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MATERIALS

ERRATUM

Please note that the heading of Volume 1: "Marketing Delphi IV Forecast and Analysis of the U.S. Automotive Industry Through 1995" should read "Marketing Final Edition" and not "Marketing Final Draft."

April 1987

**DELPHI IV FORECAST AND ANALYSIS
OF THE U.S. AUTOMOTIVE INDUSTRY THROUGH 1995**

MARKETING

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FOREWORD

INTRODUCTION TO THE STUDY

Delphi IV is a detailed presentation and analysis of data provided by three separate panels of automotive executives, managers, and engineers who are expert in technology, materials, and marketing. This report, published in three volumes, is the fourth in a series of in-depth studies of long-range automotive trends that began with Delphi I in 1979 and continued with Delphi II in 1981 and Delphi III in 1984.

We have performed the functions of data collection, data reduction, editing, and reporting, and analyzed the results. However, we emphasize that the forecasts are not ours but those of the participants. This is a consensus industry forecast of itself—and many of the experts are in positions where they can make their forecasts come true.

We take pride in our efforts to report Delphi IV forecasts, but no credit. The honor goes to the executives, managers, and engineers who provided them. Because of their source, we consider these to be the most authoritative and dependable automotive forecasts available.

THE DELPHI METHOD

General Background

This study is based on the Delphi forecasting process, in which panels of experts consider the issues under investigation and make predictions about future developments. Developed for the U.S. Air Force by the Rand Corporation, Delphi is a systematic, iterative method for forecasting based on independent inputs from a group of experts. Its objective is to measure the degree of consensus among a panel of experts regarding future events.

The Delphi method relies on the judgment of knowledgeable experts. This is a strength (in contrast to purely numerical projections) because predictions that require policy decisions are strongly influenced by personal preferences and expectations, in addition to more quantitative factors. The Delphi results reflect these personal factors. The respondents whose opinions are recorded in this report are often in a position to at least partially make their predictions come true. Even if they are moving in a direction that subsequently turns out to be mistaken, the primary concern is to learn what that direction is.

Process

The Delphi method uses repeated rounds of questioning (accompanied by the responses of peers to earlier rounds) to take advantage of grouped inputs while avoiding biasing effects so often typical of 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 discussion. 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 the 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 interests, 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. (cf. Norman C. Dalkey, "The Delphi Opinion." Memo RM-5888 PR, p. 14, Rand Corporation, 1969).

Panelists

In the Delphi method, panelists are not made known to each other. Their anonymity prevents attaching a specific opinion to any individual. Among other advantages, this enables respondents to feel comfortable in revising their previous opinion after seeing new information submitted by other panelists. All participants are encouraged to comment on their own forecast and on group results, and that information is furnished the participants in the next round. The procedures reduce the effects of personal objectives (such as the desire to win an argument) and help the panelists to remain focused on the question, positions, and comments at hand.

Presentation of Results

Numerical results are shown as medians, a measure of central tendency that mathematically summarizes an array of judgmental opinions while discounting extremely high or low estimates.

Uncovering differences of opinion is one of the major strengths of the Delphi method. Unlike some survey methods, where differences of opinion among experts are buried in averages, Delphi exposes such differences through the presentation of the Interquartile Range (IQR). A lack of consensus so demonstrated is little comfort to an individual or firm looking for planning guidance, but it is better to know the truth than to be misled.

Sample Size

Delphi surveys are undertaken with sample sizes that may appear small when compared to the relatively large numbers needed to provide accurate results in a probability sampling of an extensive universe. Delphi is by design not a random technique, however, and should not be assessed with the measures used to evaluate probability surveys. Delphi respondents are carefully selected, not chosen at random, and the universe of qualified automotive respondents is so relatively small that our sample approaches a census.

PANEL CHARACTERISTICS

The heart of a Delphi survey is the careful selection of expert respondents. Neither the Delphi process nor any other research method will result in meaningful predictions unless contributors are truly expert. The selection of such experts for the Delphi survey is made possible by close ties of long standing between University of Michigan faculty and staff and representatives of the automotive industry. The opinions of more than 225 experts in the automotive industry are the basis of this Delphi IV forecast.

Lists of prospective expert panelists were developed: one each for Marketing and Materials, and three for Technology (Body/Chassis, Powertrain/Drivetrain, and Combined). Each prospect was evaluated by a committee of persons with long experience and wide contacts in the automotive industry. Many of the panel members are known personally by one or more members of the committee. Panel members were selected who occupy an automotive industry position dealing with the topic being surveyed and are known to be deeply knowledgeable and broadly experienced in the subject matter.

