credit Research Center at Purdue University for Consumer Banker Assoc.

**Other Responses:**

Mutual funds, dealers: 10 percent for cars and light trucks

Retirement fund loans and cash: Passenger car: 2000—5 percent; 2005—10 percent; Light truck: 2000—5 percent; 2005—10 percent.

**Selected edited comments**

- Figures given for manufacturer financing are due to incentives and ties to credit cards.
- Growth in megadealers will occur and penetrate financing.
- Manufacturers' finance companies will get deeper into leasing and financing the second owner/lessor.
- Manufacturer financing is a proven money maker.
- Manufacturers will be redirecting their financing efforts to lease activity. Less emphasis on retail paper.
- Manufacturers will use leases to level production schedule year to year and rebates to level production 10-day to 10-day period.

### Discussion

Panelists predict a modest shift from loans financed by banks to loans financed through the manufacturers' captive finance organizations. At the same time, they predict that credit unions will continue to hold about one-fifth of the financing contracts.

### Manufacturer/supplier comparison

There is no statistically significant difference in responses between manufacturers and suppliers.

### Trend from previous Delphi surveys

Both the 1992 Delphi VI and the 1994 Delphi VII forecasts predicted shifts from financing at banks to financing with the manufacturer. Since at least 1988, however, the proportion of car loans between the three traditional sources has changed very little.

### Strategic considerations

Manufacturers have financed about one-third of new vehicle transactions for about the last 10 years. This proportion will increase for a number of reasons. First, manufacturers are likely to develop marketing plans that make it appealing to consumers to finance with them. For several years, manufacturers have promoted low interest rates, often in conjunction with rebates, to attract sales. Manufacturers have offered salespeople bonuses for meeting a sales quota on leases. More recently, they have issued credit cards that earn bonus dollars towards a future vehicle purchase. Most banks cannot or do not offer programs like these.

Ultimately, consumers are likely to consider the interest rate the important factor in making a financing choice. Manufacturers may have an edge here because they have historically been more aggressive in offering cut-rate financing.

**MKT-18. One-price, no-negotiating retailing has become an important selling tool within certain segments and regions of the country. Do you believe this will become a more widespread method of passenger car and light truck retailing over the next five years?**

Scale: 1 = substantially increase 3 = no change
5 = substantially decrease

| 1995-2000 One-Price Sales Trend | Mean Rating |
|---|---|
| Passenger car | 2.4 |
| Light truck | 2.5 |

**Selected edited comments**

- Both dealers and consumers want this!
- Dealing and incentives will not go out of vogue.
- This phenomenon is due to increase of large corporate "multi-points" with retail store mentality.
- It will not be individual dealers selling at retail with fixed price, it will be an outgrowth of auto brokers (i.e., CarMax) that act as multibrand shopping centers using fixed price menu.
- Most people do not appreciate the negotiation (i.e., always walking away feeling that they left money on the table).
- Probably decrease, allowing dealers to get paid for providing exceptional service, especially to those that want it.
- This movement has decreased. Even Saturn negotiates now.

**Discussion**

Panelists predict a moderate increase in the use of one-price, no-negotiation retailing in the future.

**Manufacturer/supplier comparison**

There is no statistically significant difference in responses between manufacturers and suppliers.

**Trend from previous Delphi surveys**

This question was asked in the 1994 Delphi VII forecast. At that time, panelists predicted a significant increase in one-price selling, forecasting means of 2.1 and 2.2 for passenger cars and light trucks, respectively. Now they are still predicting an increase for the future, but not as great an increase as they did in Delphi VII.

**Strategic considerations**

This question examines a fairly new and somewhat widespread phenomenon that is a part of making the buying process more agreeable. The method is not being applied uniformly at dealerships (with the possible exception of Saturn). This is a development that is implemented by the dealers, not necessarily at the direction of the manufacturers. Media reports suggest that this method of selling has had mixed results. Originally intended for those consumers who don't like haggling, it may be off-putting to those who do. An unintended consequence of no-negotiation selling is that some consumers will use the one-price sales figure at a dealership to negotiate an even better deal at another dealership.

Some dealers report favorable results from using the technique, while others have tried it and abandoned it. As manufacturers become more involved at the retail level, they have been willing to give one-price selling a try. Saturn, for instance, has been successful in using it, but there are so few Saturn dealerships that there is minimal cross-shopping. Oldsmobile has used one-price pricing strategies on several models and claimed success. Import makes seem to be using the strategy infrequently, if at all.

**MKT-19. There are increasing attempts to improve the buying process and ownership experience, particularly at the retailer. How will car dealers change between now and 2005 to enhance the purchase and ownership experience? Please be specific and consider all aspects of what a retailer does now and potentially will do in the future.**

*Note: Answers to this question have been grouped in four categories. They represent the general comments made by our panelists and have been edited.*

**Sales Procedures**

- Computer-interactive systems to demonstrate available models, content, appearance (color/trim) and specifications.
- One price only (eliminate sales staff).
- 24-hour shopping using machines similar to ATMs with displays showing all available options with running cost depending on finance option.
- "Tailor-made" financing for each buyer.
- Greater use of simulation tools to convey the ownership experience.
- More focus on ownership cost over life of vehicle vs. purchase price alone.
- Continued creativity in lease and lease purchase programs.
- Sell cars at customer's home.
- Have databases on customers' preferences, income.
- Retailing process will change from a financial experience to a customer-based experience.
- Virtual car ordering/test drives.
- Used cars will be sold by more non-auto retailers. Product availability will be provided through the Internet.
- Probably means more impersonal service but not necessarily worse.
- Far less "buy from the lot"–much more special order and consequent pressure on OEM to build and ship faster.
- Neighborhood selling as opposed to big showrooms.

**Sales Personnel**

- Better product knowledge.
- Less confrontation, less showmanship.
- Dealership sales consultants treat each customer as a potential lifetime purchaser.
- Dealer will become advisor.
- Less haggling and more personal involvement.
- Product specialists will be customer interface rather than sales people.
- Sales people paid a salary (like Saturn).

- People-to-people selling will remain the number one process.

**Vehicle Servicing and Repair**

- At-home or drive-through pickup and delivery for service.
- Free loaner.
- Decision to buy a replacement vehicle is heavily influenced by dealer service and how well the car wears in later years.
- Computerized vehicle performance monitoring and service scheduling.

**General Dealership Attributes**

- Better follow-up and faster resolution of customer complaints/problems.
- 14-day vehicle delivery.
- More emphasis on repeat customer/customer dealership loyalty.
- Will offer insurance and other services purchased elsewhere, all rolled into one payment so customer has less clutter in his life.
- Dealers will sell multiple nameplates.
- Extended and weekend hours.
- Work to keep customers–easy lease turnovers, deals to stay with dealership.
- More single line stores (owner may have many franchises but each set as a single point).
- Retailer will be looking for a continuous long-term customer. His best bet is lease.
- More mall outlets.
- Dealers grow in power vs. manufacturers–all due to economics of scale.
- More mixing of brands in the showroom.
- More personal follow-up after sale as is done in Japan.
- OEMs will either buy out or exercise more control over the dealerships.

**Discussion**

Panelists identified many ways for improving the buying and ownership experience. These suggestions can be grouped into sales procedures, sales personnel, vehicle servicing and repair, and general dealership attributes.

*Sales Procedures*

Many of the responses involve integrating higher technology into the buying process and providing better service. For instance, panelists suggest adapting technology from other retailing environments: ATM-style machines to order vehicles 24 hours per day; computer interactive systems to demonstrate models, content and appearance; and customer databases with information about preferences and income. Better service can be provided with financing tailored to the buyer's needs, including leases and lease/purchase programs and by selling cars at customers' homes.

*Sales Personnel*

Panelists' suggestions centered on improving the relationship between salesperson and customer, and in providing information. "Less confrontation," predicted several panelists. There

will be less haggling and more personal involvement. Some said that sales personnel will learn to treat each customer as a lifetime opportunity. How do you do away with disagreeable sales practices? Do away with the traditional salesman. Some panelists predict a one-price sales program that eliminates salespeople. Others were less drastic, suggesting that the traditional salesman will transform into an advisor, possibly becoming a salaried employee in the process.

*Vehicle Servicing and Repair*

Less inconvenience to the customer during service is the main theme. When a customer's car is in for service, panelists predict he or she will get a free loaner car or possibly be picked up and dropped off at home.

*General Dealership Attributes*

Improved service, sometimes mimicking the kind that other retail businesses offer, will prevail. Extended service and sales hours, more personal follow-up after the sale, and better resolution of complaints and problems are all expected to occur at the dealer in the future. These changes, panelists say, are being driven by the desire to turn one-time buyers into long-term customers.

**Manufacturer/supplier comparison**

This comparison is not made for open-ended questions.

**Trend from previous Delphi surveys**

This question was not asked in previous Delphi forecasts.

**Strategic considerations**

Panelists have predicted a great many changes at the dealership to make buying and owning a car a more pleasant experience. Most manufacturers have taken a strong interest in improving the operation of their dealers. In fact, manufacturers are often driving change more than dealers. Newer franchises, like Saturn or Lexus, require adherence to a rigorous set of standards. More established ones, like Oldsmobile, are recommending or requiring changes in dealer operations and behavior and trying new selling approaches, like one-price selling. Their efforts will be rewarded with more new customers and more retained ones.

The one-price, no-haggling method of selling vehicles has worked well for some dealerships but not so well for others. Some dealers are finding that customers like negotiating a price. In some cases, they are using the one-price deal they get at Dealer A as a negotiating tool at Dealer B. Negotiating the final price may be a fixed part of the buying process.

Ultimately, the dealership's role in selling cars and trucks is to provide a selling and servicing experience that pleases buyers. The manufacturer must still provide products that customers want to buy. A highly competent dealer is not likely to be able to sell vehicles that do not meet customer expectations. Conversely, an incompetent dealer may lose sales and tarnish the manufacturer's reputation. A manufacturer could be especially vulnerable in this regard in small markets where it is represented by only one dealer, and consumers have no other dealer nearby to buy from. It is important to remember that to the customer, the dealer represents the manufacturer directly; if the dealer performs badly, it reflects negatively on the manufacturer.

**MKT-20. Numerous characteristics describe the United States dealership network. Please indicate your 1995-2005 trend forecast for each of the following characteristics.**

Scale: 1 = sharply increase 3 = no change 5 = sharply decrease

| 1995-2005 Dealer Trend | Mean Rating |
|---|---|
| Number of "megadealers" (chain ownership) | 1.8 |
| Number of multifranchise dealerships | 2.0 |
| Number of motor malls | 2.0 |
| Number of vehicles sold per dealership outlets | 2.0 |
| Average import nameplate inventory levels | 3.4 |
| Number of sales people at the dealership | 3.4 |
| Average domestic make inventory levels | 3.7 |
| Number of new car dealerships | 3.8 |

**Other single response**

Level of service: 1.0

### Selected edited comments

- Retail channel restructuring is happening in all industries *faster* than auto—the key barriers are legal, not economic. Eventually economics will prevail.
- Dealers take over more factory responsibility for customer-requested options.

### Discussion

Panelists anticipate some further consolidation in the retail business. Fewer but larger dealerships are forecast. Dealerships are expected to sell more vehicles, using fewer sales people and lower inventories.

### Manufacturer/supplier comparison

There are no significant differences between supplier and manufacturer responses except for the degree of change for the number of multifranchise dealerships. Both groups forecast an increase in multifranchise dealerships, but suppliers predict a slightly greater increase (2.0 versus 2.3).

### Trend from previous Delphi surveys

Responses are remarkably similar to the previous 1994 Delphi VII forecast which asked a nearly identical question. The previous forecast did not ask about the number of motor malls or about the number of salespeople at the dealership, however. The only difference of note is that Delphi VIII panelists predict a slightly higher inventory level for import dealers than did Delphi VII panelists.

**Strategic considerations**

Some manufacturers have developed franchise agreements that mandate sale of only their brands at a given dealership. However, many dealerships sell more than one brand, and thus manufacturers compete with other brands for the customer's attention in the same dealer showroom. According to the forecast, this competition is likely to intensify. Salespeople are likely to be selling several brands and will be able to recommend different makes for different customers. While the pressure to sell remains, the pressure to sell a particular make may diminish. The salesperson who sells more than one brand will probably find one brand easier to sell than another. Consequently, some manufacturers may not be able to count on the sales force to be committed to selling their brand. This situation may bring about a need for the manufacturer to offer incentives to sales staff to sell their brand. In multifranchise showrooms, competition for the sales force's attention and commitment is going to get more intense.

Many manufacturers are investing substantially in sales training programs. This will produce better sales people, but it may not produce a competitive advantage, at least in multibrand dealerships, since the newly-trained salesperson may also apply his or her new skills to selling competitive makes and models. A manufacturer may need to tailor a sales training program to its own models and customers as much as possible.

A slight drop in the number of salespeople and lower inventories will help keep costs down while larger retail outlets and motor mall arrangements will leverage economies of scale.

**MKT-21. Please forecast the change in share of repair/maintenance activity for each of the following outlets over the next 10 years (1996-2005).**

| Scale: 1 = sharply increase 3 = no change 5 = sharply decrease |
|---|

| Service Trends by Type of Outlet | Mean Rating |
|---|---|
| Franchised auto specialists (e.g., Goodyear, Precision Tune) | 2.4 |
| Quick oil change outlets | 2.4 |
| New car/truck dealers | 2.8 |
| Fleet operator-owned repair shops | 2.9 |
| Mass merchandisers (Sears) | 3.1 |
| Independent repair shops | 3.8 |
| Service stations | 3.9 |

### Selected edited comments

- "Ford Care," for example, falls into franchise (auto/truck dealers).
- Sears (and possibly others) will use their prime mall locations to gain a share of the quick oil change business.

### Discussion

The panelists forecast that specialty repair and maintenance shops such as Precision Tune are likely to increase their share of the vehicle repair and maintenance business. Included in that prediction are the "quick oil change" places that provide the most routine services.

### Manufacturer/supplier comparison

There are no significant differences between manufacturers and suppliers except in the prediction for the degree of change pertaining to mass merchandisers. Manufacturers predict a slight increase in repair and maintenance activity at these locations while suppliers predict a slight decline.

### Trend from previous Delphi surveys

The 1992 Delphi VI and 1994 Delphi VII forecasts predicted similar repair and maintenance trends with the following exceptions: Both predicted a slight increase in work done at fleet repair shops and new vehicle dealers. The 1996 Delphi VIII survey also predicts a greater decrease in work done at independent repair shops (3.8) than did the Delphi VII forecast. Delphi VII predicted a slight decrease in work (3.4), while the Delphi VI forecast predicted no change (2.9).

### Strategic considerations

There seems to be a modest shift to work performed at a franchised maintenance and repair specialist and away from the independent repair shop and service stations. Part of the

reason for this can be seen in the shift in servicing needs and wants of car owners today. Vehicle owners are probably more concerned about maintenance since they seem to be keeping their cars longer than in the past. Many are having maintenance work done regularly. The quick oil change shops are especially well-liked by motorists because they are fast: They perform their service on a "while-you-wait" basis, alleviating the need to have a ride to and from the shop and being without a vehicle for an extended period of time. Franchised auto specialists may have an advantage in their location (near malls, neighborhoods, offices) and being able to perform most of the complex work the dealer can but at a somewhat lower cost. These outlets also often have good reputations and warranty their work.

The dealership is probably the most expensive place to have a car repaired or maintained. Still, panelists are not predicting a large change from current levels of activity. This "no change" forecast is possibly a function of two off-setting factors: increasing complexity of vehicles (particularly in electronics) which requires that some repairs be done at the dealer, and higher servicing costs.

The decline of work done at independent repair shops may be due in part to the burdensome cost to small shops of the equipment required to service newer vehicles and to the increased sophistication of the vehicle itself. Changing patterns of commercial development have relegated many independent shops to rural locations or other areas outside of prime shopping districts, making them less accessible than, say, the well-known franchise repair shops. The service station decline may be related to the lack of "service" many of these outlets provide: Many if not most customers have grown accustomed to pumping their own gas. Because of this, they may not think of the service station when it comes time to service or repair a vehicle. Like the independent shops, the service station may not find it profitable to invest in high-cost diagnostic and repair equipment or training required for today's electronics-laden vehicles.

**MKT-22. What are the five most essential product, sales and service attributes that a vehicle manufacturer must deliver to a customer in order to enhance brand loyalty by 2000?**

*Note: The following responses are ranked in order of frequency.*

| Product | Number of responses |
|---|---|
| Dependability/quality/reliability | 86 |
| Styling/design | 48 |
| Safety | 35 |
| Price/affordability | 25 |
| Handling/performance | 24 |

| Sales | Number of responses |
|---|---|
| Better qualities in sales people | 34 |
| Better pricing methods | 23 |
| No haggle/less pressure selling | 23 |
| Better financing options | 18 |
| More convenience/access to dealership | 16 |

| Service | Number of responses |
|---|---|
| Fixed right the first time | 36 |
| Convenience/accessibility (hours and location) | 32 |
| Better customer treatment | 29 |
| Quicker turn-around | 23 |
| Honesty/integrity/trustworthiness | 16 |

**Selected edited comments**

- Automobiles should be as reliable and easy to buy as washing machines.
- Quality and reliability are givens.
- Sales and service can have great near term impact. Loaners or valet service can help the service experience. The "hard sell" image must change to bring more people into dealerships.
- You should be able to buy or lease a car on the phone and then pick it up with your dealer-salesperson who treats you like a client, not a number. Service should be infrequent and not expensive.
- The Japanese are already doing much of what the Big Three need to do as listed above. Once many of the quality/reliability issues are no longer differentiators, the entire dealership experience is where you will win or lose the sale.

- Time constraints of the dual income family require increased convenience for customer sales and service centers in order to guarantee repeat business. No haggling policies not only eliminate hassles from this segment, they will also attract the increasing segment of older people.

**Discussion**

Many of the attributes described are the same ones that might attract a customer to a particular make or model in the first place, such as reliability or safety. Others relate to the ownership experience, such as handling/performance or having problems fixed right the first time.

**Manufacturer/supplier comparison**

Manufacturer/supplier comparisons are not done for open-ended questions.

**Trend from previous Delphi surveys**

This question was asked in a different way in the previous Delphi forecast. A direct comparison, therefore, is difficult to make. However, the top five product, sales and service attributes in the 1994 Delphi VII, shown with the percent of total responses in parentheses, were as follows:

Dealership relations (23%)
Value (17%)
Vehicle quality (15%)
Style (10%)
Reliability (8%)

**Strategic considerations**

Retaining existing customers may become more important in the future. With limited sales growth for the market as a whole and the staggering costs of marketing efforts to attract new customers, many manufacturers are realizing that it is potentially far more efficient to sell again to people who already have purchased their product.

The most frequently cited areas for enhancing loyalty were vehicle quality, reliability and design. That seems to say that loyalty is a function of a trouble-free ownership experience and satisfaction with the way the vehicle looks. A pleasant buying experience would enhance loyalty, too, as well as competent service from the service department. This certainly fits with the recent adoption by the manufacturers of a brand management philosophy.

Importantly, the attributes of the vehicle still figure most prominently when it comes to encouraging loyalty. This shouldn't be too surprising since the owner spends far more time using the vehicle than buying it or having it serviced. A frustrating buying experience, for example, may fade from memory after a few years of ownership. However, squeaks and rattles, poorly shifting transmissions or other maladies make their presence known on a daily basis. Improving sales and service is a great idea, but it is still the product that carries the most weight in deciding brand loyalty.

The dealer's impact on maintaining brand loyalty may vary between manufacturers. Buyers in densely-populated areas often have more than one dealership from which to buy a particular make. The manufacturer represented by more than one dealer may be less vulnerable to poor dealer performance because the dissatisfied customer can use the dealer across town. Smaller

manufacturers, though, may face losing a customer because of poor dealer service or sales practices because the buyer or owner has no alternate dealer to use.

**MKT-23. For the given segments, please identify the average incremental cost a customer is willing to incur to achieve improvements in the following quality measures.**

| Quality Measure | Average Incremental Cost Median Response | | | |
|---|---|---|---|---|
| | Entry Level | Intermediate/ Family | Luxury | Sport Utility/ Minivan |
| From 2 initial quality defects to 1 defect | $0 | $0 | $40 | $27 |
| Improve scheduled maintenance from every 7,500 miles to 15,000 miles | 50 | 100 | 100 | 100 |
| Reduce by 50% scheduled service operations | 50 | 100 | 125 | 100 |

| Quality Measure | Average Incremental Cost Interquartile Range | | | |
|---|---|---|---|---|
| | Entry Level | Intermediate/ Family | Luxury | Sport Utility/ Minivan |
| From 2 initial quality defects to 1 defect | $0/50 | $0/100 | $0/212 | $0/200 |
| Improve scheduled maintenance from every 7,500 miles to 15,000 miles | 0/100 | 0/200 | 0/300 | 5/200 |
| Reduce by 50% scheduled service operations | 0/150 | 0/250 | 5/500 | 0/300 |

**Selected edited comments**

- Cars and trucks are outpacing incomes. Too expensive now. Consumers do not want additional costs.
- Customer assumes OEM will make these improvements to stay competitive.
- Customer is not consciously willing to pay more for "hard-to-see" improvements.
- Depends on the type of defect. I believe that substantial improvements on all areas will be the cost of admission.
- Improvement of scheduled maintenance and reduction of scheduled service operations is expected and customer should not have to pay more for it.
- Increasingly this will drop to zero for all segments. Manufacturers will be paid in share, not margin.
- Luxury customers pay more to avoid inconvenience.
- People expect and will find these improvements without paying more. Good quality gives it to them free.
- Quality is now a given and consumer demand an industry standard in quality. If you meet that standard you're OK, but if you don't meet that standard, you don't sell cars.
- Should not have to pay for initial excellence.

- The car companies must also learn about continuous improvement without adding cost.

**Discussion**

Incremental improvements in initial quality and reduced maintenance are not particularly valued by customers, according to our survey results. Although the range of dollar values is broad for these items, the median values are generally low. Not surprisingly, the amount of incremental cost varies by segment. Luxury buyers would be more willing to pay a bit extra to avoid the inconvenience of a scheduled service visit than would entry-level buyers, for example.

**Manufacturer/supplier comparison**

There is no statistically significant difference in responses between manufacturers and suppliers.

**Trend from previous Delphi surveys**

The 1994 Delphi VII forecast showed very similar predictions. The previous forecast predicted that customers would be willing to pay more for reduced initial quality defects and reduced scheduled service operations. For example, a luxury buyer would be predicted to pay $200 for reduced service operations in Delphi VII but only $125 in Delphi VIII. He or she might have paid $100 to reduce initial quality defects, according to Delphi VII, but only $40 for that same benefit according to Delphi VIII. The two forecasts are essentially equal on improved scheduled maintenance.

**Strategic considerations**

Have auto manufacturers reached the reasonable limits of vehicle reliability and durability? Some of the respondents in our survey might say so. Consumers, too, might agree. While conceptually no one would prefer not to have a more reliable car or truck, there is a practical limit to how much more someone would pay to achieve it. Typically, an incremental unit improvement is more expensive to achieve than the previous unit increase.

Besides suggesting that incremental improvements may have reached a practical limit, respondents seem to be making the point that these improvements are expected from consumers who will not knowingly pay additional (or will not pay much) for a vehicle with no defects or one that requires less maintenance, or requires maintenance less often.

One of the reasons consumers might place a low value on improving initial quality is that quality levels for most manufacturers are so high that incremental improvements would not be particularly noticeable. Another reason is that many initial quality defects would be covered by a new vehicle warranty, thereby avoiding any out-of-pocket costs anyway.

**MKT-24.** **Do you believe a customer will exclude a vehicle from consideration if it does not provide the following benefits, or will be willing to pay a reasonable premium (for example, $200 on a $20,000 vehicle) to obtain each of the following benefits? Please circle your response.**

| Advantage | Exclude from purchase consideration | | Pay a $200 premium | |
|---|---|---|---|---|
| Ding resistance | Yes = 17% | No = 83% | Yes = 50% | No = 50% |
| Lifetime corrosion protection | Yes = 40 | No = 60 | Yes = 58 | No = 42 |
| Perceived enhanced crash protection | Yes = 56 | No = 44 | Yes = 72 | No = 28 |

### Selected edited comments

- Consumers do not want additional costs. Vehicle prices are out of control and rising too quickly.
- Customer assumes OEM will make these improvements to stay competitive.
- Customer will expect these at no cost increase.
- Some segments, such as subcompact and compact, wouldn't pay premiums as quickly as the luxury segment.

### Discussion

Of the three items addressed in this question, two were considered by many panelists to be so important that consumers would not buy a model that did not offer them. A significant percentage of our panelists thought a buyer would reject a vehicle without corrosion protection or enhanced crash protection. Fewer panelists predict that a lack of ding resistance would cause a consumer to shun a model.

About half the panelists predict that consumers would be willing to pay a $200 premium for either ding resistance or lifetime corrosion protection. Nearly three-quarters believe consumers would pay extra for enhanced crash protection.

### Manufacturer/supplier comparison

Manufacturers and suppliers generally agree about whether a customer will exclude a vehicle from purchase if it does not have the advantages asked about in this question. They differ, however, on two of the three "premium" responses. Manufacturers were significantly less likely to believe that customers would exclude a vehicle if it lacked ding resistance or perceived enhanced crash protection than suppliers were.

### Trend from previous Delphi surveys

This question was asked in the 1994 Delphi VII forecast. The results of the 1996 Delphi VIII survey are statistically identical to Delphi VII with one exception: Customers were thought to exclude a vehicle from purchase consideration for a lack of ding resistance 28 percent of the time in Delphi VII compared to just 17 percent of the time in Delphi VIII.

**Strategic considerations**

There are interesting implications for vehicle marketers here. There are some features a buyer values enough to pay extra for. Other features are expected to be included in the basic price. Still others are so important that they must be available or else the buyer will not consider buying the vehicle. It is important to optimize this combination of feature availability because of the impact it has on sales, profits and customer satisfaction.

One conclusion we can reach is that items that may lengthen the life of the vehicle or the occupants are more desirable than items that merely improve appearance. This appears to fit with the apparent growth in consumer interest in value and safety.

**MKT-25. What attributes of passenger cars will offer the greatest opportunity for product differentiation over the next 10 years (1996-2005)?**

Scale: 1 = most opportunity 3 = moderate opportunity
5 = least opportunity

| Attributes | Mean Rating |
|---|---|
| Styling | 1.8 |
| Pricing | 2.2 |
| Interior design | 2.2 |
| More features/higher content | 2.4 |
| Refinement & noise/vibration/ harshness | 2.4 |
| Handling | 2.7 |
| Ride | 2.7 |
| Safety | 2.7 |

**Selected edited comments**

- Features/content and pricing will be essential, but will not *differentiate* as they will be offered by all.
- High-end customers will pay premium for no risk, no hassle lease/maintenance/warranty package.
- Improvements in the design of existing electronics features are as important as the addition of new features.
- Styling will be the main area to differentiate car lines/models from the competition. Exterior appearance is the first cue that influences buyers and the most significant regardless of segment.
- Toward 2005, the currency rate between yen and dollar will change, and there will be a gap in the cost competitiveness between the manufacturers. Therefore, pricing can offer greater opportunity. Recently, design is similar between U.S., Japanese and European cars, so styling or interior design will not offer as great an opportunity.
- The safety race is on now! Safety will become the price of entry on all levels of cars and trucks, but some brands will be considered more safe or innovative than others.
- Pricing can never be a sustainable advantage–competitors always have to remain competitive with prices or marketing programs. Many safety items will be regulated; some will provide differentiation.
- Pricing always shows a possibility for differentiation. It is alterable (up or down) on a moment's notice, and is the most significant contributor to the cost of ownership (at least early in the cycle). As regulation becomes more oppressive, the opportunity to go beyond regulations is reduced.
- Prices will drive the market. Most people are stretching their budgets now to purchase a good car. I think the U.S. automakers need to produce a cost efficient "basic transportation car."

- Pricing will *always* differentiate among different vehicles, but it will always be determined competitively so that, for vehicles with similar characteristics, pricing will not be a major discriminator.
- The demographic makeup of the market will require safety/security as a high differential. ABS, air bags and traction control move towards being standard equipment.
- Advanced systems such as automatic stability control are both performance and safety enhancers which will identify specific vehicle lines as their prices become more mature.
- Safety, including security measures, will still differentiate–at least perceptually. New distribution measures, ways of buying/acquiring vehicles and servicing convenience in the most hassle-free environment may provide leverage.
- Pricing factor will be more and more strategically significant because cost-competitiveness gap will expand between the makers which can establish a low-cost parts sourcing system in Asia or Latin America and the makers which can't. It requires large investment and difficult strategic decisions to establish low-cost parts sourcing in such areas with high risk, so the skill level of each maker determines the cost competitiveness hereafter.
- It will be difficult to differentiate on either price or safety: 1) Price difference requires cost advantage without sacrificing quality; 2) Safety features are becoming standardized–additional safety features (e.g., side airbags) are too expensive for all but premium priced segments unless mandated across all vehicle classes.

**Discussion**

Panelists cited styling as offering the most opportunity for product differentiation followed closely by pricing and interior design. Features and options are still important to product differentiation but slightly less than the first three features. The same holds true for improved refinement and control of NVH (noise/vibration/harshness). Performance items like handling and ride hold less potential for product differentiation than the other items. Safety as a differentiator holds less promise in the future than it does now or did in the past. Many other items were mentioned by panelists such as enhanced electronics or theft protection.

**Manufacturer/supplier comparison**

There are no statistically significant differences between manufacturers and suppliers except in the areas of safety and interior design. Suppliers predict safety will offer a much greater opportunity for product differentiation than do manufacturers. Conversely, manufacturers predict interior styling will offer a greater opportunity for differentiation than do suppliers.

**Trend from previous Delphi surveys**

This question was not asked in previous Delphi surveys.

**Strategic considerations**

Design, both exterior and interior, remains a notable product differentiator. Design has always held strong appeal for vehicle consumers and will continue to do so. To some people, cars in the recent past have tended to look too much alike. This has resulted, in part, from a quest for aerodynamic efficiency that has often dictated smoother, more rounded shapes. It may be time to pursue other styling trends.

As vehicles become more expensive, pricing gains importance as a potential differentiator. Certainly, affordability has been a concern for several years. Leasing has helped alleviate the

impact of high prices by making monthly payments lower, but that solution may not last. Now that many consumers have had experience with leasing a vehicle, they will evaluate how they like it compared to purchasing a vehicle.

The pricing issue becomes complicated by the fact that consumers may desire more features. In recent years, smaller vehicles have offered features that were previously available only on larger, more expensive vehicles: power windows and locks, cruise control, etc. Perhaps consumers will cope with rising prices and still get the features they want by buying highly-equipped smaller cars and trucks or a used vehicle.

## MKT-26. How will personal vehicles be used in 2000 and 2005 compared to 1995?

Scale: 1 = much more than 1995 3 = about the same as 1995
5 = much less than 1995

| Vehicle Use | 2000 Mean Rating | 2005 Mean Rating |
|---|---|---|
| Recreation | 2.4 | 2.3 |
| Vacation/holiday travel | 2.7 | 2.7 |
| Carrying cargo | 2.8 | 2.8 |
| Carrying passengers | 2.9 | 2.8 |
| Commuting | 3.0 | 3.2 |

### Selected edited comments

- According to the increase in the holidays, recreation or vacation will increase. In the long term, according to the model shift and environmental problem, carrying cargo and commuting will decrease.
- Traffic congestion and the increase in home working (telecommuting) will decrease commuting.
- Higher energy costs by 2005 will reduce elective use and commuting distances. Better public transit will be in demand.

### Discussion

Recreational use of vehicles is forecast to increase somewhat in the future. To a lesser extent, vacation or holiday travel will increase also, as will using the vehicle for carrying passengers or cargo. Commuting will remain steady in the short run and decline a bit in the longer term, according to our panelists.

### Manufacturer/supplier comparison

There is general agreement between manufacturers and suppliers except in the use of commuting and vacation/holiday travel. Suppliers see little change from today's level of use for commuting. Manufacturers predict a slight decline in the short term, and a significant decline in the long term. For vacation/holiday travel, manufacturers see a significant decline in this kind of use in the long term, while suppliers see little change from today.

### Trend from previous Delphi surveys

The Delphi VIII forecast continues the trend predicted in the 1994 Delphi VII survey: decreasing development times at the rate of about a month per year. The chart on the following page compares this forecast with the Delphi VII forecast. The 1992 Delphi VI forecast did not address the development times of European manufacturers.

| Current Hardpoints | Future Development Cycles, in months | | | |
|---|---|---|---|---|
| | Delphi VII 1998 | Delphi VIII 2000 | Delphi VII 2003 | Delphi VIII 2005 |
| U.S. manufacturers | 36 | 34 | 32 | 30 |
| Japanese manufacturers | 30 | 28 | 28 | 26 |
| **New Hardpoints** | | | | |
| U.S. manufacturers | 42 | 40 | 36 | 36 |
| Japanese manufacturers | 36 | 35 | 34 | 32 |

**Strategic considerations**

How vehicles are used has implications for what kinds of vehicles consumers buy. If recreational use increases as forecast, more buyers may require a vehicle that can perform on- and off-road, has a higher carrying capacity for things like camping or sports equipment, and can pull a trailer.

Changes or trends in vehicle use also have a great influence on sales. If vehicle use increases, vehicles wear out faster and have to be replaced more often. The converse is true if vehicle use decreases. Although panelists predict no change in commuting use, if telecommuting were to become more common, for example, collective vehicle mileage could diminish. That could mean cars wear out less often and therefore get replaced less often, resulting in lower vehicle sales. The entire issue of future work and lifestyle patterns is obviously of great importance to the industry.

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***According to many reports, the new vehicle development cycle is 42-to-54 months in the United States.***

**MKT-27a. Please give your forecast in months of future development cycles, from concept approval through production of first marketable vehicle, for reskinning platforms that maintain *current* hardpoints.**

| Future Development Cycles Maintaining *Current* Hardpoints | Median Response (in months) | | | Interquartile Range (in months) | | |
|---|---|---|---|---|---|---|
| | Current Est. | 2000 | 2005 | Current Est. | 2000 | 2005 |
| United States manufacturers | 39 | 34 | 30 | 36/40 | 32/36 | 28/31 |
| European manufacturers | 44 | 38 | 35 | 42/46 | 36/40 | 32/36 |
| Japanese manufacturers | 32 | 28 | 26 | 30/34 | 27/30 | 24/28 |

**Selected edited comments**

- Based on marketing trends and the realities of tooling lead time, 30 months may be optimum.
- The longest most involved segment of the development cycle is the test and validation sequence.
- Communication technology developments and organizational improvements will have the major impact on reductions. Also, supplier relationships, if managed and directed towards this goal, could have a significant impact.
- Financial pressures to recoup design investment will continue to create new opportunities to reduce design cycle.
- Europeans have the most room for improvement and are rapidly becoming more competitive.

**Comparison of forecasts: TECH-28**

The technology panel forecast development cycles for high- and low-volume vehicles. For this comparison the high-volume technology forecast was used. In all cases, the technology panel predicted shorter development cycles than the marketing panel. The differences in forecasts ranged from 2.2 months to 5.0 months.

**MKT-27b. Please give your forecast in months for future development cycles, from concept approval through production of first marketable vehicle, for a new platform that establishes *new* hardpoints.**

| Future Development Cycles Establishing *New* Hardpoints | Median Response (in months) | | | Interquartile Range (in months) | | |
|---|---|---|---|---|---|---|
| | Current Est. | 2000 | 2005 | Current Est. | 2000 | 2005 |
| United States manufacturers | 48 | 40 | 36 | 42/48 | 39/42 | 35/38 |
| European manufacturers | 52 | 46 | 40 | 50/54 | 44/48 | 40/42 |
| Japanese manufacturers | 40 | 35 | 32 | 36/41 | 34/36 | 30/34 |

**Selected edited comments**

- Japanese will bottom out with respect to new design. They may get the most economic benefit from a vehicle life.
- My belief is that there is a great disparity between U.S. manufacturers.
- Around 2005, as the result of the requisition of lean development, average development cycles of U.S./European/Japanese manufacturer will be similar.
- Distinction between U.S./European/Asian OEMs is becoming blurred. Japanese are developing vehicles in North America; Ford and GM will share more platforms globally.

**Discussion**

Panelists see a continuing reduction in the amount of time it takes to freshen a vehicle's design. The Japanese manufacturers are considered to have the advantage in 1995. Although the American and European manufacturers are thought to be capable of significant improvements in their own development cycles, the Japanese, too, will reduce development times and still take less time to revise models than their American or European rivals.

Panelists do not find much distinction between freshenings and "new-from-the-ground-up" designs as far as the differences in how long it takes between Japanese, European and American. Obviously a complete redesign will take everybody longer than a mere freshening, but now and for the foreseeable future, the Japanese will take less time and the Europeans the most. The differences in time are expected to narrow, however.

**Manufacturer/supplier comparison**

There is no statistically significant difference in responses between manufacturers and suppliers.

**Comparison of forecasts: TECH-29**

There is no statistically significant difference in responses between Marketing and Technology panels except for the items summarized in the table on the following page.

| Future Development Cycles<br>New Platforms—New Hardpoints<br>High-volume Vehicle | | | | | | |
|---|---|---|---|---|---|---|
| Manufacturer Location | Mean Estimate Current | | Mean Estimate 2000 | | Mean Estimate 2005 | |
| | Mkt. | Tech. | Mkt. | Tech. | Mkt. | Tech. |
| United States | 48 | 46 | 42 | 39 | 37 | 34 |
| Japan | 40 | 37 | 36 | 33 | 32 | 29 |
| Europe | 42 | 49 | 47 | 43 | 42 | 38 |

Technology panelists forecast development cycles two-to-four months shorter than marketing panelists for the areas where there is a statistically significant difference.

### Trend from previous Delphi surveys

Delphi VIII forecast continues the trend predicted in the 1994 Delphi VII survey. The chart below compares this forecast with the Delphi VII forecast.

### Strategic considerations

It is critical to minimize the amount of time it takes to design a product. Being able to design new products quickly and efficiently has implications for saving money and also for bringing a more current vehicle to market. Time-based costs, like salaries, are reduced by 50 percent when it takes two years instead of three to engineer or design a vehicle. Designing vehicles quickly also means being able to bring the latest thinking in design, features, safety, etc. to market. The longer it takes to develop a program, the more likely that early (and sometimes irreversible) decisions about styling, features, etc., could be out of date by Job 1. Ideally, any design or product development process would be established so items that change with consumers' whims or tastes are given attention towards the end of the project. Additionally, shortening the design cycle frees up engineering and design personnel to spend time perfecting components or systems that can be "put on the shelf" for future applications.

How quickly a company brings products to market may, in some ways, be a measure of how successfully the company is functioning. In the auto industry, being able to introduce new products on a regular basis—in a timely fashion, on budget, etc.—is crucial to a company's continued marketplace success. Customers have grown accustomed to a regular barrage of newly-designed products and may ignore designs that have not been freshened recently.

Panelists predict that the difference between American, Japanese and European development times is likely to decrease in the future. The Japanese may maintain a lead, but it will probably not be so great as to offer a significant competitive advantage, particularly compared to the American manufacturers. This can differ significantly with vehicle type, e.g., sedan versus pickup.

**MKT-28. What organizational, technological and/or business environment changes must occur to achieve your forecast in MKT-27a and 27b for U.S. design cycles?**

- Better technological integration with supply base. Earlier involvement with suppliers and design freeze discipline.
- Better utilization of technology (i.e., CAD/CAM). Closer relationships and more trust between supplier and car company. Partnerships. Simplification of systems for approvals, etc. Better organization and communication. Global program management.
- Clear objectives, empowered task teams, better customer information and use of computers for design, tooling and testing.
- Complete move to platform design concept. Simultaneous engineering as a reality. Better reward system for group achievement.
- Earlier supplier involvement. Less OEM bureaucracy. More empowerment to product development team leaders.
- Embrace concurrent engineering. Teaming concepts. Systems sourcing.
- Fewer changes after approval. Electronically simulated testing. Dedicated product development teams.
- Fully integrated design, releasing and tooling computer systems. Smaller, highly communicative and empowered teams. "Continuous improvement" culture. Quality expertise throughout the organization.
- Much more effective use of supplier resources and expertise.
- Restructuring product development organizations at OEM level. Continue trend of supplier involvement in development and develop rapid prototyping capability for all tooling related products.
- Stronger communication and coordination between OEMs and suppliers (true partnering). Reduction in number of suppliers will establish key suppliers for each commodity, reducing quote processing time. More effective OEM/supplier project teams will establish design and engineering relationships early-on in the program development.
- Truly develop partnerships with suppliers to work together–OEM purchasing are only interested in lowest price too many times. The industry needs profitable, well-managed suppliers and their advanced technology.
- Vehicle makers must standardize their product development processes and employ strong program management. Suppliers must be integrated as full development partners. Governmental certification processes must be harmonized across state/country borders.

**Discussion**

As the above comments show, our respondents had a number of ideas for shortening the product development cycle. Most of the ideas involve better use of technology, earlier and closer relationships with suppliers, and program management that enhances communication and rewards group accomplishments.

**Manufacturer/supplier comparison**

This comparison is not made for open-ended questions.

**Trend from previous Delphi surveys**

The same kinds of issues have appeared in the past three Delphi forecasts.

**Strategic considerations**

Changing behavior and corporate culture is not easy. But these are the areas that need to be addressed if product development cycles are to be improved. Taking best advantage of available technology is important, though probably not as important as improving human relations, communications and trust within the corporation and, in the case of procurement, between manufacturers and suppliers. Clearly excellent discipline is required throughout the entire process which is based on common processes, systems and methods.