Panels include some respondents employed with motor vehicle manufacturers and others working for their suppliers of components, parts, and materials. It is common within the industry and convenient here to refer simply to "manufacturers" and "suppliers."

Panel members and their replies are kept anonymous. However, panelists were asked to mail in a business card to enable us to send them follow-up questionnaires. These cards were used to determine the following panel characteristics: Approximately 25% of the Technology panelists were presidents or vice presidents; 40% were directors and managers; 24% were engineers, and included chief, assistant chief, and staff. The others were technical specialists. About 45% were employed by vehicle manufacturers, 50% by component and parts suppliers, and 5% by materials suppliers.

The Marketing panel was made up of 30% presidents, chairmen, CEO's, and vice presidents; 30% were managers, and 16% were directors. The remainder were marketing and planning specialists. Twenty-one percent were employed by vehicle manufacturers, 60% by component and parts suppliers, and 19% by materials suppliers.

Among Materials panelists, 77% were general managers, vice presidents and directors, 7% engineers, and the others consisted of technical, marketing, and planning specialists. Employment was 22% by vehicle manufacturers, 26% component and part suppliers, and 52% materials suppliers.

HOW TO USE THIS REPORT

In the course of their planning activities, industry executives make extensive use of quantitative analyses and forecasts. But, because of major unknowns in the future environment of the industry, those executives also rely heavily on judgment. The Delphi procedures measure the results both of numerical analyses and of judgmental factors being exercised by the experts.

How useful are the Delphi forecasts? A factor to consider is that the experts whose opinions constitute the forecasts are in positions within the automotive industry where they have the responsibility, authority, and resources to make at least some of their predictions come true.

No matter how uncertain it is, the automotive future must be anticipated. With lead times up to five years for vehicles, and longer for some facilities, manufacturers had to begin taking action years ago in order to produce vehicles today. If a forecast reflects a high degree of consensus, it is a path the industry is following. Knowing this provides you with planning lead time—time that could be used either to plan to mesh with the forecast or to attempt to change the factors that are the basis for the forecast. In many cases it may be possible to change the future before it arrives.

For suppliers and others interested in the automotive industry, these Delphi forecasts establish the best planning base we know. They provide lead time to move with trends or to alter events and change undesirable trends.

Delphi forecasts are primarily strategic planning instruments—not the only ones, but part of a collection that should be used in the planning process. The value of a Delphi forecast is measured by how well it helps you and your organization to succeed in the years ahead.

Note: The best method to locate individual items of interest in this report is to start on page number 123 with “Index of Questions Listed By Topic.”

PRESENTATION OF STUDY RESULTS

The many forecasts assembled in Delphi IV may not always appear to be related to each other, but generally they are. Readers should realize that the automotive industry and its products represent a unified system. It is, of course, greatly complex, but an understanding of the interrelations between parts will lead to the most effective long-range planning.

This complexity explains the broad range of the U-M Delphi forecasts. For example, unit sales of cars and trucks are forecast in detail, and therefore, dozens of underlying trends that drive sales and production are covered, including fuel prices, market shares, supplier relations, and vehicle quality.

Numerical Tables

When the question asked panelists calls for a response in the form of a number, the group response is reported in terms of the median value and the interquartile range (IQR). The median value is the middle response, and 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% and the IQR 35–45%. This means that one-quarter of the respondents answered 35% or less, another quarter chose 45% or more, and the middle half of all responses ranged between 35% and 45%. That narrow interquartile range would indicate a fairly close consensus among the respondents.

In contrast, the percentage forecasts for a different question might show a median of 40% (the same as in the preceding example) but an interquartile range of 20–70%, indicating little consensus among the respondents or substantial uncertainty with regard to the future. This would be a warning that the median forecast of 40% may not have a high predictive value—which is in itself valuable information.

Interpretation of IQR

The interquartile ranges are a key to maximizing benefits from a Delphi study. A close consensus, as indicated by a tight interquartile range, is encouraging in the sense that it indicates agreement among experts. Such a consensus does not “prove” the forecast is necessarily going to come true; a sudden change in the international scene could lead all respondents to agree on a different set of answers. What a consensus does indicate, however, considering the expert knowledge and key position of the respondents, is that anyone whose interests are tied to the future of the U.S. automotive industry can make plans based on the knowledge that, until new factors prevail, industry plans and actions at all levels in vehicle manufacturer and major supplier companies will probably reflect the consensus. But it should always be remembered that even the best forecasts are trend predictions about which cyclical variations are almost a certainty.