**MKT-29. What is the maximum allowable time in months between minor facelifts and new platforms for various segments for a vehicle to remain competitive?**

| | Median Response (in months) | | | | Interquartile Range (in months) | | | |
|---|---|---|---|---|---|---|---|---|
| | 2000 | | 2005 | | 2000 | | 2005 | |
| Segment | Facelift | New platform | Facelift | New platform | Facelift | New platform | Facelift | New platform |
| **Passenger Car** | | | | | | | | |
| Entry level | 36 | 60 | 24 | 48 | 24/36 | 48/60 | 24/36 | 36/60 |
| Intermediate/family | 30 | 60 | 24 | 48 | 24/36 | 48/60 | 24/30 | 39/60 |
| Luxury | 30 | 48 | 24 | 48 | 24/36 | 46/60 | 22/36 | 36/60 |
| **Light Truck** | | | | | | | | |
| Minivan | 36 | 60 | 24 | 48 | 24/36 | 44/72 | 24/36 | 37/60 |
| Sport utility | 36 | 60 | 24 | 48 | 24/36 | 48/68 | 24/36 | 37/60 |
| Pickup | 36 | 71 | 36 | 60 | 24/48 | 48/93 | 24/36 | 41/72 |

**Selected edited comments**

- Increasingly change will become more rapid and expected by consumers. Parallels can be drawn to the motorcycle or consumer electronics businesses. New platforms are not important unless they represent the best way to achieve technological improvements desired by the customer. (This includes major cost reductions that can be translated into more product content or lower price.)
- Need "face lifts" more often to increase market interest.
- No significant difference in expectations for minivans and sport utility vehicles vs. family cars.
- This timing is governed by the body stampings components suppliers, primarily based on development timing and tooling time. This process must be supported by a fully representative cross-functional team in order to attain these aggressive timeframes.

**Discussion**

Panelists believe across all segments that, by 2000, a vehicle should receive a facelift about every three years (a little less for family and luxury cars) to remain competitive. By 2005, it falls to two years for all but pickup trucks, which remain at three years. By 2000, five years is the maximum for a complete redesign or new platform. Luxury vehicles are forecast to require a new design every four years. A pickup truck design is forecast to last about six years. By 2005, that changes to four years for totally new designs except for pickup trucks which last a year longer. It is important to note that there is a significantly broad interquartile range around most of the medians suggesting a lack of consensus among panelists.

**Manufacturer/supplier comparison**

Manufacturers and suppliers are in general agreement about how frequently minor facelifts of vehicles should occur. However, there is significant difference in forecasts between the two groups for major redesigns (new platform). Suppliers believe that major redesigns should occur

much more frequently than do manufacturers. The table below highlights the differences between manufacturers and suppliers.

**Maximum allowable time between new platforms**

| | Time (in months) | | | |
|---|---|---|---|---|
| | 2000 | | 2005 | |
| Segment | Manufacturers | Suppliers | Manufacturers | Suppliers |
| **Passenger Cars** | | | | |
| Entry Level | 76 | 54 | 68 | 48 |
| Intermediate/family | 72 | 54 | 65 | 48 |
| Luxury | 72 | 53 | 67 | 47 |
| **Light Truck** | | | | |
| Minivan | 75 | 56 | 68 | 50 |
| Sport utility | 75 | 55 | 67 | 49 |
| Pickup | 90 | 65 | 85 | 59 |

### Trend from previous Delphi surveys

This question was asked in the 1994 Delphi VII survey which forecast for 1998 and 2003. The table below compares that forecast to the current one.

The trend is for more frequent major and minor redesigns if a model is to remain competitive in the market. It is interesting that Delphi VII panelists predicted that the length of time between redesigns would be different for each segment in the longer term. Delphi VIII panelists, however, predict that time between redesigns should be the same in the long term except for pickup trucks.

| | Median Response (in months) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Facelift | | | | New Platform | | | |
| Segment | Delphi VII | | Delphi VIII | | Delphi VII | | Delphi VIII | |
| | 1998 | 2003 | 2000 | 2005 | 1998 | 2003 | 2000 | 2005 |
| **Passenger Cars** | | | | | | | | |
| Entry Level | 36 | 36 | 36 | 24 | 60 | 60 | 60 | 48 |
| Intermediate/family | 36 | 34 | 30 | 24 | 60 | 60 | 60 | 48 |
| Luxury | 36 | 30 | 30 | 24 | 56 | 50 | 48 | 48 |
| **Light Truck** | | | | | | | | |
| Minivan | 36 | 36 | 36 | 24 | 72 | 72 | 60 | 48 |
| Sport Utility | 36 | 36 | 36 | 24 | 72 | 68 | 60 | 48 |
| Pickup | 48 | 42 | 36 | 36 | 90 | 84 | 71 | 60 |

**Strategic considerations**

Styling and design, which have always been important in attracting customers, may become even more important in the future. Design cycles will shorten because customers will expect it. "New and improved" has always appealed to consumers, and competitive pressures will certainly expand on time-based engineering of products. Furthermore, the move to leasing may increase the importance of fresh styling to keep customers loyal.

This question asks about a "maximum time." Carried a step further, is there an "optimum time" for redesigning a vehicle? The answer really depends on the balance between cost of product development time, sales volume and profitability. All firms are trying to reduce product development time but care must be taken to ensure that cost is also reduced. Customers are concerned about affordability as well as new and fresh products. In some market segments, newness is very important whereas in others, it is less so and price dominates.

This will be an important area to watch over the next ten years and the best combination of high speed and low cost will probably be a key attribute of the winner.

**MKT-30. How important to continued product sales success is a major redesign (by segment)?**

Scale: 1 = extremely important 3 = somewhat important
5 = not at all important

| Segment | Mean Rating |
|---|---|
| **Passenger Car** | |
| Sporty/personal | 1.6 |
| Luxury | 1.7 |
| Intermediate/family | 2.3 |
| Entry level | 2.9 |
| **Light Truck** | |
| Sport utility | 2.0 |
| Minivan | 2.6 |
| Pickup | 3.1 |

**Selected edited comments**

- Interest is first created through the eye. People are drawn to new and exciting adventures/things. People get bored easily and crave change.
- The important issue is if the redesign represents increased customer value.

**Discussion**

Panelists believe that a new design is at least somewhat important for all vehicles for maintaining product sales success. How important a redesign is differs by segment. Sporty and luxury cars, and sport utility vehicles rely more on styling, design and engineering changes than vehicles in other segments.

**Manufacturer/supplier comparison**

There is no statistically significant difference in responses between manufacturers and suppliers.

**Trend from previous Delphi surveys**

This question was not asked in previous Delphi surveys.

**Strategic considerations**

Product design and appearance are still major factors in attracting new buyers. There is a certain amount of excitement in the marketplace when a new model is introduced, both because it is new and because it, presumably, has attractive and innovative styling. Differences in rated importance of a redesign by segment may reflect the heightened emotional attraction of sports cars and luxury cars compared to the more practical considerations associated with entry level vehicles. Although this question does not give an indication of how long the design cycle is for a particular

segment, it does describe the relative importance of redesign for a segment and implicitly the relative length of time between redesigns.

There are substantial implications for product management, especially for multiline manufacturers. One is that not all vehicles in the lineup need to be redesigned with the same frequency. Consumers may not expect lower cost vehicles to display the same up-to-the-minute styling or engineering of more expensive ones. That is good for manufacturers of low-margin entry-level vehicles whose vehicles may retain their popularity for at least a few years longer than a sports car or luxury sedan. Obviously all manufacturers must strive to improve their product development performance (time, cost and effectiveness) in order to remain competitive.

**MKT-31. Please forecast, in thousands of units, the number of passenger cars and light trucks which will be sold in the United States and Canada by traditional domestic dealer networks and import dealer networks for 2000 and 2005.**

*Please note: it is a characteristic of medians that they frequently do not add to the total.*

| Vehicle Sales by Market/Network | 1994* | Median Response | | Interquartile Range | |
|---|---|---|---|---|---|
| | | 2000 | 2005 | 2000 | 2005 |
| | | (in thousands) | | (in thousands) | |
| **U.S. total passenger car sales** | **8,992** | **9,200** | **9,500** | **8,900/10,000** | **9,000/10,500** |
| Big Three | 5,808 | 5,950 | 6,100 | 5,600/6,150 | 5,637/6,500 |
| Japanese | 2,656 | 2,700 | 2,700 | 2,500/3,000 | 2,500/3,000 |
| European | 389 | 400 | 500 | 400/500 | 400/600 |
| Other imports | 138 | 150 | 200 | 100/200 | 139/369 |
| **U.S. total light truck sales** | **6,098** | **6,500** | **6,915** | **6,215/6,850** | **6,400/7,280** |
| Big Three | 5,229 | 5,500 | 5,700 | 5,300/5,805 | 5,258/6,027 |
| Japanese | 851 | 910 | 1,000 | 876/1,000 | 859/1,200 |
| European | 18 | 25 | 50 | 20/100 | 20/125 |
| Other imports | 0 | 0 | 2 | 0/10 | 0/50 |
| **U.S. total vehicle** | **15,089** | **15,720** | **16,275** | **15,250/16,450** | **15,600/18,000** |
| **Canada total passenger car sales** | **749** | 800 | 837 | 754/857 | 771/907 |
| Big Three | 490 | 500 | 523 | 499/550 | 496/586 |
| Japanese | 194 | 200 | 213 | 200/225 | 200/240 |
| European | 45 | 50 | 50 | 47/55 | 49/60 |
| Other imports | 20 | 25 | 26 | 20/35 | 20/50 |
| **Canada total light truck sales** | **482** | **520** | **568** | **500/600** | **502/646** |
| Big Three | 440 | 460 | 480 | 448/500 | 447/550 |
| Japanese | 39 | 49 | 50 | 40/50 | 42/71 |
| European | 3 | 5 | 5 | 3/10 | 3/15 |
| Other imports | 0 | 0 | 0 | 0/5 | 0/12 |
| **Canada total vehicle** | **1,232** | **1,310** | **1,400** | **1,271/1,415** | **1,300/1,550** |

* Source: Automotive News Jan. 9 & Jan. 16, 1995

**Selected edited comments**

- By 2005, the Big Three will have intense competition in light trucks from foreign OEMs, and globalization will limit regional domination.
- Higher fuel costs may depress truck sales long term.
- In the United States, total market share of Japanese makers won't increase.
- The North American market is mature. We can expect recession sales of 12 million units and good year sales of 15 million.

## Discussion

Panelists forecast that the two baseline years, 2000 and 2005, will be strong sales years in the industry. Light vehicle sales in the United States are expected to be 4.2 percent more in 2000 than in 1994. Sales in 2005 are predicted to be 7.8 percent higher than in 1994. Canadian sales predictions are even more optimistic. Panelists predict that sales in 2000 will be 6.3 percent higher than in 1994 and sales in 2005 will be 13.6 percent higher.

The forecast shows that there will be a slight shift in the proportion of cars to trucks sold. Cars represented 59.7 percent of the U.S. and Canadian light vehicle market in 1994. By 2005, panelists predict that figure will fall to 58.0 percent. Similarly, there will be a slight shift in the proportions between the sales of U.S., Japanese, or European designs. In the United States for example, although volume sales are up for all manufacturers, the United States and Japanese are expected to lose a bit of market share to European and other imports.

## Manufacturer/supplier comparison

There is no statistically significant difference in responses between manufacturers and suppliers.

## Trend from previous Delphi surveys

The current Delphi forecast continues an upward trend anticipated by Delphi VI. It is difficult to make direct comparisons since previous Delphi forecasts use different baseline years. Delphi VI (1992) and VIII (1996), however, both use 2000 as a forecast year. Those forecasts are within 100,000 units of each other for total light vehicle sales for that year. The split between cars and trucks is quite different though. Delphi VI predicted sales of cars and trucks at 10.4 million units and 5.2 units, respectively. The current Delphi predicts that same split to be 9.2 million and 6.5 million. This seems to reflect the realization that trucks will continue to become popular choices for personal transportation.

## Strategic considerations

Sales, strong or weak, have an important impact on assemblers and suppliers. This has been a cyclical sales industry for many years. There are some issues facing the industry that could lead to structural changes. For one, there is the perception of an affordability crisis. Are new vehicles getting so expensive that sales could be affected? New vehicle quality is also very high and cars and trucks last longer than before. This may give owners the opportunity to keep vehicles longer. Without knowing the exact context in our respondents' minds for answering this question, there clearly are background issues that, in general, effect whether the outlook for sales is positive or negative.

It is important to look at these data from a strategic perspective to capture a sense of long term trends rather than short term cyclicality. Evidence suggests we may be entering a less cyclical, slow-growth phase of the auto market. Certainly this is being prompted in part by the manufacturers using greater discipline in maintaining capacity for a midsize rather than maximum size market. This could redefine the industry away from its traditional feast to famine behavior.

**MKT-32.** **Please estimate total *passenger car* market share percent. We suggest that you first consider segment shifts, making sure that the total market adds to 100 percent. Next, consider the sources of vehicles within each segment, making sure that these add to 100 percent for each segment. Please see page 87 for market segment definitions.**

| Passenger Car Sales by Segment | Est. 1994* | Median Response 2000 | Median Response 2005 | Interquartile Range 2000 | Interquartile Range 2005 |
|---|---|---|---|---|---|
| **Lower Small** | **8.4%** | 9% | 9% | 8/10% | 8/11% |
| Traditional domestic | **70.9%** | 70% | 70% | 69/72% | 66/73% |
| Foreign | **29.1** | 30 | 30 | 28/31 | 27/34 |
| **Upper/Specialty Small** | **20.8** | 21 | 21 | 20/22 | 19/22 |
| Traditional domestic | **77.6** | 77 | 77 | 75/78 | 74/79 |
| Foreign | **22.4** | 22 | 23 | 21/25 | 21/25 |
| **Lower Middle** | **16.0** | 16 | 16 | 15/18 | 15/18 |
| Traditional domestic | **93.1** | 93 | 92 | 90/94 | 90/93 |
| Foreign | **6.9** | 7 | 8 | 6/10 | 6/10 |
| **Upper/Specialty Middle** | **29.5** | 30 | 30 | 28/30 | 26/31 |
| Traditional domestic | **83.8** | 84 | 84 | 82/85 | 81/85 |
| Foreign | **16.2** | 16 | 16 | 15/18 | 15/19 |
| **Large** | **11.7** | 11 | 10 | 10/12 | 8/11 |
| Traditional domestic | **80.2** | 80 | 80 | 80/82 | 79/84 |
| Foreign | **19.8** | 20 | 20 | 18/20 | 16/20 |
| **Lower/Middle Luxury** | **9.8** | 10 | 10 | 9/10 | 9/10 |
| Traditional domestic | **58.6** | 59 | 59 | 56/60 | 55/60 |
| Foreign | **41.4** | 41 | 41 | 40/44 | 40/45 |
| **Upper Luxury - Luxury Specialty** | **3.8** | 4 | 4 | 3/5 | 3/5 |
| Traditional domestic | **39.4** | 40 | 40 | 38/45 | 38/49 |
| Foreign | **60.6** | 60 | 60 | 56/62 | 38/49 |

* Source: Ward's Automotive Reports, Jan. 9, 1995

NOTE: Totals may not add to 100% due to rounding.

### Selected edited comments

- I believe we will see an increase in the cost of new cars and a growth of the "two-year" used car market tied to leasing. People will be unwilling to pay for the new car but will want instead a more fully contented used vehicle.
- Large car segment will shift to light truck/sport utility vehicle.

- Rich will get richer, middle class will become poorer. Foreign (Japanese) will introduce smaller niche market vehicles.

**Discussion**

Respondents do not predict great changes in sales by vehicle segment. Small cars are predicted to continue to take about 30 percent market share, midsized cars about 45 percent, large cars about 10 percent and luxury models about 15 percent. Foreign manufacturers are forecast to continue to do well in small and luxury car segments.

**Manufacturer/supplier comparison**

Some important differences emerged between the predictions for manufacturers and suppliers in both long- and short-term. In the small car segment, manufacturers tend to predict a higher share for the lower small segment, and lower for the upper small segment than do suppliers. Similarly, manufacturers predict that large cars will take a slightly smaller share of the market than do suppliers. Within the upper/specialty middle segment, manufacturers predict that domestic manufacturers will take a smaller share than suppliers predict.

**Trend from previous Delphi surveys**

There are no significant changes from the 1994 Delphi VII forecast.

**Strategic considerations**

Panelists predict little variation from today's segmentation. None of the sales segments is thought to change greatly during the next 10 years, nor are the shares between traditional domestic and import brands likely to vary significantly. This may mean that panelists believe the market has matured or crystallized to a point where large shifts in consumer demand or tastes are no longer going to happen. Of course, this question does not address changes in consumption from cars to trucks, and it is here that the most important trend in sales has been occurring.

Although panelists forecast for 2005 a median split between domestic and import buyers of upper luxury/luxury specialty cars very close to historical levels, the interquartile range is fairly widespread. A significant number of respondents may believe that domestic manufacturers will secure a larger share of that segment than the median would suggest.

A demographic trend to consider is the aging of the baby boom generation. The conventional wisdom is that as consumers get older, they purchase larger and more expensive vehicles. Unless this behavior is changing, one would think that large and luxury segments would grow in the next 10 years. Panelists may have used additional information or insights to make their prediction.

**MKT-33.** **Please estimate total *light truck* market share percent. We suggest that you first consider segment shifts, making sure that the total market adds to 100 percent. Next, consider the sources of vehicles within each segment, making sure that these add to 100 percent for each segment. Please see page 87 for market segment definitions.**

| Light Truck Sales by Segment | Est. 1994* | Median Response 2000 | Median Response 2005 | Interquartile Range 2000 | Interquartile Range 2005 |
|---|---|---|---|---|---|
| **Small/middle sport utility** | **18.0%** | 20% | 20% | 18/20% | 19/22% |
| Traditional domestic | **81.6%** | 80% | 80% | 0/83% | 78/84% |
| Foreign | **18.4%** | 20 | 20 | 17/20 | 15/22 |
| **Large/luxury sport utility** | **7.8** | 8 | 9 | 8/10 | 7/10 |
| Traditional domestic | **95.1** | 95 | 95 | 93/95 | 90/95 |
| Foreign | **4.9** | 5 | 5 | 5/6 | 5/10 |
| **Minivan** | **21.0** | 21 | 21 | 20/22 | 18/23 |
| Traditional domestic | **96.0** | 95 | 94 | 94/95 | 90/95 |
| Foreign | **4.0** | 5 | 6 | 5/6 | 5/10 |
| **Large van** | **6.8** | 6 | 6 | 5/7 | 5/7 |
| Traditional domestic | **100** | 100 | 100 | 100/100 | 100/100 |
| Foreign | **0.0** | 0 | 0 | 0/0 | 0/0 |
| **Small pickup** | **19.9** | 20 | 20 | 19/21 | 18/22 |
| Traditional domestic | **91.2** | 90 | 90 | 90/91 | 88/91 |
| Foreign | **8.8** | 10 | 10 | 8/10 | 8/12 |
| **Large pickup** | **26.5** | 25 | 25 | 24/26 | 21/26 |
| Traditional domestic | **99.0** | 98 | 98 | 97/99 | 95/99 |
| Foreign | **1.0** | 2 | 2 | 1/3 | 1/5 |

* Source: Ward's Automotive Reports, Jan. 9, 1995

### Selected edited comments

- Sport utility vehicle: Toward 2005, sport utility vehicles' share will gradually decrease mainly because of the increase of low-price-oriented customers. Van: After 2000, van's market share will slightly decrease mainly because of the decrease of family generations. Pickups: After 2005, pickups' market share will slightly increase mainly because the post-baby boomer generation will begin to get their car licenses. In light truck segments, foreign manufacturers (i.e., Toyota, Mitsubishi, BMW, etc.) will slightly increase their share because they will start their large-scale light truck local production.
- The numbers may not really represent the shifts occurring in this market. Much of the movement won't be from one truck segment to another, it will be from a car to a truck (i.e., luxury car sales moving to luxury sport utilities).

- The small, personal sport utility is currently underdeveloped and lags technically, qualitatively, etc., behind other vehicles. This will change. Growth will be up. A kinder, gentler Wrangler will sell big. Foreign vans, utilities and large pickups will establish U.S. footholds.

**Discussion**

As with passenger cars in MKT-32, few significant changes in the share among the various truck segments are predicted. Forecasts for 2000 and 2005 are nearly identical. Large pickups and minivans are the leaders. Panelists do not expect this to change much in the next 10 years. A slight increase is forecast to occur in the small/middle sport utility market, supported by recent introductions of small sport utility vehicles from Suzuki and Toyota. Panelists also predict modest gains in minivans and pickups for foreign manufacturers.

**Manufacturer/supplier comparison**

As with cars, manufacturers and suppliers disagree on some segment market shares. In the short term, manufacturers predict that domestic manufacturers will take a smaller share of the minivan segment, and foreign manufacturers a higher share than do suppliers. Also in the short term, suppliers forecast that the small pickup market will be greater than the manufacturers predict. In that segment, in both the short- and long-term, suppliers predict that domestic manufacturers will hold a 10-point higher share than manufacturers predict.

**Trend from previous Delphi surveys**

In the 1994 Delphi VII forecast, panelists forecast a larger share for small sport utilities and a smaller one for large and luxury sport utilities than do the current panelists. They also predicted that, by 2003, small and large pickups would have equal market shares. The 1996 Delphi VIII panelists forecast that large pickups will have five points more market share.