A broad IQR suggests that the forecast should be viewed with less confidence and a high priority be placed on closely following the subject under consideration in order to keep alert to significant developments.

Respondents' Comments

In a Delphi survey, respondents are encouraged to write in comments—to explain their forecast and to convince other respondents to change their positions. Many of these comments are shown in this report. Duplicate comments are excluded. These replies may be important clues to future events or trend changes that are not apparent in the numerical data. An individual panelist may know something unique and special that planners should carefully consider. However, readers should be careful not to overrate the comments. It is possible for a well-stated contrary opinion to mislead the reader into ignoring an important majority opinion that is represented by numerical data. Of course, one point in collecting and displaying comments is that—perhaps—one or more of them should lead to contrary action. In the final analysis, it is up to the reader to decide.

Discussion

Narrative discussions are presented to highlight future trends and the interquartile ranges of the survey results.

Comparison of Vehicle Manufacturers and Supplier Panelists

For competitive reasons the manufacturers try to maintain secrecy regarding their forward plans, and it might be thought that their representatives know more than others about the automotive future. Offsetting this, the manufacturers source from 30 to 70 percent of each finished product with suppliers and work together closely with few secrets between them. However, the size (hundreds of suppliers) and complexity of the information network can prevent optimal information transfer. Therefore, our analysis includes a comparison of answers from manufacturer and supplier respondents to determine if there are significant differences of opinion.

Trend From Previous Delphi Surveys

A single Delphi survey is a snapshot of time: it collects and presents the opinions and attitudes of a group of experts at one point of time. But the market and business environment change; better information becomes available as we move closer to the forecast period. Data from previous Delphis are presented to track these changes in opinion. Significant changes (as in forecasts of fuel prices) should prompt the reader to consider the environmental drivers behind the forecast.

Strategic Considerations

Based on the replies to the question being discussed, other Delphi IV results, earlier Delphi studies, and OSAT's extensive interaction with the automotive industry over several years, inferences are drawn as to major developments and their impact on the industry.

Reference To Other Delphi IV Sections

Where appropriate, we have cross-referenced discussions or numerical tables in other Delphi IV volumes. This allows the reader to gain input from a different perspective of expertise. It is important that all dimensions—marketing, engineering, manufacturing, and distribution—be considered in developing a business strategy.

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EXECUTIVE SUMMARY

The Marketing volume of the University of Michigan Delphi IV Forecast of the U.S. Automotive Industry Through 1995 projects that the U.S. market will become even more competitive in the next decade. Imports [Question MKT-23] and transplants [MKT-19A and MKT-19B] will continue to put pressure on the domestic market that is expected to grow modestly [MKT-7]. This could give rise to a redistribution of market share [MKT-21 and MKT-22]. The implication of these forecasts on the automotive manufacturers, their suppliers and employees, and communities are indeed significant. The future promises to be complex, challenging, and extremely hazardous for all industry participants.

For the automotive manufacturer and supplier it means rethinking goals, plans, and actions to focus on improving both market position and profitability. Successful corporations will be those that implement new and effective strategies to address a fast changing business environment. A more aggressive people- and market-oriented culture is key to increasing changes for success.

Delphi IV reports on a variety of business environment factors. Forecasts of major strategic planning factors, government regulation, economic cycles, fuel prices, etc., [MKT-1 through MKT-4] are presented. The forecasts indicate a continued reposturing of the customer/supplier relationship. Outsourcing of parts traditionally manufactured by captive suppliers may increase business opportunities for the independent suppliers [MKT-41], but increased transplant capacity in the U.S. and foreign sourcing by domestic manufacturers [MKT-42] may restrict the growth potential.

All participants in the industry including the manufacturers and suppliers, labor, service industries (i.e., telecommunications, utilities) and government must reevaluate their often adversarial relationships. A more team-based cooperation must emerge to ensure the greatest degree of synergism between all parties and thus ensure the delivery of high quality, reasonably priced products to demanding customers.

The Delphi IV Marketing volume covers a variety of product forecasts from expected sales of total passenger cars and light trucks to various model forecasts [MKT-7, MKT-10 through MKT-12]. Some vehicle features are also forecast such as four-wheel drive, four-wheel steering, and anti-lock brake systems [MKT-36 and MKT-38] and can be compared with similar forecasts by a Technology Delphi panel.

Other product areas covered in the Delphi Marketing volume are: market share by body type [MKT-29], luxury option penetration rate for compact vehicles [MKT-37], and dealer and do-it-yourself repair trends [MKT-47].