With regard to shares between domestic and foreign manufacturers, current panelists differ from Delphi VII panelists. Delphi VIII panelists forecast smaller shares of the small and middle sport utility segment for domestic manufacturers, 80 percent compared to the older forecast's 88 percent. However, in minivans and large and small pickup trucks, Delphi VIII panelists predict larger shares for domestic manufacturers compared to Delphi VII panelists.

**Strategic considerations**

Because the forecasts for 2000 and 2005 are nearly identical, panelists may see a great deal of stability in the truck market, at least concerning relative sales by segment. This is particularly interesting in light of ever-growing truck sales. Keep in mind that these proportions do not indicate changes in sales levels, but rather just the portion of sales for each segment in the truck market.

Of course external events such as an energy crisis could cause a shift. Panelists clearly do not expect such a discontinuity in the next 10 years. This is seen in a number of Delphi questions regarding external factors.

## Definitions–market segment examples

| Passenger Car Segment | Domestic | Import |
|---|---|---|
| **Lower small** | Dodge Neon<br>Saturn | Toyota Tercel<br>Mazda Protégé |
| **Upper/specialty small** | Mercury Tracer<br>Pontiac Sunfire | Volkswagen Golf<br>Honda Civic |
| **Lower middle** | Dodge Stratus<br>Pontiac Grand AM | Subaru Legacy<br>Honda Accord |
| **Upper/specialty middle** | Ford Taurus<br>Pontiac Firebird | Nissan Maxima<br>Toyota Celica |
| **Large** | Dodge Intrepid<br>Chevrolet Caprice | Toyota Avalon |
| **Lower/middle luxury** | Lincoln Continental<br>Buick Park Avenue | Acura Vigor<br>Mazda 929 |
| **Upper luxury/specialty** | Cadillac Seville<br>Lincoln Mark VIII | Jaguar XJ6<br>Lexus SC400 |

| Light Truck Segment | Domestic | Import |
|---|---|---|
| **Small/middle sport utility** | Jeep Wrangler<br>Ford Explorer | Suzuki Sidekick<br>Nissan Pathfinder |
| **Large/luxury sport utility** | Chevrolet Blazer<br>GMC Yukon | Toyota Land Cruiser<br>Range Rover |
| **Minivan** | Dodge Caravan<br>Ford Aerostar | Mazda MVP<br>Volkswagen Eurovan |
| **Large van** | Dodge Ram Van<br>Ford Econoline | No entries |
| **Small pickup** | Ford Ranger<br>Chevrolet S-10 | Isuzu Pickup<br>Mitsubishi Pickup |
| **Large pickup** | Ford F-Series<br>Dodge Ram Pickup | Toyota T 100 |

**MKT-34** **Please check the one outcome for each year that you believe is the most likely to occur.**

| U.S. Light Vehicle Sales | >15 million "Good" | 14-15 million "Medium" | <14 million "Weak" |
|---|---|---|---|
| 1996 | 32% | 58% | 10% |
| 1998 | 23 | 54 | 23 |
| 2000 | 48 | 46 | 6 |
| 2002 | 57 | 34 | 9 |
| 2005 | 52 | 43 | 5 |

**Selected edited comments**

- I believe there will be a slight downturn in the 1997 or 1998 model year and a serious downturn in the 2002 or 2003 model year (partly due to fuel costs).
- Next trough in the business cycle probably in 1997.
- Growing lease penetration (and more frequent cycling) and the used car market dynamics confuse the issue.
- I think that fuel cost will become very important in the 2001/2002 model year which will depress sales. The industry should rebound by 2005.
- Depends on mix between cars and trucks. Increased leasing activity may prompt even greater substitution of used (nearly new) cars.

**Discussion**

As the chart shows, panelists are very optimistic about future sales in the United States. With the exception of 1998, all the years are considered overwhelmingly average or better.

**Manufacturer/supplier comparison**

There is no statistically significant difference in responses between manufacturers and suppliers.

**Trend from previous Delphi surveys**

This question was asked in a different form in previous Delphi forecasts. Because of changes in format, comparisons cannot be made.

**Strategic considerations**

With the exception of 1998, which shows the highest likelihood of being a weak year, sales over the next 10 years are predicted to be average-to-good. Of course, due to the traditionally cyclical nature of the auto industry, the years we did not ask about could be low sales years. Despite rising prices (see MKT-13 and MKT-14), the outlook for the industry as a whole is favorable, according to panelists.

This is comforting news to some industry thinkers who fear the impact of higher new vehicle prices and greater availability of nearly new used cars could have a depressing effect on new vehicle sales.

The recent trend to match industry capacity to a midsized rather than a maximum market could have a profound impact on the industry future. This could damp some of the cyclability of the market (lower peaks and higher valleys) leading to a more stable automotive business environment with attendant increases in the overall efficiency and effectiveness of the industry.

**MKT-35. Please estimate in years the average age of U.S. passenger cars and light trucks and the length of time new vehicle buyers will keep their vehicles by 2000 and 2005.**

| Vehicle Age and Ownership Trends | Current Est.* | Median Response (in years) | | Interquartile Range (in years) | |
|---|---|---|---|---|---|
| | | 2000 | 2005 | 2000 | 2005 |
| Average age of passenger cars | 8.3 | 8.5 | 9.0 | 8.5/9.0 | 8.5/10 |
| Length of ownership by new car buyer | 5.5 | 5.9 | 6.1 | 5.0/7.0 | 5.5/8.0 |
| Length of ownership by new car lessee | N/A | 3.0 | 3.0 | 2.5/3.5 | 3.0/4.0 |
| Average age of light trucks | 8.6 | 8.8 | 9.0 | 8.6/9.0 | 8.7/10 |
| Length of ownership by new light truck buyer | 5.7 | 6.0 | 6.5 | 6.0/8.0 | 6.0/8.0 |
| Length of ownership by new light truck lessee | N/A | 3.0 | 4.0 | 3.0/4.0 | 3.0/5.0 |

* Source: AAMA, Facts & Figures; length of ownership is OSAT estimate

**Selected edited comments**

- Because people will be more aware of the environment, vehicle age will be longer than current estimate.
- Excludes the impact of increasing lease vs. buy mix. Leases will be predominantly two-to-three years.
- Improved quality equals longer life.
- Income will not keep up with cost of vehicle.
- Length of ownership will shorten as leasing increases. Car life will be longer but not by original owner. Very large, expensive cars can be used by leases longer due to more traditional styling.
- Relatively high sales over the period will help lower average.
- Life style and life cycle changes will prompt changes in ownership patterns.
- Both vehicle age and ownership trends will be longer than the current ones because of the environment-conscious trends.
- Consumers who want a new vehicle every three years will increasingly choose to lease. This will help lengthen ownership averages.

**Discussion**

Panelists predict that vehicles collectively will be older than today, adding over half a year in median age by 2005. How long the original buyer (or lessee) keeps his or her vehicle will increase, too. The original ownership period for truck buyers is forecast to increase a bit more than for cars, but only slightly. People who buy their vehicles are predicted to keep them longer than people who lease.

### Manufacturer/supplier comparison

There is no statistically significant difference in responses between manufacturers and suppliers.

### Trend from previous Delphi surveys

In keeping with trends from previous Delphi forecasts, 1996 Delphi VIII panelists predict that the length of time a car or truck buyer keeps his or her vehicle will grow as will the average age of all vehicles.

The table below shows the median response for each year from the two previous Delphi forecasts. Please note that panelists in these two forecasts were not asked about vehicle lessees.

| Vehicle Age and Ownership Trends | Median Response | | | |
|---|---|---|---|---|
| | 1992 Delphi VI | | 1994 Delphi VII | |
| | 1995 | 2000 | 1998 | 2003 |
| Average age of passenger cars | 8.0 | 8.3 | 8.2 | 8.5 |
| Length of ownership by new car buyers | 5.7 | 5.9 | 5.7 | 6.0 |
| Average age of light trucks | 8.0 | 8.4 | 8.5 | 8.5 |
| Length of ownership by new light truck buyers | 6.0 | 6.1 | 6.0 | 6.0 |

### Strategic considerations

Most obviously, there is a difference in ownership between consumers who buy and those who lease. There are implications here for dealer service and maintenance and repair in general as more and more people choose to lease their vehicles. These people may be less careful about vehicle maintenance and upkeep since, in most cases, they will turn the vehicle back in to the manufacturer or dealer at the end of the lease term. On the other hand, consumers who buy may be more mindful of maintenance schedules than before, since they are expected to be keeping their vehicles longer, and in anticipation of a longer ownership period, do more to keep their vehicle in good condition.

An important issue here is whether people are keeping their cars longer because cars are getting more expensive and they cannot afford to buy as often, or they are keeping their vehicles longer because they are better built and simply last longer. The reality is probably a combination of both those factors. In any case, less frequent sales of new vehicles could mean fewer sales, other factors being equal.

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**MKT-36. The North American Free Trade Agreement (NAFTA) has been in effect since early 1994. How will it affect vehicle production and parts sourcing? Please indicate the perceived risk in terms of U.S. production loss that sourcing may be changed from the United States to Mexico.**

Scale: 1 = high risk 3 = moderate risk 5 = low risk

| Vehicle System | Mean Rating |
|---|---|
| Electrical | 2.3 |
| Interior trim | 2.3 |
| Electronics | 2.6 |
| Brakes | 2.9 |
| Steering/suspension | 3.0 |
| Vehicle assembly | 3.0 |
| Engine | 3.2 |
| Transmission | 3.5 |
| Body/chassis | 3.5 |

**Selected edited comments**

- In the short term (one-to-two years), the peso will prevent much sourcing in Mexico. However, by 2000 that will change significantly, and there will be an increase in Mexican production.
- NAFTA's implementation won't affect parts sourcing as drastically as some think. The potential savings with Mexican labor is quickly offset by local (Mexican) raw materials costs and the transportation costs to bring the goods north. Also, over time, Mexican labor costs will rise faster (percentage wise) than their American counterparts, further eroding the Mexican "advantage." Low-end cars and trucks will continue to be produced in Mexico, higher-end cars will be imported into Mexico (a benefit to American auto production as witnessed in fiscal year 1994).
- NAFTA should have only moderate impact on U.S./Mexico trade in automotive. It is likely to have a much greater (and negative) impact on Canada.
- Suppliers are being strongly encouraged to invest in or make a presence in Mexico (through joint ventures, etc.). Local content rules still apply for several more years in Mexico. It's difficult to invest or go to Mexico unless you can make the business case that you can export to your Big Three customers in the States profitably.
- The automatic transmission is the most complicated mechanical part of the vehicle. High capital cost and high risk of problems make automatic transmissions the last thing to locate in Mexico.
- We believe that NAFTA represents an opportunity, not a risk, for the United States in terms of both vehicle production and parts sourcing.
- NAFTA will have a profound long-term impact on the structure of this industry. Mexico (and Canada) already enjoy a larger share of auto industry jobs in North America than the size of

their markets would justify. This is the price that must be paid to secure access to the market and grow a middle class capable of buying these products. The number of high wage, moderate skill jobs in the United States will continue to decline. The UAW knows this, despite any rhetoric to the contrary. In parallel with the proposed UAW/IAM/Steelworkers merger, I believe we will soon see international organizing strategies that are unprecedented on this continent.

- The opportunity is for Mexican operations to run as a business entity, not one that is focused only on trade balance or hard currency. In the long run, it makes Mexico a long-term, viable source for global production.
- I concur that Canada may be drastically affected. Lots of pressure on suppliers to move production to Mexico.
- Capital intensive business (vs. labor intensive) will be less likely to move from the United States.
- Hi-tech components will stay in the United States.
- High capital costs for engine and transmission manufacturing as well as current investment in capacity in the United States will make the transition or shift to Mexico unlikely.
- Major component (engine, transmission, etc.) will continue to remain in the United States due to reliability considerations surrounding quality, design and manufacturing complexity.
- Developments in Mexico should also take into account non-U.S. company participation. On balance, Mexico represents greater opportunity than risk. If Canadian currency stays as weak as it is, Canada could benefit through parts export.

**Discussion**

Panelists forecast that electrical components and interior trim are the most likely to be sourced to Mexico. Engines, transmissions, and body and chassis components are less likely to be sourced there.

**Manufacturer/supplier comparison**

There is no statistically significant difference in responses between manufacturers and suppliers.

**Trend from previous Delphi surveys**

Panelists in this Delphi forecast agree with those from the previous Delphi survey. However, Delphi VIII panelists believe there is somewhat more risk in having transmission and body/chassis components sourced to Mexico than did the Delphi VII panelists.

**Strategic considerations**

There are several benefits to building components in Mexico. The most prominent is lower hourly wages. Products that require high levels of labor input are likely to be sourced to lower wage rate countries like Mexico. Another benefit may be that local sourcing requirements demand that vehicle components be built in Mexico.

Some factors, however, may discourage sourcing in Mexico. The country recently experienced a major financial crisis that severely depressed the value of its currency, the peso. Some of the advantages of lower labor costs may have been offset by the currency difficulties. Some components require a high level of engineering expertise, most of which is located in the

United States and Canada. Another difficulty that does not often get mentioned is that sourcing parts to Mexico helps develop a local production base and nurtures a growing auto industry that could potentially compete with the U.S. industry.

Efforts to reduce vehicle costs on the part of vehicle assemblers puts pressure on suppliers to reduce their own costs. One way to reduce costs is to locate plants in lower labor cost locations. But labor costs are not the whole picture by far. In fact, shipping heavy components back to the United States or Canada could offset a part of the lower Mexican labor rates.

**MKT-37.** **For the following countries, please forecast, in thousands of units, passenger car and light truck production.[1]**

| Vehicle Production by Country | 1993* | Median Response | | Interquartile Range | |
|---|---|---|---|---|---|
| | | 2000 | 2005 | 2000 | 2005 |
| | | (thousands of units) | | (thousands of units) | |
| **Japan** | | | | | |
| Passenger car | 8,497 | 8,500 | 8,500 | 8,000/8,638 | 7,850/8,900 |
| Truck | 2,730 | 2,800 | 2,810 | 2,650/3,000 | 2,500/3,000 |
| **United States** | | | | | |
| Passenger car | 5,981 | 6,200 | 6,400 | 6,000/6,961 | 6,000/7,075 |
| Truck | 4,883 | 5,200 | 5,400 | 5,000/5,800 | 5,000/6,000 |
| **Germany** | | | | | |
| Passenger car | 3,753 | 3,800 | 3,900 | 3,725/4,000 | 3,700/4,200 |
| Truck | 237 | 250 | 292 | 240/306 | 244/400 |
| **France** | | | | | |
| Passenger car | 2,836 | 2,900 | 3,000 | 2,800/3,000 | 2,800/3,200 |
| Truck | 319 | 325 | 334 | 300/400 | 300/400 |
| **Spain** | | | | | |
| Passenger car | 1,505 | 1,600 | 1,700 | 1,505/1,800 | 1,600/1,950 |
| Truck | 262 | 300 | 300 | 270/300 | 270/350 |
| **Canada** | | | | | |
| Passenger car | 1,349 | 1,400 | 1,475 | 1,346/1,500 | 1,357/1,600 |
| Truck | 888 | 900 | 1,000 | 900/1,000 | 900/1,100 |
| **Italy** | | | | | |
| Passenger car | 1,117 | 1,150 | 1,175 | 1,100/1,200 | 1,100/1,300 |
| Truck | 150 | 150 | 160 | 150/200 | 150/200 |
| **South Korea** | | | | | |
| Passenger car | 1,593 | 1,800 | 2,100 | 1,700/2,000 | 1,800/2,525 |
| Truck | 457 | 520 | 630 | 500/600 | 550/800 |
| **UK** | | | | | |
| Passenger car | 1,375 | 1,400 | 1,450 | 1,312/1,487 | 1,345/1,500 |
| Truck | 193 | 200 | 203 | 193/213 | 193/250 |
| **Belgium** | | | | | |
| Passenger car | 347 | 350 | 350 | 346/362 | 347/400 |
| Truck | 56 | 60 | 60 | 50/60 | 50/70 |

[1] Truck estimates include bus production.

| Vehicle Production by Country | 1993* | Median Response | | Interquartile Range | |
|---|---|---|---|---|---|
| | | 2000 | 2005 | 2000 | 2005 |
| | | (thousands of units) | | (thousands of units) | |
| **China, Peoples Republic of** | | | | | |
| Passenger car | 221 | 600 | 1,000 | 400/1,000 | 675/1,500 |
| Truck | 1,088 | 1,500 | 1,800 | 1,200/1,500 | 1,400/2,150 |
| **Commonwealth of Independent States (C.I.S.)** | | | | | |
| Passenger car | 1,207 | 1,300 | 1,500 | 1,207/1,438 | 1,300/1,700 |
| Truck | 600 | 700 | 800 | 615/750 | 637/950 |
| **Mexico** | | | | | |
| Passenger car | 835 | 992 | 1,075 | 880/1,075 | 900/1,500 |
| Truck | 245 | 300 | 395 | 250/400 | 275/500 |
| **Brazil** | | | | | |
| Passenger car | 1,102 | 1,300 | 1,400 | 1,162/1,500 | 1,298/1,712 |
| Truck | 288 | 300 | 400 | 298/400 | 300/500 |

*Source: AAMA Facts & Figures 1994

### Selected edited comments

- I believe Japan will become increasingly expensive, leading Toyota and others to manufacture elsewhere for "non-Japan" markets. The Chinese market, like many Third World markets, will expand. Localization laws will require production in those markets. Generally, the world market will reflect a spreading out of the vehicle assembly capacity by region (or country). Expanding Third World markets will be offset somewhat by two economic downturns in traditional markets in the next 10 years.

### Discussion

Japan and the United States are predicted to continue to be the world's top producers of motor vehicles. Japan is forecast to be the leader in cars and the United States the leader in trucks. Unlike Japan and other major vehicle producers whose production level is seen as stable, the United States is forecast to increase production of cars and trucks by up to a million units by 2005. Most of the increases in production, however, are forecast to take place in emerging countries such as China and South Korea.

### Manufacturer/supplier comparison

There is no statistically significant difference in responses between manufacturers and suppliers.

### Trend from previous Delphi surveys

Both the 1992 Delphi VI forecast and the 1994 Delphi VII Forecast predicted a much higher level of vehicle production in Japan in the future than the current forecast predicts for 2000 or 2005. For 2000 and 2005 (Delphi VI) and 2003 (Delphi VII), Japan was predicted to produce about 13

million vehicles, compared to about 11.3 million each year for 2000 and 2005 in this forecast. Despite the revision in production volumes, the proportion of cars to truck production has remained constant, with about 75 percent of production in Japan being cars. China, not included in previous Delphi forecasts, is predicted to produce nearly 3 million vehicles by 2005, putting it ahead of long-time producer nations such as the United Kingdom and Canada.

**Strategic considerations**

With at least a dozen countries around the world producing in excess of a million vehicles (several countries much more than that), auto production is truly a global phenomenon. Most light vehicle production matches to some degree local consumption—Japan being the notable exception by manufacturing far more vehicles than its own population consumes. China is considered ripe for a major increase in vehicle production in the next 10 years, and South Korea is forecast to greatly expand its production also.

Some of the drivers for production are political. An auto industry is considered by some a milestone to fully industrialized status, hence the government impetus in some countries to develop factories and a transportation infrastructure. Established manufacturers look to emerging markets for future sales, as many advanced economies become saturated. Manufacturers with intentions to sell in these markets are establishing production facilities there to serve them.

**MKT-38. Please estimate the sources, in thousands of units, of North American passenger car and light truck production (United States and Canada) for the following years.**

| Sources of Production | 1994* | Median Response | | Interquartile Range | |
|---|---|---|---|---|---|
| | | 2000 | 2005 | 2000 | 2005 |
| | | (thousands of units) | | (thousands of units) | |
| **Passenger car** | | | | | |
| Big Three | 6,101 | 6,275 | 6,400 | 6,100/6,300 | 6,200/6,500 |
| Japanese | 1,709 | 1,880 | 2,000 | 1,800/2,000 | 1,900/2,100 |
| European | 7 | 75 | 140 | 50/100 | 100/200 |
| Other import mfrs. | 0 | 15 | 45 | 8/50 | 10/77 |
| **Light truck** | | | | | |
| Big Three | 5,885 | 6,000 | 6,200 | 6,000/6,100 | 6,000/6,400 |
| Japanese | 503 | 600 | 700 | 600/700 | 650/800 |
| European | 0 | 50 | 50 | 40/50 | 50/100 |
| Other import mfrs. | 0 | 10 | 17 | 5/25 | 7/36 |

* Source: Automotive News, Jan. 16, 1995

### Selected edited comments

- Continued strong yen will free more North American assembly for Asian manufacturers.
- Koreans will make another attempt before the end of the decade, possibly through a joint venture.
- European purchase of *at least* one Big Three factory–despite UAW issues.
- "Trucks" to include more family type vans and sport utility vehicles.
- Japanese Light Trucks: Toyota has localized all North American pickup (except T100) production at NUMMI already and plans a Camry-based minivan. Add a larger Honda minivan in a few years, plus local production of sport utility vehicles.

### Discussion

North American production is thought to increase by over a million units in the United States and Canada by 2005. That is approximately a 9.5 percent increase from 1994, or about 0.8 percent annually. Domestic and foreign manufacturers both are expected to increase their production. European manufacturers are predicted to increase production here substantially although unit production will still remain small compared to that of the Big Three and the Japanese. The mix of production between domestic and foreign manufacturers is predicted not to change dramatically in the next 10 years. The Big Three are expected to continue to produce about 75 percent of the cars and 90 percent of the trucks.

Panelists exhibit a high level of consensus since interquartile ranges fall closely around the median.

### Manufacturer/supplier comparison

There is no statistically significant difference in responses between manufacturers and suppliers.

### Trend from previous Delphi surveys

Delphi VIII panelists indicate more optimism in future sales than did 1994 Delphi VII panelists, although the two panels are predicting for different years. The following table shows production for the previous and current Delphi forecasts. The years 1998 and 2003 are from the Delphi VII forecast.

| | Median Response (000's) | | | |
|---|---|---|---|---|
| | **1998** | **2000** | **2003** | **2005** |
| **Passenger Car** | | | | |
| Big Three | 5,300 | 6,275 | 5,500 | 6,400 |
| Foreign-owned | 1,800 | 1,970 | 2,000 | 2,185 |
| **Light Truck** | | | | |
| Big Three | 5,000 | 6,000 | 5,050 | 6,200 |
| Foreign-owned | 400 | 660 | 420 | 767 |
| **Total** | 12,600 | 14,905 | 13,100 | 15,552 |

### Strategic considerations

Production in North America is likely to grow during the next 10 years. Most of that production will stay in the United States and Canada, but there is evidence to suggest that exports may grow significantly as the Big Three, for example, prepare models for shipment to Japan. Growing production will help keep suppliers productive and workers employed.

It is notable that European manufacturers have established factories in North America. In the United States, BMW's plant is operational and Mercedes-Benz has a plant under construction. Peugeot and Volvo are reportedly considering building U.S. factories. These companies may continue to purchase from their European suppliers, so new business opportunities for American suppliers may be limited.

**MKT-39. Please forecast, in thousands of units, the number of total motor vehicle units which will be exported to the United States from the following countries in 2000 and 2005. Consider such issues as labor costs, size of local car market, etc.**

| | | Median Response (thousands of units) | | Interquartile Range (thousands of units) | |
|---|---|---|---|---|---|
| Country | 1994* | 2000 | 2005 | 2000 | 2005 |
| Belgium | 12 | 12 | 12 | 10/15 | 10/15 |
| Canada | 1,200 | 1,300 | 1,400 | 1,200/1,400 | 1,200/1,500 |
| France | — | 7.5 | 7.5 | 0/35 | 0/27 |
| Germany | 206 | 210 | 217 | 200/250 | 200/300 |
| Italy | 2 | 2 | 2 | 2/3 | 2/4 |
| Japan | 1,678 | 1,500 | 1,400 | 1,400/1,700 | 1,275/1,683 |
| Mexico | 266 | 350 | 500 | 300/500 | 350/725 |
| South Korea | 133 | 200 | 250 | 150/200 | 150/325 |
| Spain | — | 0 | 6 | 0/10 | 0/21 |
| Sweden | 77 | 80 | 80 | 75/80 | 73/90 |
| United Kingdom | 12 | 15 | 15 | 12/16 | 12/20 |

*Source: AAMA World Motor Vehicle Data Book (Passenger cars)

Other countries mentioned by panelists were Australia , Brazil, China, India and Taiwan

**Selected edited comments**

- Imports into the United States will decline unless niche products are offered or low-cost sources such as China are developed to world class standards. Mexico will reach world-class standards.
- Some German manufacturers, such as BMW and Mercedes Benz, will have U.S. sources. So exports from Germany are expected to decrease slightly. Because of the appreciation of the yen, exports from Japan will decrease sharply. Some of the Japanese makers will increase North American production. Because NAFTA will become effective, exports from Mexico and Canada will increase. South Korean manufacturers will have plans to sharply increase their production and exports.
- The affordability crisis is creating an opportunity for low cost entry level vehicles from as yet unidentified low cost countries.

**Discussion**

Panelists predict a moderate rise in imports into the United States. By 2005, imports will grow by about 8.5 percent. There will be slight changes, however, in the number of units coming from individual countries. Shipments from Canada are predicted to increase by 200,000 units while

shipments from Japan are expected to decline. Mexico and South Korea are forecast to nearly double shipments to the United States, making them the third and fourth largest importers, respectively. They are expected to ship about twice as many cars as all of Europe.

The broad spread of some of the interquartile ranges shows that panelists are not in complete agreement on the magnitude of exports. Some panelists believe that Canada will send more vehicles in the future than it does today. On the other hand, imports from Japan may be even less than the median response indicates.

**Manufacturer/supplier comparison**

There is no statistically significant difference in responses between manufacturers and suppliers.

**Trend from previous Delphi surveys**

This question was not asked in previous Delphi surveys.

**Strategic considerations**

It is important to note that this question only measures imports by country, not sales by a nameplate's country of origin. Sales of Japanese cars, for example, may not necessarily diminish because Toyota, Nissan, Honda and the others send fewer vehicles from Japan. All have plants in North America and can supply the U.S. market from them. Likewise, some European manufacturers have built factories in the United States to supply the U.S. and world markets, supplementing output from their European plants.

Although there are no extreme changes predicted, the drivers for such changes could be exchange rates, low labor costs and local content rules. Shipments from Japan are very sensitive to exchange rates, while Mexico may continue to require manufacturers to build locally in order to sell locally.

**MKT-40. Please forecast total United States vehicle exports, in percent, by geographic destination by 2000 and 2005.**

| United States Exports To: | 1994* | Median Response | | Interquartile Range | |
|---|---|---|---|---|---|
| | | 2000 | 2005 | 2000 | 2005 |
| Canada | 56.7% | 53% | 51% | 50/55% | 45/55% |
| Asia, except Japan | 11.5 | 12 | 12 | 11/13 | 11/15 |
| Europe | 11.7 | 12 | 12 | 11/13 | 11/14 |
| Middle East | 9.1 | 9 | 9 | 8/10 | 7/10 |
| Latin/South America | 5.4 | 6 | 6 | 5/6 | 5/7 |
| Japan | 4.1 | 5 | 6 | 5/6 | 5/8 |
| Mexico | 0.8 | 1.3 | 2 | 1/3 | 1/4 |

*Source: AAMA World Motor Vehicle Data Book, 1994

### Selected edited comments

- Export growth will be primarily light truck/sport utility vehicles in 2000, then opportunities will be satisfied by local production.
- In particular, exports to Japan are expected to increase but mainly by the export of Japanese makers in the United States. Exports to Asia will also increase because many Asian countries will take part in GATT and start free trade.
- NAFTA will enable OEMs to focus Mexican plants on a few models and import from United States/Canada. More U.S.-built Japanese nameplate exports to Japan.

### Discussion

Panelists do not predict great changes, by destination, for U.S. exports. Canada will remain overwhelmingly the primary destination for U.S.-built cars, taking about half of U.S. exports. They are followed by Asia with about 15 percent, and Europe and the Middle East each with 10 percent. Tight interquartile ranges indicate a fairly strong consensus on this question.

### Manufacturer/supplier comparison

There is no statistically significant difference in responses between manufacturers and suppliers.

### Trend from previous Delphi surveys

This question was asked in a slightly different form in the 1994 Delphi VII survey. We increased the number of regions in Delphi VIII so direct comparisons are difficult. In both surveys, panelists predict that future exports will not differ proportionally between regions.

### Strategic considerations

There has been a great deal of activity on the part of the domestic manufacturers regarding exports. Much of their efforts have been focused on Japan, building or buying distribution

channels, readying models with right-hand drive and increasing consumer awareness with advertising campaigns. The manufacturers' own estimates suggest they intend to sell far more vehicles in Japan than they do now. Delphi panelists, however, do not expect to see a proportionally larger share of American-built vehicles being shipped to Japan.

It is also surprising that the portion of vehicles to be exported to other Asian countries is not predicted to increase much. Optimistic predictions about income growth in places like China, India, Vietnam and others, with accompanying predictions about increasing vehicle ownership, suggest great opportunities for exports. Panelists seem either to doubt these predictions or believe cars for Asian consumers will not be coming from North America but will be built in those countries.

In general though, despite a weakening currency, a more export-oriented industry management and some positive export experiences (Chrysler minivans in Europe, for example), U.S. exports to different markets may not change much.

Of course an interesting consideration is that with both the Japanese and European manufacturers building products in North America, they are likely to expand exports from North American factories in the years ahead.

**MKT-41. Vehicle exports from North America to Japan are beginning to rise. What actions can North American producers take to increase sales to Japan?**

**1996-2000**

- Actions are political, not manufacturing.
- Better distribution partners in Japan; highest initial quality vehicles only for export.
- Build quality products (vehicles and components) that customers want. Selling in Japan is different than in North America. Top management must become involved.
- Build right-hand drive cars; work to better understand and design cars specifically for this market. Begin to develop selling network–Japanese style. Develop long-term market strategy–20-year plan.
- Build vehicles focused on Japanese consumers' desires; push for balanced trade on imports/exports.
- Continued political pressure through lobbying efforts. Produce more right-hand drive vehicle models.
- Encourage U.S. government to pressure Japan. Make outstanding products. Expand distribution agreements with Japanese distributors.
- Export vehicles with right-side steering. Export vehicles which meet the needs of Japanese (small size, high quality, leisure-oriented).
- Increase ties to Japanese OEMs and do more rebadging of vehicles.
- Lobby to reduce restrictions and regulations on imported vehicles to Japan.
- More marketing research in Japan–understand and conform to local needs. Improve distribution/joint ventures.
- Need smaller vehicles in certain classes. Get designs that are wanted by rest of world–it will be a status symbol.
- Raise quality as perceived by Japanese. Offer appropriate vehicles (size, displacement, right-hand drive, etc.). Spend hundreds of millions of dollars to establish distribution networks.
- Sales to Japan from North America will never amount to much. It is a waste of effort to sell cars from United States in Japan.
- Washington has to play hard ball on trade practices.

**2001-2005**

- Additional right-hand drive products. Pacific Rim manufacturing. World class products.
- Better mileage, better quality, better distribution network.
- Build in Japan at least as CKD.
- Build right-hand drive cars. Create image in Japanese market in accordance with 20-year plan. Locate manufacturing facility in Japan.
- Consider implementing localization in some form. Develop Japan-specific strategy and products.

- Design vehicles to meet unique requirements of Japanese consumer.
- Get-tough U.S. trade policies. More customer responsive focus by U.S. manufacturers.
- Increase ties to Japanese OEMs and do more rebadging of vehicles.
- Top quality parts and service support of the growing fleet of U.S. cars in Japan.

**Discussion**

Most of the recommendations for expanding sales in Japan fit into three categories: government intervention, product design and vehicle distribution. Many respondents believe there is still not a "level playing field" for the U.S. domestic manufacturers and that if the Big Three are to have access to Japan's vehicle market, the U.S. government will have to play hardball with regard to Japan's perceived import restrictions. Many respondents argued that current U.S. designs may not be especially well-suited for the Japanese market in terms of size, engine displacement, quality, etc. They suggest doing more market research to determine Japanese consumers' wants and needs. Lastly, panelists recommend improving the vehicle distribution network.

**Manufacturer/supplier comparison**

This comparison is not made for open-ended questions.

**Trend from previous Delphi surveys**

This question was not asked in prior Delphi forecasts.

**Strategic considerations**

According to our respondents, if U.S. manufacturers want to sell more vehicles in Japan, there are a number of improvements to be made. As mentioned above, most of that work falls into three categories: product design, distribution and political concerns.

The differences in design between American and Japanese cars are not nearly so great as they were a decade ago. American cars still tend to be larger, with much greater displacement engines. Size and displacement are important considerations since Japan has strict requirements for the former and taxes are levied according to the latter. Improvements can be made in the distribution of American cars, too. American manufacturers may need to develop more dealerships and also ensure a steady and reliable supply of replacement parts.

The most complex issue for American manufacturers may be coping with political concerns. Japan exports a great many more vehicles to the United States than it imports from the United States. This imbalance has led to tensions over trade imbalances between the two countries. Recently the United States threatened to impose a tariff on some Japanese luxury models in an attempt to reduce Japanese imports (and to show the seriousness of its intentions with regard to trade).

There is potentially a "Catch-22" here in that U.S. manufacturers may not make significant efforts to sell in Japan—such as designing smaller models for Japan or spending for a distribution network—if there is an ongoing perception that official or unofficial trade barriers will prevent success.

In reality, the Japanese market will never be highly important to the domestic manufacturers because it is essentially saturated, with little potential for growth. Still it is important to export vehicles to Japan but with little investment beyond engineering high quality, right-hand drive vehicles.

**MKT-42. What percentage of North American-produced passenger cars and light trucks (including fleets) will use each of the following alternate energy sources in 2000 and 2005?**

| Alternate Fuels | 1994* | Passenger Cars | | | |
|---|---|---|---|---|---|
| | | Median Response | | Interquartile Range | |
| | | 2000 | 2005 | 2000 | 2005 |
| Alcohol or alcohol/gasoline (>10% alcohol; includes flex fuel or variable fuel) | <1% | 1% | 2% | 1/2% | 1/4% |
| Diesel | 0.0 | 0 | 1 | 0/1 | 0/2 |
| Electric | 0.0 | 1 | 1.5 | 0.1/1 | 1/3 |
| Electric/gasoline hybrid | 0.0 | 0.5 | 1 | 0/1 | 0.5/2 |
| Hydrogen | | 0 | 0 | 0/0 | 0/0 |
| Natural gas | 0.0 | 0.5 | 0 | 0/1 | 0.25/1 |
| Propane | 0.0 | 0 | 1 | 0/1 | 0/1 |

| Alternate Fuels | 1994* | Light Trucks | | | |
|---|---|---|---|---|---|
| | | Median Response | | Interquartile Range | |
| | | 2000 | 2005 | 2000 | 2005 |
| Alcohol or alcohol/gasoline (>10% alcohol; includes flex fuel or variable fuel) | <1% | 1% | 2% | 1/2% | 1/3% |
| Diesel | 4.1 | 5 | 5.2 | 4/5 | 4/7 |
| Electric | 0.0 | 0.1 | 1 | 0/1 | 0/2 |
| Electric/gasoline hybrid | 0.0 | 0 | 0.8 | 0/1 | 0/2 |
| Hydrogen | | 0 | 0 | 0/0 | 0/0 |
| Natural gas | 0.0 | 0.5 | 1 | 0/1 | 0/2 |
| Propane | 0.0 | 0 | 1 | 0/1 | 0/2 |

*Source: Ward's Automotive Reports, Jan. 1995

**Selected edited comments**

- Alternate fuel sources will increase.
- I believe gasoline prices will significantly increase between 2000 and 2005, therefore promoting alternatives. However, it is too soon to predict which technology will gain favor initially.
- I don't see much change to alternate fuels except in certain metro areas. There I believe propane, natural gas, make more sense than electric.

- These estimates assume alternate fuel vehicles are sold to meet mandates including potential private and local mandates.

### Discussion

Panelists predict that the use of alternate power sources will not increase significantly in the future. Use of alcohol or alcohol/gasoline blends are forecast to reach a penetration rate of 2 percent by 2005 in cars and light trucks. Electric vehicles are forecast to reach 1.5 percent by 2005 in cars, half that amount in light trucks. Diesel fuel use in light trucks is predicted to increase slightly. Other alternate fuels are forecast to have a penetration rate of 1 percent or less by 2005.

### Manufacturer/supplier comparison

There is no statistically significant difference in responses between manufacturers and suppliers.

### Comparison of forecasts: TECH-11 and MAT-4

There is no statistically significant difference in responses between the marketing and materials panelists. There is a difference between marketing and technology panelists for the items noted in the following tables.

| Alternative Fuels | Passenger Cars | | | | | |
|---|---|---|---|---|---|---|
| | Mean Response 2000 | | | Mean Response 2005 | | |
| | Mkt. | Tech. | Matl. | Mkt. | Tech. | Matl. |
| Alcohol or Alcohol/gasoline (>10 percent alcohol; includes flex fuel or variable fuel) | 2.0% | 5.3% | 6.6% | 3.5% | 8.6% | 10.8% |
| Diesel | 1.0 | 1.6 | | 1.7 | 4.1 | |
| Electric/gasoline hybrid | 0.7 | 1.9 | | 1.8 | 4.3 | 3.5 |
| Hydrogen | | | | 0.2 | 0.6 | |
| Natural Gas | 0.6 | 1.4 | 1.7 | 1.2 | 3.1 | 3.4 |

| Alternative Fuels | Light-Duty Trucks | | | | | |
|---|---|---|---|---|---|---|
| | Mean Response 2000 | | | Mean Response 2005 | | |
| | Mkt. | Tech. | Matl. | Mkt. | Tech. | Matl. |
| Alcohol or Alcohol/gasoline (>10 percent alcohol; includes flex fuel or variable fuel) | 2.1% | 5.5% | 6.1% | 3.3% | 8.7% | 9.4% |
| Diesel | 4.6 | 6.0 | | 6.4 | 10.5 | |
| Natural Gas | 0.7 | 1.8 | 1.9 | 1.5 | 3.6 | 3.9 |

Technology panelists forecast higher penetrations of each of the items noted.

### Trend from previous Delphi surveys

Comparisons to the 1994 Delphi VII survey are difficult because that forecast did not distinguish between cars and trucks as this one did. Still, panelists then as now predict little use of alternative fuels or power plants.

### Strategic considerations

The next 10 years hold little promise for the adoption of alternate power sources. The world's oil reserves seem to be far from depleted, and great strides have been made to tame the internal combustion engine's emissions. Gasoline supplies are probably reliable, and prices are likely to remain stable or increase only moderately (see questions MKT-1 and MKT-2). As long as gasoline remains relatively cheap, it will be hard to replace it as the fuel of choice among vehicle owners. Therefore, market forces are not likely to drive the switch to alternate fuels.

The strongest force for increasing penetration of alternative fuels is government policy. Despite important advances in controlling vehicle emissions, some parts of the country (California, the Northeast) are mandating even stricter measures. In 1998, for example, California will require that 2 percent of sales be of zero-emission vehicles. This essentially means electric vehicles although there is some recent flexibility emerging: The mandate may be delayed in favor of an approach that will encourage limited introduction of electric or hybrid vehicles until the technology is validated. Beyond technical difficulties and infrastructure issues associated with meeting the mandate, manufacturers face a great unknown in how consumers will react to buying and using electric vehicles. Operating an electric vehicle is different from operating a gas-powered one. If consumers' expectations are to be changed, it may not be too early to start a public awareness campaign.

**MKT-43. Please forecast the total domestic and import U.S. market application rate in percent of the following powertrain and chassis features in 2000 and 2005.**

| Powertrain/Chassis Features | 1994* | Passenger Cars | | | |
|---|---|---|---|---|---|
| | | Median Response | | Interquartile Range | |
| | | 2000 | 2005 | 2000 | 2005 |
| Multivalve engine | 37.9% | 45% | 55% | 40/50% | 45/60% |
| V-8 engines | 9.0 | 9 | 9 | 8/10 | 7/11 |
| Super chargers | 0.3 | 0.5 | 0.5 | 0.3/1 | 0.3/1 |
| Active suspension | 0.1 | 0.5 | 1 | 0.15/1 | 0.3/3 |

| Powertrain/Chassis Features | 1994* | Light Trucks | | | |
|---|---|---|---|---|---|
| | | Median Response | | Interquartile Range | |
| | | 2000 | 2005 | 2000 | 2005 |
| Four-wheel drive | 32.6% | 35% | 38% | 34/40% | 35/40% |
| Multivalve engine | 2.1 | 5 | 10 | 4/10 | 5/15 |
| Diesel engine | 4.1 | 3 | 4 | 2/5 | 2/7 |

* Source: Automotive News 1994 Market Data Book & Ward's Auto Report, Jan. 19, 1994 & OSAT estimates

### Selected edited comment

- Three-valve engines on horizon to fit between two- and four-valve. Boosted engines knocked out.

### Discussion

Panelists predict that multivalve engines will be in more than half the cars sold in the United States by 2005, an increase of about 45 percent from 1994's estimated installation rate. Conversely, V-8 engines and superchargers are forecast to remain at today's application rates. Active suspensions are expected to show a huge percentage change, but actual installation rates will remain very small.

On trucks, four-wheel drive is predicted to come into broader use. Multivalve engines, already very common on passenger cars, are forecast to become more commonplace on trucks. Diesel engines, long associated with trucks, are forecast to remain nearly constant in application rate.

### Manufacturer/supplier comparison

There is no statistically significant difference in responses between manufacturers and suppliers.

### Trend from previous Delphi surveys

With regard to passenger cars, previous Delphi forecasts were more optimistic about the use of add-on equipment to assist in engine aspiration. The 1992 Delphi VI forecast in particular forecast use of turbochargers and superchargers in 5 percent of passenger cars. Although this Delphi VIII forecast asks only about superchargers (since turbocharged engines are all but nonexistent in production vehicles), the forecast falls to less than 1 percent. On the other hand, multivalve engines are forecast to have higher installation rates in the future than predicted in past Delphi surveys. Delphi VI forecast a 30 percent application rate for multivalve engines for 2000 and Delphi VII a 40 percent rate for 1998.

For trucks, forecasts about four-wheel drive have been very stable from forecast to forecast.

### Strategic considerations

The most notable finding in this question is the increasing use of multivalve engines. Supercharged engines still have a small portion of the market and turbocharged engines have all but disappeared. Manufacturers have chosen multivalve engines to help extract the most power out of a given displacement engine. Although it is a technical solution in some cases, it is also a marketing one. Overhead cam engines are considered more "high-tech" and desirable than pushrod engines in some consumers' eyes. Unfortunately, these engines are significantly more expensive to build and contribute to growing vehicle prices. Consumers have shown time and again, however, that they are willing to pay for what they want.

The issue of high-tech versus low-tech engines is very controversial and promises to be a major industry battleground over the next few years. Do consumers buy performance or how the performance is achieved? Certainly price/cost is a very important factor and, considering that a high-tech engine costs in the area of $1,000 more than a low-tech design, this will be a most interesting issue.

**MKT-44. Please forecast the total domestic and import U.S. market in percent of the following brake system technologies in 2000 and 2005.**

| Brake Systems | 1994* | Passenger Cars | | | |
|---|---|---|---|---|---|
| | | Median Response | | Interquartile Range | |
| | | 2000 | 2005 | 2000 | 2005 |
| Antilock brake system | 55.8% | 70% | 87% | 64/80% | 80/95% |
| Four-wheel disc brakes | 6.1 | 10 | 15 | 8/10 | 10/25 |
| Traction (anti-spin) control | 7.7 | 10 | 20 | 10/15 | 15/26 |

| Brake Systems | 1994* | Light Trucks | | | |
|---|---|---|---|---|---|
| | | Median Response | | Interquartile Range | |
| | | 2000 | 2005 | 2000 | 2005 |
| Two-wheel antilock brakes | 53.8% | 50% | 48% | 43/60% | 30/60% |
| Four-wheel antilock brakes | 32.1 | 40 | 50 | 35/50 | 40/75 |
| Four-wheel disc brakes | 14.2 | 16 | 20 | 15/20 | 15/30 |

* Source: Cars: Ward's Automotive Reports "Factory Installation" Dec. 1994
Trucks: Wards Automotive Reports "Factory Install trucks" Jan. 1995

### Selected edited comments

- Stability control (active braking plus four-wheel steering) will leapfrog current technology.

### Discussion

These features will show some significant gains in market acceptance. Antilock brakes, already very popular and available on a broad range of cars, are forecast to grow more so in the future. With a predicted installation rate of 87 percent by 2005, antilock brakes will be as common as air conditioning. Front disc brakes already are in use universally. Drum brakes, however, still dominate in rear. According to our panelists, that could start to change as more models switch to rear discs. Finally, traction control, a relatively new offering, is expected to expand market share.

On light trucks, the brake systems forecast is a bit different. Relatively low cost rear-wheel-only systems were developed for trucks and are in widespread use. However, our survey predicts expanded use of all-wheel antilock braking systems on light trucks. Panelists believe that antilock brakes, either two- or four-wheel, will be essentially universal on trucks by 2005, surpassing the installation rate on cars. Lastly, four-wheel disc brake systems are expected to become more common.

### Manufacturer/supplier comparison

There is no statistically significant difference in responses between manufacturers and suppliers.

### Comparison of forecasts: TECH-48

There were a number of statistically significant differences between the Marketing panel and the Technology panel. They are summarized in the chart below.

| Brake Systems | Mean Response 2000 | | Mean Response 2005 | |
|---|---|---|---|---|
| | Mkt. | Tech. | Mkt. | Tech. |
| **Passenger Car** | | | | |
| Antilock brake system | — | — | 85.4% | 89.5% |
| Four-wheel disc brakes | 12.6% | 16.7% | 19.6 | 26.1 |
| **Light Truck** | | | | |
| Four-wheel ABS | 45.1 | 51.0 | 57.7 | 69.0 |
| Four-wheel disc brakes | — | — | 23.4 | 31.2 |

Technology panelists predict higher installation rates for various braking features than do Marketing panelists.

### Trend from previous Delphi surveys

Current panelists predict higher application rates for antilock brakes on passenger cars in the future than did previous panelists. The 1992 Delphi VI panelists forecast a 50 percent installation rate by 2000, but Delphi VIII panelists forecast 70 percent for 2000. Similarly, 1994 Delphi VII panelists forecast a 75 percent rate for antilock brakes for 2003 while Delphi VIII panelists predict an 87 percent rate for 2005, just two years later. With trucks, however, the forecasts from all three panels are much closer. All of them predict nearly universal use of ABS on trucks by 2000.

The forecast for the use of four-wheel disc brakes on cars has declined with each new Delphi forecast. Delphi VI panelists forecast a rate of 35 percent by 2000. The Delphi VII panel forecast a 30 percent rate by 2003, while the current panel forecasts 15 percent by 2005. For trucks, Delphi VIII panelists are more optimistic, forecasting a 20 percent installation rate by 2005.

### Strategic considerations

Vehicle skid control systems seem to be the next phase in technological development. Traction control and antilock braking systems are examples of technology that offers measurable improvement to vehicle control. The benefits of disc brakes in the rear are less clear. While disc brakes are known for less fade and better resistance to water, they do not necessarily decrease stopping distances. The extra expense of putting disc brakes in the rear is questionable, particularly on low-priced vehicles. Furthermore, with the dynamic weight shift to the front during braking, rear brakes do not contribute a significant fraction of the total brake effort. This is particularly true with front-wheel drive vehicles. Also, the parking brake is more expensive and complicated with disc brakes. Consequently, the displacement of drums by discs in the rear is likely to proceed at a slow pace. In fact, as a cost savings measure, Nissan replaced the rear discs with drums when it redesigned the Maxima. Other manufacturers could follow suit. Still, if the number of vehicles with all-wheel disc brakes doubles in 10 years, as our panelists predict, that will require significantly more production of the appropriate disc brake hardware (and concurrent decrease in drum brake production).

Antilock brakes have become so broadly available that it is hard to dispute their popularity. Recent research by insurance groups suggests that the devices may not be responsible for reducing as many accidents as was once thought. Even so, many consumers insist on having them. Since they are available in vehicles in all price ranges, price is not likely to be a barrier to the acceptance of these items.

On trucks, use of antilock control is expected to grow to nearly 100 percent use in 10 years. Trucks benefit as cars do from the enhanced control afforded by ABS. Pickup trucks, however, are a special case and are probably the main users of two-wheel systems. With relatively little weight over their rear wheels, pickup trucks tend to lock their rear brakes easily. A two-wheel ABS system then can modulate the rear brakes and prevent lock-up. Obviously this does nothing to prevent lock-up of the front wheels.

**MKT-45. What percentage of vehicles produced in North America will have the following Intelligent Transportation System (ITS) features, formerly known as IVHS, by 2005?**

| ITS Feature | Median Response | Interquartile Range |
|---|---|---|
| | 2005 | 2005 |
| In-vehicle message system | 15% | 9/20% |
| Adaptive cruise control | 10 | 5/20 |
| Collision warning systems | 10 | 5/20 |
| Navigation | 10 | 5/20 |
| Automatic toll collection | 5 | 2/10 |

### Selected edited comments

- Automatic toll collection will be done by the toll collecting agency.
- In Japan the penetration rate of navigation is sharply increasing. So as the result of advanced technology and reduced cost, the penetration rate of navigation system will increase.
- Technology will be low infiltrating. The cost of technology vs. vehicle affordability will keep this at bay until significant cost reductions are achieved in the new components required for these technologies.

### Discussion

Panelists predict a relatively low level of installation for some prominent ITS features by 2005. An in-vehicle message system is forecast to be the most commonplace, with an installation rate of 15 percent. An automatic toll collection system is forecast to be the least prevalent by 2005.

### Manufacturer/supplier comparison

There is no statistically significant difference in responses between manufacturers and suppliers.

### Comparison of forecasts: TECH-51

There is no statistically significant difference in responses between the technology and marketing panelists.

### Trend from previous Delphi surveys

The 1994 Delphi VII forecast surveyed panelists about two ITS features, adaptive cruise control and collision warning systems. At that time, panelists forecast for cars a 7 percent penetration rate for adaptive cruise control and 5 percent for collision warning systems, both figures for 2003. Those predictions are in line with the 2005 predictions of 10 percent for each of those systems in the current forecast.

**Strategic considerations**

Some ITS features are extensions of current devices, such as adaptive cruise control which reduces vehicle speed to maintain a safe distance between motorists. These features are self-contained in the vehicle and do not interact with devices external to the vehicle. Some of the features proposed for ITS systems, like automatic toll collection, require a great deal of interaction between manufacturers and government to define the systems, develop common standards and build an infrastructure. These kinds of features represent a new phase in government/industry cooperation. Some features bypass the driver's inputs to control the vehicle while other ones warn the driver to take action. Regardless of their operation or purpose, the intent of ITS devices is to make motor vehicle travel safer and more efficient. In some cases, insurance companies may be willing to offer reduced premiums to consumers whose vehicles are equipped with accident-avoidance features.

How well these products will be received by the consumer remains to be seen. One issue is cost. A recurring theme in this Delphi forecast is affordability. Escalating vehicle prices suggest that manufacturers might want to remove features, not add more of them. Another issue is control. Some drivers may balk at a vehicle which second-guesses their driving decisions and, for instance, slows the vehicle as it approaches another one. In their favor, though, is the public's (and government's) desire for safety. Antilock brakes are seen as a safety enhancement for which consumers are willing to pay up to $1,000. ABS has not been a braking panacea, however. Recent reports say that consumers do not use them properly, releasing instead of applying the brake pedal when the pulsing that accompanies ABS operation begins. In addition, some insurance companies who once offered discounts for ABS-equipped vehicles no longer do so in response to research that suggests these vehicles are no less accident prone than vehicles without ABS. For ITS features to gain wide acceptance, consumers must perceive the benefits.

**MKT-46. Please select from the following list the five most important considerations you believe will influence the desire to purchase an electric passenger car for personal use by 2000.**

| Electric Vehicle Attributes | Percent of total responses |
|---|---|
| Driving range | 83% |
| Service availability (charging/ infrastructure) | 57 |
| Purchase price | 57 |
| Operating cost | 56 |
| Performance | 41 |
| Tax/other government incentives | 31 |
| Status/environment appeal | 23 |
| Product technology | 14 |
| Safety | 13 |
| Product quality | 13 |
| Resale value | 11 |
| Passenger space | 8 |
| Comfort/convenience | 8 |
| Dealer/company incentives | 7 |
| Exterior styling | 6 |
| Cargo space | 2 |
| Interior styling | 1 |

**Selected edited comments**

- Basic problems must be solved for electric vehicles to be accepted by customers.
- I choose exterior styling as one of the factors as I believe people will want something that "looks good" as well as the environmental aspects of the vehicle. The exterior styling will be an incentive for the vehicle.
- The above assumes that an electric vehicle already exists in the segment the person is considering (i.e., a small car prospect is *not* going to consider a minivan just because it is available as an electric and the small car is not).

**Discussion**

Panelists examined a list of items that might be of interest or concern to the prospective EV buyer.

The characteristic most frequently mentioned was driving range, followed by service availability (recharging). These two attributes are mostly specific to electric vehicles. Most of the remaining attributes are common consumer concerns that apply to any vehicle purchase. Purchase price, operating cost and performance round out the top five.

### Manufacturer/supplier comparison

There are no manufacturer/supplier comparisons for this question.

### Trend from previous Delphi surveys

Panelists in this survey have predicted electric vehicle attributes a bit differently from the previous Delphi panelists. Interestingly, driving range and purchase price, which were thought to be among the five most important considerations by 100 percent of the 1994 Delphi VII respondents, were given a top five ranking by only 83 percent and 57 percent of 1996 Delphi VIII respondents. The remaining three "most important" attributes from Delphi VII are operating cost, vehicle performance and service availability (which was defined *not* to include infrastructure/recharging availability).

### Strategic considerations

The issues facing the electric vehicle market are as much economic, marketing or public relations as they are technical. One approach to encouraging public acceptance of electric vehicles is to have them provide a familiar driving and ownership experience. Electric vehicles differ most notably from gasoline- or diesel-powered vehicles in that liquid-fueled vehicles take a short time to refuel and operate for a long time (relative to the time it takes to refuel) between refuelings. Electric vehicles are just the opposite. The technical challenge, then, is to improve driving range and/or reduce refueling time.

That challenge is based on customers' expectations drawn from their present experience. An alternative challenge is to alter drivers' expectations and possibly their driving behavior. For instance, consumers are accustomed to driving hundreds of miles on a single tank of gas and taking only minutes to refuel. That expectation would have to be revised, as would consumers' driving behaviors since electric vehicles may never have the driving range of gasoline-engine vehicles. Drivers would have to learn to monitor daily mileage and plan trips carefully. The refueling dilemma could be less serious than anticipated considering how much "down time" the typical vehicle has during the day. Charging at night while the owner sleeps and during the day while he or she works should theoretically be sufficient. On the positive side, some electric vehicle owners might enjoy the lack of engine noise, the infrequent service intervals (no oil changes), and the potential to refuel at home (avoiding stops for gas on frigid winter days).

The chief advantage of electric vehicles—reducing mobile pollution—is a societal one, not a personal or individual one. In current form, society's gain may be the individual's loss in terms of convenience and unconstrained mobility. That will make the job of marketing these vehicles that much more difficult.

Changing owner expectations is probably the key to acceptance of electric vehicles. EVs have different operating characteristics. Current research seems to focus on developing an electric vehicle that matches the performance characteristics of a gasoline-burning vehicle. Delphi VIII panelists predict that driving range will be first and foremost in the minds of electric vehicle buyers. While engineering tries to expand the driving range, marketing can try to persuade drivers that the approximately 70-mile range currently available is sufficient, or that an electric vehicle makes an excellent second car. It is a two-pronged approach to gaining vehicle acceptance: building a vehicle that meets expectations but also altering expectations to fit the circumstances.

Ultimately, electric vehicles, if they ever become widely accepted, will probably be limited-purpose vehicles unless the heat engine/electric hybrid emerges. They may never have the broad-ranging practicality of a liquid-fueled vehicle. Even so, the compromises may not be any greater than those endured by the sports car owner who lacks passenger and luggage space, the diesel-

engine sedan owner who has trouble finding fuel, or the motorcycle rider who suffers during inclement weather.

**MKT-47.** **Customer purchasing priorities vary with fuel price. Please indicate the priority consumers place on the following vehicle purchase attributes at $1.15 and $3.00 per gallon of fuel.**

SCALE: 1 = extremely important 3 = moderately important 5 = not at all important

| Vehicle Attributes | $1.15/gallon fuel | $3.00/gallon fuel |
|---|---|---|
| Size and comfort of vehicle | 2.2 | 2.8 |
| Acceleration from zero mph | 2.5 | 3.4 |
| Passing acceleration | 2.5 | 3.0 |
| Driving range | 3.0 | 1.9 |
| Top speed | 3.2 | 3.9 |
| Fuel economy | 3.3 | 1.4 |
| Fuel cost (dollars/refueling, ¢ per mile) | 3.4 | 1.6 |
| Perceived environmental desirability of fuel | 3.7 | 3.1 |

**Selected edited comments**

- Fuel should go up in price to be more on world level to stimulate more ride/sharing, to stimulate U.S.-owned oil fields and improve balance of payments.
- Range is only a factor if availability is interrupted or restricted by supplier.

**Discussion**

When the price of gasoline is low, at $1.15/gallon, consumers' priorities can be ranked as follows, from most important to least important:

- size and comfort of vehicle
- passing acceleration
- acceleration from zero mph
- driving range
- top speed
- fuel economy
- fuel cost
- perceived environmental desirability of fuel

At a much more costly $3.00/gallon, consumers' priorities are forecast to change, according to our panelists. The new priorities will be:

- fuel economy
- fuel cost
- driving range
- size and comfort of the vehicle
- passing acceleration
- perceived environmental desirability of fuel
- acceleration from zero mph
- top speed

### Manufacturer/supplier comparison

Manufacturers and suppliers are in general agreement in this question except that, compared with suppliers, manufacturers believe that customers would place greater importance on driving range and passing acceleration when fuel costs $1.15 per gallon.

### Trend from previous Delphi surveys

This question was also asked in the 1994 Delphi VII forecast. Panelists in that survey forecast that the same three attributes would be most valued by consumers when gasoline is priced at $1.15 per gallon. The remaining attributes were rated moderately important in both surveys, except for environmental desirability of fuel which rated not very important (3.7) in Delphi VIII. At $3.00 per gallon, there was again great similarity between the forecasts except that Delphi VII panelists forecast passing acceleration would remain rather important (2.5).

### Strategic considerations

While $3.00 per gallon for gasoline may seem like a fantasy in this country, it is a reality in most industrialized nations. In those countries the price is higher because most oil is imported, but also because of higher gasoline taxes. In this country, with a domestic oil industry, market forces alone are unlikely to push gasoline prices up to $3.00 in the near- or medium-term. A combination of market forces—an oil embargo and taxes—however, could.

What is interesting here is the relative importance of typical features and attributes vis-à-vis the price of fuel. Not surprisingly, fuel cost and fuel economy would be expected to become significantly more important to consumers at $3.00 per gallon. At that price, a consumer who drives 12,000 miles per year and averages 20 miles per gallon pays $1,800 for fuel. At $1.15 per gallon, that consumer pays only $690 for fuel. This is a big difference and is even more striking over the entire ownership period. Performance attributes, like acceleration and top speed, become significantly less important.

Interestingly, higher fuel prices could be a boon to the use of electric and other alternate fuel vehicles. Many of the attributes that consumers find less important at higher fuel prices are coincidentally the weak attributes of electric vehicles. Consequently, if the government desires to encourage use of alternate-fueled vehicles, raising the gasoline tax might be an effective inducement.

It must be kept in mind that regardless of fuel price, the value of improved fuel economy decreases at the margin; i.e., at 15 miles per gallon, there is a much greater incentive to reduce fuel consumption than at a 30 mpg rating.

**MKT-48. For the following features, please estimate the highest purchase price in 1994 dollars which will permit a 25 percent passenger car penetration rate. Recall that an average vehicle cost $20,000 in the 1994 U.S. market.**

| Feature | Median Response | Interquartile Range |
|---|---|---|
| Collision-avoidance systems | $375 | $250/450 |
| Active suspension | 200 | 187/250 |
| Navigation information systems | 200 | 150/300 |
| Traction (anti-spin) control | 200 | 150/200 |
| Compact disc players | 175 | 125/200 |

### Selected edited comments

- Any additional add-ons are going to have a hard time penetrating if they cost extra. Volume consumers can no longer afford the rapid price escalation that they have witnessed. Extra dollars for "trinkets" are going to be a hard sell!
- Traction (anti-spin) control must be high-speed, not low-speed brake intervention.

### Discussion

Panelists forecast that consumers would be willing to pay nearly $400 for a collision-avoidance system on an average priced vehicle. Less valuable to consumers, at $200 each, are active suspension, navigation information system and traction control. Compact disc players are commanding the smallest purchase price.

### Manufacturer/supplier comparison

There is no statistically significant difference in responses between manufacturers and suppliers.

### Trend from previous Delphi surveys

This question was considered in the 1992 Delphi VI and the 1994 Delphi VII forecasts. The price assigned to compact disc players has declined by $50 in each forecast. Active suspension, navigation systems and traction control have remained mostly the same in all three surveys. Collision-avoidance systems, valued at $400 in Delphi VI, fell to $200 in Delphi VII. It is interesting to note that the estimated prices of these features has stayed fairly even despite dramatic increases in vehicle costs.

### Strategic considerations

Collision-avoidance systems are thought to be the most "valuable" in terms of what consumers are willing to pay for them. This may be because an effective system could have value in a consumer's mind based on potential reduced insurance rates, prevention of lost time due to repairs and other costs avoided. It also enhances safety and security, important consumer concerns. Another "practical" feature, navigation systems, was valued significantly less by panelists. This might be because a navigation system would likely get less use than a collision-

avoidance system (which would engage anytime a vehicle is turned on or reaches a certain speed) or because consumers value an avoided accident more than not getting lost.

The remaining three features have already seen market exposure to varying degrees. Compact disc players and traction control systems are not uncommon. These two features can be found (or are at least available) in makes and models in all price ranges. Active suspension systems, however, are less common, and more typically found in higher range vehicles.

In one way or another, each of these items is an enhancement of existing features or capabilities. They improve performance or safety but many consumers may judge the improvement to be only marginal and not worth paying extra. Active suspensions may provide a smoother ride or better handling, but the improvement may not be worth the extra cost. Navigation systems are useful, but many cost-conscious consumers may be satisfied to unfold a map. With vehicle prices steadily increasing, the consumer will be more demanding of new features.

**MKT-49.** **"Green" marketing may create new opportunities. However, significant uncertainty exists regarding consumer priorities and perceived value. For each vehicle attribute, please estimate the highest passenger car cost increase which customers will allow while still permitting the capture of at least 25 percent of the midsized and midpriced market (approximately $18,000).**

| "Green" Marketing Attribute | Median Response | Interquartile Range |
|---|---|---|
| 40-mpg economy | $425 | $212/1000 |
| Zero emissions | 200 | 100/663 |
| 100% recyclability | 100 | 0/250 |
| Low-polluting vehicle manufacturing | 50 | 0/200 |

**Zero emissions**

- Consumer will resist unless government mandates zero emissions.
- Consumers are not willing to pay more for this.
- Consumers want clean cars but don't want to pay for them.
- I believe the customer will not pay for "green." Drivers must come from regulations or be self-initiated by manufacturer.
- Only if there is a corresponding savings (i.e., no emissions tests, less vehicle registration, etc.).
- While a small number would pay much more, very few would pay over this.

**100 percent recyclability**

- Customers assume companies have the burden of recyclability.
- Customers expect this, but will not pay for it.
- In general, I think people would be satisfied if you could recycle *most* of the car.
- Will not be perceived by the consumer as a benefit to them.
- Will require government mandate.

**Low-polluting vehicle manufacturing**

- Consumers won't pay a premium for a societal benefit. Will require regulation to accomplish.
- Manufacturer's problem rather than customer's.

**40-mpg fuel economy**

- 40-mpg fuel economy depends on fuel price.
- Assuming gas prices rise sharply and/or government mandates.

- Customer will voluntarily pay for this only if there is no sacrifice of space, performance or safety.
- Not in the next 10 years even if gas goes to $3.00/gallon.
- This has personal utility–customers will pay.

**Selected edited comments**

- Consumer must be able to closely relate to benefit to be willing to pay significant price for feature.
- Consumers will not want to pay for social benefits.
- Except for the "40-mpg fuel economy" there is no economical merit for user, so a small dollar amount could be increased.

**Discussion**

Panelists forecast that consumers will be willing to pay only a small price for environmentally responsible attributes. Higher fuel economy, though, is worth significantly more.

**Manufacturer/supplier comparison**

There is no statistically significant difference in responses between manufacturers and suppliers.

**Trend from previous Delphi surveys**

Panelists in the 1996 Delphi VIII survey generally agreed with panelists in the 1994 Delphi VII forecast. The exception is fuel economy, where the previous panelists forecast consumers would value 40-mpg economy less, at $300.

**Strategic considerations**

The conclusion from panelists' responses to this question is that consumers will not pay more for environmentally-friendly attributes that do not have a payback for them. The civic virtue of environmental responsibility does not carry much weight for buyers. Certainly the issue of the divergence of what is good for society and what is good for the individual citizen comes into play. While conscientious buyers may theoretically prefer zero emissions or 100 percent recyclability, they are not prepared to pay much for them. Any progress (or burdens, depending on the point of view) in automotive environmentalism has been made due to government intervention.

**MKT-50. Please forecast the total domestic and import U.S. passenger car market in percent of the following factory-installed comfort and convenience items in 2000 and 2005.**

| Comfort Features | 1993 MY* | Median Response | | Interquartile Range | |
|---|---|---|---|---|---|
| | | 2000 | 2005 | 2000 | 2005 |
| Air conditioning | 88.5% | 90% | 92% | 90/90% | 90/95% |
| Automatic climate control systems | 16.8 | 20 | 25 | 18/20 | 20/29 |
| Keyless entry | 13.6 | 20 | 30 | 15/25 | 20/40 |
| Sunroof | 18.8 | 20 | 21 | 19/20 | 20/25 |
| Leather interiors | 15.3 | 16 | 18 | 15/18 | 15/20 |
| Antitheft | 10.7 | 15 | 20 | 15/22 | 15/38 |
| Trip computers | 13.6 | 15 | 20 | 14/15 | 15/23 |
| CD players | 4.8 | 10 | 15 | 7/15 | 10/25 |
| Steering wheel-mounted controls | 4.0 | 6 | 10 | 5/10 | 6/20 |
| Car phone | 0.5 | 5 | 10 | 1/10 | 4/20 |
| Dual climate control systems | 3.0 | 5 | 8 | 4/7 | 5/10 |
| Incoming air filters | 1.5 | 5 | 7 | 2/9 | 3/20 |
| Telescopic steering columns | 0.5 | 1 | 2 | 0.9/2 | 1/5 |

* Source: Automotive News 1994 Market Data Book & Ward's Auto Reports & OSAT estimates

### Selected edited comments

- Obviously, pricing is the key factor in growth. Percentages given for steering wheel-mounted controls in conjunction with IVHS.
- Some of these technologies will be replaced by 2005.
- Trip computers will be replaced by navigation systems.

### Discussion

Panelists predict that some comfort features will enjoy significant increases in popularity over the next 10 years. Factory-installed antitheft systems are forecast to double in use by 2005, while keyless entry systems are expected to more than double. Car phones installed at the factory, with negligible installation rates in 1993, are anticipated in 10 percent of passenger cars by 2005.

### Manufacturer/supplier comparison

Manufacturers and suppliers are in general agreement except that suppliers believe that car phones will be installed in a greater percent of cars than do manufacturers. Suppliers forecast installation rates of 7.6 percent and 16.8 percent for 2000 and 2005, respectively. Manufacturers forecast rates of only 3.3 percent and 6.9 percent.

### Trend from previous Delphi surveys

Only a few of these comfort and convenience features were addressed in previous Delphi forecasts. The 1992 Delphi VI survey forecast a 20 percent installation rate for factory-installed car phones in 2000, much greater than this forecast's rate. The 1994 Delphi VII survey forecast very similar installation rates for air conditioning and CD players and somewhat less optimistic rates for sunroofs (17 percent in 2003).

### Strategic considerations

Some features will receive much greater acceptance in the future, others less. No installation rate is forecast to decrease in the future, an interesting finding in itself. It is difficult to categorize which features are likely to gain popular acceptance and which will not. Even so, given the emphasis on value by today's consumers, it seems likely that those features which offer conspicuous benefits and reasonable cost will grow in popularity.

Intriguingly, some of our respondents predict that new technology will overtake some of these features, either replacing them with something else or changing them considerably from their current form, proving again the rapid pace of technological change and the uncertainty it brings.

It has been mentioned elsewhere in this forecast but bears repeating: There may be a day of reckoning in the near future between rising vehicle prices and consumer spending priorities. If consumers continue to desire many features on their vehicles, they may start to buy smaller, lower priced, but highly-equipped cars in order to get the features they want at an affordable price.

**MKT-51. Consumers have become accustomed to many choices in tires and wheels. What trends for 2000 and 2005 do you see for tires and wheels?**

Scale: 1 = much more than in 1995 3 = about the same as in 1995
5 = much less than in 1995

| | Mean Rating | |
|---|---|---|
| **TIRES** | **2000** | **2005** |
| Water-shedding designs | 2.0 | 1.7 |
| Longer life | 2.1 | 1.7 |
| Self-repairing | 2.3 | 1.9 |
| Lower profile | 2.5 | 2.2 |

| | Mean Rating | |
|---|---|---|
| **WHEELS** | **2000** | **2005** |
| Aluminum | 2.1 | 1.9 |
| Styled steel | 2.6 | 2.6 |
| Chrome-plated | 3.0 | 3.0 |
| Wheel covers | 3.5 | 3.6 |

### Discussion

Tire design and technology continue to evolve. This forecast suggests that tires will increase in functionality in the coming years. Longer life treads and designs that grip slippery surfaces are expected to make the greatest gains, while lower profile tires are expected to achieve lower growth.

With wheels, wheel covers are forecast to decline and chromed wheels may have peaked in popularity. Aluminum wheels are forecast to make significant gains and styled steel wheels more modest gains.

### Manufacturer/supplier comparison

Manufacturers and suppliers are generally in agreement except that manufacturers predict greater usage than suppliers do for aluminum wheels by 2000. Manufacturers also believe that self-repairing tires will be used by 2005 more than suppliers do.

### Trend from previous Delphi surveys

The 1994 Delphi VII forecast used a different scale for its question about wheels, making comparisons difficult. However, that forecast predicted a slight decrease in the use of steel wheels by 2003 and a slight increase in the use of aluminum wheels.

### Strategic considerations

Tires play a critical role in the performance characteristics of the vehicle while wheels contribute to the appearance. Panelists believe that there is significant room for change and

improvement in tire design. Although they did not say so specifically, one might wonder what advances in truck tire design could be in the works as more people opt for sport utilities yet prefer the precise steering and handling characteristics of passenger cars.

Aluminum wheels will become more widely used, but so will heavier, less expensive styled-steel wheels.

**MKT-52a. What *exterior* styling changes do you anticipate by 2000 and 2005?**

**BY 2000**

- All new/major cars to be cab forward except selected sporty and luxury cars ("long hood"). Wheels-at-corners, strong stance.
- More complex shapes due to increased use of composite materials. Continued copying, especially in minivans, of GM's futuristic all purpose vehicle.
- More niche styling, more models, less value.

**BY 2005**

- Continue to decrease wind resistance; sleeker vehicle.
- I expect to see more vehicles look like the current all-purpose vehicle by 2005. More aerodynamic and sporty styling.
- More aluminum.

**MKT-52b. What *interior* styling changes do you anticipate by 2000 and 2005?**

**BY 2000**

- Continued increase in information technology.
- Electronics explosion.
- More ergonomic design with more intelligent layout of controls and more comfortable and adjustable seats.

**BY 2005**

- Designed for older drivers (adaptive interiors).
- More controls on steering wheel and more use of overhead projection.
- More electronically-controlled functions and high-tech look to instrument panel.
- Trends toward individualizing the interior to the driver and passengers.

**Discussion**

*Exterior:*

In the nearer term, panelists envision a broader use of the so-called "cab-forward" design architecture with its expanded passenger compartment. Greater variation in the smaller elements of design may be possible with greater use of composites. That will be useful in helping models that share platforms to differentiate their styling from platform siblings.

Further into the future, panelists predict greater use of aluminum, presumably for lighter weight, and even sleeker, more aerodynamic lines.

*Interior:*

Panelists predict interior designs that more easily conform to the driver's ergonomic needs. These designs will also provide more information to the driver through the use of electronics-based features.

**Manufacturer/supplier comparison**

This comparison is not made for open-ended questions.

**Trend from previous Delphi surveys**

This question was not asked in any previous Delphi survey.

**Strategic considerations**

The way a vehicle looks, both inside and out, is still an important consideration in the purchase of a new car or truck. Fuel economy demands have dictated a period of aerodynamic styling that has left some buyers accusing manufacturers of building "look-alike" vehicles.

Future competitive battles for customers may rely more heavily on vehicle design. There may be significant opportunity for fresh styling approaches as customers tire of the "jelly bean" aerodynamic design of many current vehicles. Other styling innovations may occur in trucks as they adopt more car-like styling to match their car-like features and amenities.

Styling is probably a greater issue for multibrand manufacturers like GM, Ford and Chrysler. These companies have often had several marketing divisions sharing the same platform and therefore have a strong need to be able to differentiate the appearance of vehicles off the same platform. A renewed emphasis on brand image, particularly at GM suggests that making models seem different from each other (a strong component of which would surely include *looking* different from each other), will be getting a great deal of attention. Some of that differentiation will come from styling. Of course pricing, availability of options, and other factors help manufacturers differentiate like models from each other, too.

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**MKT-53. "Partnering" is a popular term used to describe future manufacturer/supplier relationships. However, there is no common definition of "partnering." From your viewpoint, what are the five most critical concepts, characteristics or features of "partnering"?**

| The following responses are ranked in order of frequency | Percent of respondents who cited this attribute |
|---|---|
| Confidence/trust/honesty/mutual respect | 39% |
| Long-term commitment/contract | 22 |
| Aligning goals and strategies | 20 |
| Shared risks and rewards | 17 |
| Open/good communication | 16 |

**No comments**

**Discussion**

Panelists mentioned a number of partnership attributes that they find most critical to its success. They cited trust, honesty and mutual respect as most important. Other important characteristics include having a long-term outlook on the relationship, matching each partner's goals and strategies, and sharing risks and rewards. Finally, open communication is important in conducting an effective partnership.

**Manufacturer/supplier comparison**

This comparison is not made for open-ended questions.

**Trend from previous Delphi surveys**

The previous two Delphi forecasts cited the same attributes as this one, albeit in different order. Panelists in the 1994 Delphi VII forecast cited commitment and well-defined and equal sharing of responsibilities as the most important considerations. Panelists in the 1992 Delphi VI forecast identified common goal determination, facets of which include better communication and exchange of information.

**Strategic considerations**

The North American auto industry is in the midst of a major restructuring of its supply base. Manufacturer-supplier relationships and interaction that worked in the past may no longer be competitive. A more competitive marketplace in North America, sometimes greater numbers of competitors, a successful Japanese manufacturer/supplier system that seems to emphasize long-term relationships over short-term gains, as well as other things, all point to a need to re-examine traditional relationships, improving what works and eliminating what does not.

Manufacturers seem to be taking the lead by reducing the number of suppliers they work with and asking more from those suppliers. Potentially, both manufacturers and suppliers will gain as cooperation and trust increase. Manufacturers will have suppliers who are willing to commit to long-term improvements, such as reducing cost or increasing quality. Suppliers will work more

closely with their customers, earlier on in a project and possibly with a higher level of cooperation and concern.

All of the attributes that panelists cite for building strong partnerships seem to require long-term relationships. Building trust and mutual respect takes time. If partnering is seen as truly beneficial to the conduct of business in the auto industry, then it would follow that manufacturers should choose suppliers based on long-term factors. With short-term, price-based relationships, manufacturers may lose the benefits that come from having true partnerships. Combining the benefits of price-based and partnership approaches is a challenge. Ultimately, the kinds of attributes panelists cite for effective partnerships emphasize the "soft" people skills that can be the most difficult to incorporate into business behavior.

**MKT-54. What do you believe are the five major issues and long-term strategic considerations underlying outsourcing decisions, both manufacturing and design/engineering, by the major U.S. vehicle manufacturers?**

| The following responses are ranked in order of frequency | Percent of respondents who cited this attribute |
|---|---|
| Lower costs/pricing | 51% |
| Competence of supplier | 28 |
| Access to expertise/technology | 21 |
| Enhance global competitiveness/presence | 16 |
| Quality | 13 |

**No comments**

**Discussion**

Panelists told us that, overwhelmingly, lower costs and/or better pricing are the major reasons for a manufacturer to outsource. That is followed by the supplier's competence—presumably his ability to do something as well or better than the assembler. Next, and related to the previous characteristic, is access to technology or expertise. Increasing global competitiveness ranks fourth. Finally, quality is considered among the fifth most important reason for outsourcing.

**Manufacturer/supplier comparison**

This comparison is not made for open-ended questions.

**Trend from previous Delphi surveys**

Panelists from the previous Delphi forecast agree with the observations of the current Delphi panel for the two most important outsourcing considerations: cost and competency. The 1994 Delphi VII forecast, though, includes the importance of labor commitments and time savings in the top five reasons. It does not include global presence. Delphi VII ranks quality sixth.

**Strategic considerations**

There are a number of reasons why an automobile manufacturer might outsource the design and/or the manufacture of components. Under increasingly competitive market and business conditions, manufacturers are questioning the wisdom of doing certain aspects of design and manufacture that might be more effectively or efficiently done outside. The advantages of outsourcing can include obtaining lower prices and better technology, using scarce resources on other projects, maintaining a lean staff, avoiding duplication of efforts (vis-à-vis suppliers) and others.

Panelists most frequently cited obtaining lower costs as a major reason for outsourcing. Some manufacturers may find that their internal costs are greater than those of outside suppliers. For example, GM probably faces higher labor costs than outside companies who build the same products their component divisions do. All manufacturers, though, are pressured to reduce costs in order to maintain profit margins in an increasingly price-conscious marketplace.

Some vehicle manufacturers determine that suppliers can develop, design or build something better than they can. Large suppliers have their own research and development facilities and are frequently the source of innovative products. Manufacturers perform R & D also, but in some respects this distracts them from their primary focus on the vehicle as an entire system. While the manufacturer may recognize the need for, say, better braking systems, a brake supplier might be better equipped to develop that better system. Therefore, it makes sense to source to the supplier with proven competence and expertise.

Global competitiveness and high quality standards are also important considerations to the manufacturer who considers outsourcing. The increasingly global market demands that manufacturers who build all over the world have suppliers who can supply their plants effectively and efficiently. Those suppliers must be able to maintain quality standards appropriate to the markets their customers sell in.

That manufacturers are so willing to consider outsourcing suggests great changes in the supplier community. Suppliers who are willing to take on responsibility, demonstrate expertise and initiate innovation and quality improvements, as well as effectively manage costs, stand to gain business. Suppliers waiting to be told what to do, or who want to just "build to print" may find themselves without loyal customers. Suppliers who are looking for new business should carefully consider the results of this question.

Outsourcing responsibility for components or systems is part of a larger change in focus in the industry. Vehicle manufacturers are returning to their core competencies and want to use their resources in ways that have the greatest effect. That means identifying those attributes of the vehicle where competitive differentiation is possible and achievable, whether it is in vehicle styling, engine design or marketing and distribution. These are the things customers notice or which improve customer satisfaction.

**MKT-55. Purchasing criteria priorities change over time. Given the following criteria, please indicate the importance to North American vehicle manufacturer purchasing activities today and in 2000 and 2005.**

SCALE: 1 = most important 3 = moderate importance 5 = least important

| Purchasing Criteria | 1995 Ranking | 2000 Ranking | 2005 Ranking |
|---|---|---|---|
| Price | 1.5 | 1.7 | 1.8 |
| Quality performance/rating | 2.0 | 1.6 | 1.6 |
| Delivery performance | 2.1 | 1.8 | 1.7 |
| Manufacturing competence | 2.2 | 1.7 | 1.5 |
| Engineering competence | 2.4 | 1.7 | 1.5 |
| Supplier's long term relationship with customer | 2.9 | 2.3 | 1.9 |
| Effective management of supplier's supply base | 3.3 | 2.4 | 2.0 |
| Availability of modular assemblies | 3.4 | 2.4 | 1.8 |
| Effective management of supplier human resources | 3.4 | 2.8 | 2.5 |

**Selected edited comments**

- Emphasis on price must be replaced by value analysis.
- OEMs continue to expect more and more from the supply base. The reward to the supplier is a more stable relationship.
- Suppliers are growing in importance and talent relative to car companies. Some of them may even decide they can do niche markets.

**Discussion**

The above attributes are listed in ascending order based on 1995 ratings of importance. In 1995, price is forecast to be the most prominent purchasing criterion. Price is followed by quality, delivery performance, manufacturing competence and engineering competence. The remaining attributes and their "importance" ratings are shown in the table.

Despite its importance today, price may become slightly less important in the future, especially relative to other criteria. All other criteria, to varying degrees, will become more important tomorrow than they are today. Notably, modular assemblies, not considered especially important to today's purchasing staffs, will become much more important in the future, though they do not eclipse other criteria.

### Manufacturer/supplier comparison

Manufacturers and suppliers generally agreed on the level of importance assigned to vehicle manufacturer purchasing criteria. Where they disagreed was in quality performance/rating, where manufacturers ranked this higher in importance than did suppliers for all three years. Nevertheless, both groups agree that this criterion will be more important in the future than it is now.

### Trend from previous Delphi surveys

The forecast from the 1994 Delphi VII forecast (for 1994 and 1998) was nearly identical in ranking these attributes. The absolute "importance" ratings were also similar, and the slight differences that did occur are not statistically significant.

### Strategic considerations

Although price is today the most important purchasing criterion, it becomes relatively less important in the future as manufacturers increasingly consider other attributes as important. There is a wide range of ratings for various attributes today, but these ratings converge considerably in the future. By 2005, eight of these attributes cluster between 1.5 and 2.0, about the same level of importance. This has important implications for suppliers who are trying to manage their own resources and improve on areas where they are weak while maintaining their strengths. Panelists are saying that manufacturers want across-the-board improvements. That could be very taxing for smaller companies with fewer resources. For example, it takes a significant amount of time and money to meet ISO 9000 quality standards. At the same time, vehicle manufacturers have generally stated that they want to have fewer suppliers. For all these reasons, expect to see fewer suppliers in the auto industry in the next 10 years.

It is important to note that not all vehicle manufacturers value each of these criteria equally. General Motors, for example, may focus more on price than does Chrysler, who seems to expect a broader range of performance from its suppliers. Similarly, not all suppliers need to address the same issues to meet future purchasing criteria. Some may need to focus on quality issues, some on manufacturing competence or engineering expertise.

Tier 1 suppliers are likely to make changes first, but they will probably not be able to meet new vehicle manufacturer expectations without cooperation from their own suppliers. Consequently, indirect or lower tier suppliers will need to be prepared to change but perhaps not in ways identical to suppliers who supply the vehicle assemblers directly.

**MKT-56. There is debate regarding increased OEM requirements for suppliers without direct OEM compensation. Please indicate your belief that the OEMs currently possess adequate techniques for supplier evaluation and that the OEMs are adequately compensating suppliers for these activities.**

SCALE: 1 = strongly agree 3 = neither agree nor disagree 5 = strongly disagree

| Supplier Attributes | OEMs Adequately Evaluate | OEMs Adequately Compensate |
|---|---|---|
| Proven functional technologies | 2.6 | 3.4 |
| Design/engineering expertise | 2.8 | 3.6 |
| Core competencies | 3.0 | 3.6 |
| Continuous improvement | 3.1 | 3.7 |
| Flexibility | 3.1 | 3.7 |
| End-user knowledge | 3.2 | 3.5 |
| Global coordination | 3.2 | 3.6 |
| Price/value | 3.2 | 3.8 |
| Life-cycle management | 3.5 | 3.7 |

**Selected edited comments**

- The responses would be dramatically different if the questions were specific to an OEM.
- In general the OEMs do not appreciate, know and evaluate properly or compensate suppliers for their full service capabilities or contributions.
- OEMs talk about many things from top managers' perspectives, but rarely do their policies and beliefs get implemented at the "worker bee" buyer/engineer level. Bring new technology: no time, no budget, too risky, wait until someone else has it in production. Late program releases for no good reason, then make the supplier find a way to make up the lost time at no cost to the OEM.
- The process is still very political. Image is more important than reality. The first line management at OEMs understand suppliers capability, but are not listened to by senior management.

**Discussion**

For the first part of the question, panelists are generally neutral about OEM ability to evaluate suppliers, although they tend to disagree that OEMs adequately evaluate the suppliers' life-cycle management. On technical issues, panelists slightly agree that the OEMs are capable at evaluating supplier performance.

In the second part, panelists tend to somewhat disagree that OEMs adequately compensate suppliers.

**Manufacturer/supplier comparison**

Manufacturers and suppliers generally agree that the OEMs adequately evaluate suppliers for these performance and capabilities attributes. However, they disagree on whether OEMs adequately compensate suppliers for their performance and expertise. In five of the nine attributes, suppliers and manufacturers disagreed about the adequacy of compensation. Because the differences between manufacturers and suppliers are particularly important in this question, the table below summarizes the responses. Responses that are statistically different, or where one group agrees and the other group disagrees, are shaded.

Scale: 1 = strongly agree 3 = neither agree nor disagree 5 = strongly disagree

| Supplier Attributes | OEMs Adequately Evaluate | | OEMs Adequately Compensate | |
|---|---|---|---|---|
| | Manufacturers | Suppliers | Manufacturers | Suppliers |
| Continuous improvement | 2.4 | 3.2 | 2.6 | 3.9 |
| Core competencies | 3.0 | 3.0 | 3.3 | 3.7 |
| Design/engineering expertise | 2.8 | 2.8 | 2.7 | 3.7 |
| End-user knowledge | 3.2 | 3.2 | 3.1 | 3.6 |
| Flexibility | 3.1 | 3.2 | 3.0 | 3.8 |
| Global coordination | 3.4 | 3.2 | 3.2 | 3.7 |
| Life-cycle management | 3.5 | 3.5 | 3.4 | 3.8 |
| Price/value | 2.6 | 3.3 | 2.5 | 4.0 |
| Proven functional technologies | 2.4 | 2.7 | 2.5 | 3.5 |

**Trend from previous Delphi surveys**

This question was asked in Delphi VII. Panelists in this survey generally agree with the responses of panelists in Delphi VII. There are two exceptions. The first is that the more recent panel slightly agrees that suppliers are adequately evaluated on their proven functional technologies, while the earlier panel neither agreed nor disagreed (2.6 versus 3.0). The second is that the newer panel disagrees that suppliers are adequately compensated for their flexibility (3.7 versus 3.2).

The nature of this question makes it necessary to examine separately changes from the previous forecast for manufacturers and suppliers. Manufacturers remain largely consistent from forecast to forecast. They change their views in a few instances, though. For one, they feel a bit more strongly that they adequately evaluate suppliers on continuous improvement (2.4 versus 2.7). This contrasts with the switch by suppliers from mild agreement to mild disagreement on that subject (2.8 versus 3.2). Lastly, manufacturers still agree that they adequately compensate suppliers for price/value, only less so than in the 1994 Delphi VII (2.5 versus 2.0).

In regard to adequate evaluation, suppliers mostly agree in this forecast with responses from the previous one, except on the issue of continuous improvement mentioned above. On

adequate compensation, they disagree more strongly, to varying degrees, with the premise stated in the question. They feel most strongly that they are undercompensated for their price/value (4.0).

**Strategic considerations**

While panelists generally agree that OEMs can adequately evaluate suppliers for their competencies and performance, they tend to disagree that suppliers are adequately compensated. The issues of evaluation and compensation are important because the structure of the auto industry value chain is changing, and manufacturers are looking for heightened levels of performance from suppliers. Operating at these higher levels and taking on responsibility for functions the OEM used to perform, require new procedures, new processes, new costs and even a higher level of risk than in the past. It is necessary, therefore, that OEMs be able to judge how well suppliers perform and to compensate them for their performance.

That panelists responded neutrally about supplier evaluation is revealing because it says that OEMs have some work to do with regard to this facet of purchasing. The neutral response suggests that OEMs are doing neither a good nor a bad job evaluating suppliers, which is not particularly flattering. The moderate disagreement with the "adequately compensates" premise suggests even more work may need to be done between OEM and supplier in order to reach an understanding about compensation issues. This latter is especially important as suppliers take on even more responsibilities, and compensation becomes a more contentious issue.

**MKT-57. Considering the next 10 years, please identify the changes in value-added by each industry participant you expect at each functional stage.**

SCALE: 1 = value-added sharply increasing 3 = remains the same
5 = value-added sharply declining

| Changes in Value-Added | Design | Product Engineering | Manufacturing | Assembly |
|---|---|---|---|---|
| **Vehicle Assembly** | | | | |
| Vehicle manufacturer | 3.1 | 3.4 | 3.2 | 2.9 |
| 1st tier supplier | 2.0 | 1.9 | 2.3 | 2.2 |
| 2nd tier supplier | 2.6 | 2.4 | 2.6 | 2.9 |
| Engineering service firm | 2.6 | 2.5 | 2.8 | 2.9 |
| **Powertrain** | | | | |
| Vehicle manufacturer | 2.8 | 2.8 | 2.9 | 2.8 |
| 1st tier supplier | 2.3 | 2.1 | 2.4 | 2.5 |
| 2nd tier supplier | 2.7 | 2.6 | 2.7 | 2.8 |
| Engineering service firm | 2.7 | 2.7 | 2.9 | 3.0 |
| **Electronics** | | | | |
| Vehicle manufacturer | 3.1 | 3.2 | 3.4 | 3.3 |
| 1st tier supplier | 1.8 | 1.7 | 1.9 | 2.0 |
| 2nd tier supplier | 2.4 | 2.3 | 2.4 | 2.4 |
| Engineering service firm | 2.7 | 2.7 | 2.9 | 2.9 |
| **Interior** | | | | |
| Vehicle manufacturer | 3.3 | 3.5 | 3.7 | 3.5 |
| 1st tier supplier | 1.8 | 1.8 | 1.8 | 1.9 |
| 2nd tier supplier | 2.4 | 2.4 | 2.4 | 2.5 |
| Engineering service firm | 2.7 | 2.6 | 2.9 | 3.0 |

### Selected edited comments

- As the result of acquiring the design-in development, suppliers will more and more add value in design and product engineering areas.
- Manufacturers are getting smaller, losing expertise or outsourcing in most areas.
- OEMs will move toward more system integration function, but they will retain control of vehicle design and powertrain technologies.

### Discussion

Panelists identify a number of areas where there will be shifts in responsibility within the value chain. Overwhelmingly, panelists predict that first tier supplier's value-added will increase in all four functional areas of vehicle assembly and components. In Electronics and Interior

components, second tier suppliers are also expected to add more value than they do presently. In some cases, the increasing value of the suppliers' contribution may be offset by a diminishing contribution from the vehicle manufacturer. However, for Powertrain, all four participants are predicted to maintain their current level or add increasing value.

**Manufacturer/supplier comparison**

Manufacturers and suppliers generally agree on most of the value-added changes. There are a few exceptions though. For engineering of the powertrain, manufacturers predict that the vehicle manufacturer will have moderately declining value-added while the suppliers predict vehicle manufacturers will have moderately increasing value-added.

**Trend from previous Delphi surveys**

This year's panel has not substantially changed its view from Delphi VII's panel, although there are several exceptions. This year's panel expects that the second tier supplier will provide more product engineering value to the vehicle assembly process and to electronics components than it did in the past. The panel believes that the second tier suppliers will have a significantly increasing share of value-added in the future. Finally, the newer panel has changed from the older panel by predicting that the first tier supplier's assembly contribution will significantly increase, not stay the same, and the engineering service firms assembly contribution will stay the same, not significantly increase.

**Strategic considerations**

Panelists forecast a shift in value-added away from the vehicle manufacturer to the supplier. What is driving this transition? Probably the most fundamental factor is cost. Vehicle assemblers want to rid the value chain of excess costs, many of which reside at the vehicle manufacturers themselves. Many functions and processes that the assembler performs now could be done at a supplier at a lower cost, including research and development of new components and then manufacture of these components. In addition, the assembler sometimes duplicates the efforts of the supplier, particularly in developing standards and specifications for components, along with post-production validation. Another is technical expertise. Many suppliers, especially large, traditionally first-tier ones, have extensive R & D capability and are often the source of new technology. In some cases, they may be better placed to develop such innovations than the assembler. Another is organizational "leaning". It is simply more cost-effective to purchase outside talent or expertise sometimes than to maintain a full-time staff for sporadic effort.

Individual vehicle manufacturers will likely have differing needs or desires when transferring responsibilities to suppliers. Beyond the cost or expertise considerations mentioned above, they are likely to want to keep the components or processes that they believe differentiate their products from competitors' and which they believe are most noticeable by consumers. At the same time, they will want to outsource those same things that are not crucial to vehicle differentiation. For example, rhetoric in the media suggests that most manufacturers view their powertrains as differentiable components. Therefore, their control or value-added in those components is not likely to diminish.

As responsibilities shift, so too may assets and people, as well as profitability. It is possible that first tier suppliers may attract engineers from both vehicle manufacturers and from lower tier suppliers in an effort to meet their expanding role in the value chain. This could be a source of friction if the first tier is perceived as robbing the other tiers of engineering talent. However, it could also be a logical destination for engineers at the vehicle assemblers who work on components that get outsourced. Similarly, there is concern regarding profitability and the valuing of additional

services done by suppliers. If outsourcing is a mutually-beneficial action that serves to enhance efficiencies in the value chain, then it can succeed. On the other hand, if it is merely an attempt by vehicle assemblers to shift their costs to suppliers, without benefit to those suppliers, then it may fail. The short-term gain by assemblers could result in a long-term disadvantage, such as the future unavailability of the uncompensated supplier. Because import as well as domestic manufacturers build vehicles in North America, suppliers now have access to a larger number of potential customers and more leeway to pick and choose among them. They may choose to work with vehicle manufacturers who value outcomes that benefit themselves and their suppliers.

Ultimately, intensified competition in the North American market has caused manufacturers to focus on their core competencies in order to succeed. This raises questions about strategies like high vertical integration, or being a jack-of-all-trades. While the vehicle assembler may still need to define what the vehicle does or how it behaves, the components that accomplish this often can be designed by someone else, particularly if their function or purpose is largely invisible to the customer. Many components simply need not originate within the vehicle assembler.

## DEFINITIONS

**FOREIGN NAMEPLATES** Refers to all non U.S.-headquartered vehicle manufacturers or dealership networks of production location (i.e., Honda's U.S. production should be combined with its import vehicles).

**LIGHT TRUCK** Includes sport utilities, vans and pickup vehicles.

**NORTH AMERICAN-PRODUCED PASSENGER CARS AND LIGHT TRUCKS** Refers to all vehicles produced in the United States and Canada.

**TRADITIONAL DOMESTIC OR BIG THREE** Refers to all U.S.-headquartered (parent company) manufacturers or dealership networks regardless of production location (i.e., forecast for General Motors should include NUMMI-produced Prizms and imported Metros).

**Note:** "year" refers to Model Year unless otherwise specified.(This page intentionally left blank)

## KEY WORD INDEX

| Key Words | Question Number | | |
|---|---|---|---|
| | Marketing | Technology | Materials |
| ABS(plastic) | - | - | 16,40 |
| ABS(brakes)--see Brakes, antilock | | | |
| AC compressor | - | 80 | - |
| Accessory drive | - | 4,9 | - |
| Acetal | - | - | 16 |
| Acrylic | - | - | 16,37 |
| Active engine mounts | - | 34 | - |
| Advanced features | 48 | - | - |
| Aerodynamics | - | 4,9 | - |
| Affordability | - | 14,16,35 | 10,31,33,40,44 |
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| Airbags | - | 50 | 40 |
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| Key Words | Question Number | | |
|---|---|---|---|
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| Cylinder heads & blocks material | - | 61a,b | 15,20,21a,b |
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| Electronic | - | 9,72,73,77,81,83 | - |

| Key Words | Question Number | | |
|---|---|---|---|
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| Lean NOx trap | - | 65 | - |
| Legislation | 6,9 | 13,14,15,16,43 | 3,4,6,7,32,38,44 |
| Lift control | - | 60 | - |
| Lightweight materials | - | - | 5,9,12,15,17,18,20,22, 23,28,29,32,33,34,36, 40,43,44 |
| Lithium-polymer | - | 35 | - |

| Key Words | Question Number | | |
|---|---|---|---|
| | Marketing | Technology | Materials |
| Loans | 15,16,17 | - | - |
| Magnesium | - | - | 5,10,12,13,15,17,18, 22,28,33,36,40,41,44 |
| Maintenance | 23 | - | - |
| Manufacturing | 1,5 | - | 5,7,8,22,23,26,28-32, 35,38,41,44 |
| Market segments | 13,32 | - | - |
| Market share | 32,33 | - | - |
| Market structure | 4 | - | - |
| Materials | - | 10,43 | - |
| Materials change | - | 38 | - |
| Message system | - | 51 | - |
| Metal matrix composite | - | - | 21b,22,35,40,44 |
| Metal substrate | - | 64 | - |
| Miller cycle | - | 34 | - |
| Modle niches | 8 | - | - |
| Motors, electric | - | 79,80 | - |
| Multiplexed | - | 74,75 | - |
| Nameplate offerings | 4 | - | - |
| Natural gas | 42 | 11,12 | 4 |
| Navigation | - | 51 | - |
| Nickel-cadmium | - | 35 | - |
| Nickel-hydride | - | 35 | - |
| Nodular iron | - | - | 35 |
| Noise cancellation | - | 81 | - |
| NOx catalyst | - | 63 | - |
| Nylon | - | - | 16,18 |
| Occupant restraint | - | 14,15 | - |
| Oil pan | - | 67 | 17,22 |
| Outsourcing | 54 | - | - |
| Owner loyalty | 22 | - | - |
| Ownership | 19,26,35 | - | - |
| Paint | - | - | 9,18,27,31,38-40,44 |
| Particulate controls | - | 65 | - |
| Parts | - | 23,24 | - |
| PC/PBT | - | - | 16 |
| Performance | - | 20 | 28,40,44 |
| Phenolic | - | - | 16 |
| Piston | - | 67,68 | 18,22,23,28,35 |
| PNGV (Partnership for a New Generation Vehicle) | - | 7,8,9,10 | - |
| Political trends | 1 | - | - |
| Polycarbonate | - | - | 16,34 |
| Plastic/composite | - | 38,39,40,67 | 5,7,9,15,16,18,19,22, 25-28,30-36,39-44 |
| Platforms | 29 | 19 | 5,29 |
| Polyester elastomer | - | - | 16 |
| Polyester thermoplastic | - | - | 16 |
| Polyester thermoset | - | - | 15,16 |

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| | Marketing | Technology | Materials |
| Polyethylene | - | - | 16 |
| Polymer based | - | 38,67 | - |
| Polypropylene | - | - | 15,16,18,19,40 |
| Polyurea | - | - | 16 |
| Powdered metal | - | 38,62 | 15,21b,22,24 |
| Powertrain material applications | - | - | 5,10,12,18,24,28 |
| PPO/nylon | - | - | 16 |
| PPO/styrene | - | - | 16 |
| Prices | 13,14,25 | - | 11 |
| Procurement | 55 | - | - |
| Product design | - | 21,22 | - |
| Product liability | - | 14,15 | 6 |
| Production, volumes | 5,36,37,38 | - | - |
| Production development | 27a,b,28 | - | - |
| Production process | - | 10 | - |
| Propane | - | 11,12 | 4 |
| Push rod | - | 55,62 | - |
| PVC | - | - | 16,40 |
| QRD | - | 20,37 | 28,31,40 |
| Quality | 23 | - | |
| Recyclability | 49 | 43 | 5,7,8,16,31,40-44 |
| Redesign | 29,30 | 56 | 12,20 |
| Reformulated gasoline | - | - | 2 |
| Regionalization | - | 14,16 | - |
| Regulation | 6,9 | 13,14,15,16,17,43 | 3,5-8,16,35,38,42,44 |
| Repair | 19,21,22 | - | 9 |
| Research consortia | 7 | - | - |
| Retail prices | 13 | - | - |
| Retail sales | 18,30,31 | - | - |
| Ride and handling | - | 20 | - |
| Ride/handling | - | 47 | - |
| Roller lifters | - | 62 | - |
| Rolling/resistance | - | 4,9 | - |
| Rubber | - | - | 15 |
| Safety | 7,24,25 | 20 | 5,6,8,28,31,33,36,40, 44 |
| Sales | 2,5,18,30,32,33,34 | - | - |
| Sales personnel | 19,22 | - | - |
| Sales procedures | 19,22 | - | - |
| Seals | - | 68 | 23 |
| Selection criteria materials | - | - | 8,22 |
| Selling | 18,19 | - | - |
| Service | - | 83 | 19,28 |
| Sharing | - | 19 | - |
| Skills | - | 84,85 | - |
| SMA | - | - | 16 |
| Social factors | 2 | - | - |
| Spark plugs | - | 59 | - |

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| | Marketing | Technology | Materials |
| Springs | - | 46 | 33 |
| Stainless Steel | - | - | 22,27 |
| Standardization | 7 | 32 | - |
| Standards | - | 14,15 | - |
| Start-up catalyst | - | 64 | - |
| Steel | - | 38,39,40 | 5,8,9,15,16,18,29,31, 32,33,35,36,41,42 |
| Steering | - | 47,80 | 17-19,40 |
| Strategic planning | 1 | - | - |
| Stratified charge | - | 34 | - |
| Styling | 22,29,30,52a,b | - | - |
| Sub-assemblies | - | 23,24,25 | - |
| Supercharged/ Supercharger | - | 58,4 | - |
| Suppliers | 53-57 | - | - |
| Suspension | 43,48 | 46 | 5,15,18,20,33,40 |
| Systems engineering | - | 33 | - |
| Taxes | 9 | 1,12 | 1 |
| Technology leadership | - | 30 | - |
| Thermoplastic | - | - | 9,15,18,31,32,33, 40-42,44 |
| Thermoset | - | - | 9,15,16,18,31,32,42,44 |
| Tires | 51 | 4,9,49 | 7,15,20 |
| Titanium | - | - | 18,40 |
| Toll collection | - | 51 | - |
| Tooling | - | 26 | 5,9,25,31,40 |
| Torte liability | - | 17 | - |
| TPO | - | - | 8,15,16,40 |
| Traction control | 44,48 | 48 | - |
| Trade | 39,40,41 | 17 | - |
| Transaction prices | 14 | - | - |
| Transmission | - | 4,72,69 | 17-19,24,25,28 |
| Transverse | - | 70 | - |
| Trends | 1,2 | - | - |
| Truck attributes | 11,12,25 | - | - |
| Turbocharger | - | 4,58 | 23 |
| Two-stroke engine | - | 34 | - |
| Urethane | - | - | 16,18,37,40 |
| Value of 1 mpg improvement | - | 6 | 14 |
| Value of pound saved | - | 42 | 13 |
| Valve covers | - | 67 | 18 |
| Valves per cylinder | - | 54 | - |
| Valvetrain | - | 55,60,68 | 23,24 |
| Vehicle attributes | 10-12,25,48 | - | - |
| Vehicle demand | 2,31 | - | - |
| Vehicle features | 50 | - | - |
| Vehicle integrity | - | 14,15 | - |
| Vehicle production | 5 | - | - |

| Key Words | Question Number | | |
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| | Marketing | Technology | Materials |
| Vehicle servicing | 19,21,23 | 83 | - |
| Vehicle use | 26 | - | - |
| Vinylester TS | - | - | 16 |
| Voice activated | - | 77 | - |
| Voltage, system | - | 78 | - |
| Water pump | - | 80 | - |
| Weight reduction/weight | - | 4,5,9,41,42 | 5,7-9,12-14,16,18,40, 44 |
| Wheels | 51 | - | 17,18,33,36 |
| Wrist pins | - | 68 | - |
| Zinc | - | - | 15,18,41 |