The marketing experts seem to be less enthusiastic about "high tech" features than the technology panel. These differences illustrate an important attribute of the Delphi method: the reports do not "hide" discrepancies in averages, but expose for investigation differing opinions.

MKT-1. Many factors could be considered in strategic planning. Following is a list of some of these factors. Please indicate your forecast of the trend in each, (increasing, remaining the same, or decreasing). Unless otherwise indicated, all factors refer to the U.S.

	<u>Percent of</u>		
	<u>Total Respondents for Each Variable</u>		
	<u>10-Year Trend: 1985-1995</u>		
	<u>Increasing</u>	<u>Same</u>	<u>Decreasing</u>
Other foreign competition*	92%	5%	3%
Truck prices	75	23	2
Car prices	72	21	7
Energy prices	71	29	0
World truck sales volume	69	29	2
Personal income	64	27	9
Japanese competition	60	27	13
World car sales volume	59	37	4
Taxes: Business	56	36	8
U.S. political stability	11	84	5
Unemployment	25	65	10
Short-term interest rates	26	61	13
Energy availability	7	60	33
Savings	32	59	9
Government regulations	39	56	5
Long-term interest rates	44	45	11
Taxes: Personal	32	43	25
World political stability	16	42	42
Highway and road conditions	20	36	44

* non-Japanese

<u>Single Responses</u>	<u>Trend</u>
Discretionary income	Decreasing
Literacy rate	Increasing
Population growth	Same
Travel	Increasing

Discussion

Panelist consensus on the ten-year trend for twenty major strategic planning factors appears to be the greatest (greater than 70% response rate) in five areas: energy prices (increasing), U.S. political stability (same), other foreign (non-Japanese) competition (increasing), car prices (increasing), and truck prices (increasing). Other areas had a greater degree of variation.

Comparison of Vehicle Manufacturer and Supplier Panelists

Although the specific weights differed between the two panels, the panels agreed as to the direction of every category except three: government regulation (suppliers: same, manufacturers: increasing), long-term interest rates (suppliers: increasing, manufacturers: same), and savings (suppliers: same, manufacturers: increasing)

Strategic Considerations

The business and social environment that business will be operating under through the next ten years will be anything but stable and complaisant. Rising costs (energy, long-term interest rates, and taxes), intensifying competition (from Japan and other foreign countries), and decreasing international stability all present a challenge to manufacturers in achieving the forecasted increase in world car and truck volumes.

Our concept of an ever-changing industry would appear to be intact. Strategic planning is taking on increasing importance in every organization because of the much more complex and unpredictable business environment. Competitive analysis, as an example, of a strategic planning issue, is becoming unbelievably complicated because of the dramatic expansion of firms that can be considered as competitors.

MKT-2. *The following is a two-part question.*

MKT-2A. Do you foresee a trend toward more or less U.S. government regulation of the automobile industry in the following areas during the 1990s?

<u>Area</u>	<u>Percent of Total Respondents for Each Variable</u>		
	<u>More</u>	<u>Same</u>	<u>Less</u>
Passenger restraints	70%	29%	1%
"Lemon laws"	69	30	1
Product liability	69	29	2
Safety	61	32	7
Diesel engine emissions	58	34	8
Spark-ignited engine emissions	21	70	9
Fuel economy (CAFE)	13	58	29
Corrosion	22	61	17
Noise	31	62	7
International trade	50	46	4
Damageability	40	49	11

<u>Single Responses</u>	<u>Trend</u>
Flammability	More
Highway maintenance	More
National speed limit	Less
Recycling materials	More
Workplace/hazardous material	More

Selected Edited Comments

Answers depend on the party in power and fuel availability.

Discussion

Panelists foresee no reduction of the current level of regulation concerning the motor vehicle. Regulatory categories which are expected to become more stringent and received the greatest consensus among panelists (greater than 65% response rate) were safety, product liability, passenger restraints, and "lemon laws."

Comparison of Vehicle Manufacturer and Supplier Panelists

Although the weight given to each category were different, there was no variation as to the direction of each regulation area.

Comparison of Replies to MKT-2A and T-12A

Two differences arose between the panels: Marketing panelists think there will be more government regulation in the areas of safety and spark-ignited engine emissions. Technology respondents view these two categories as remaining the same through the 1990s.

Strategic Considerations

Product design and engineering will continue to be influenced by federal regulation. Manufacturers and suppliers must continue to monitor social and environmental factors that will influence the direction of future regulation. Active company participation in community affairs will help implement expected future regulation in a predictable, rational manner.

MKT-2B. In the following areas, please indicate your expectations for possible future regulatory activities. These could be new regulations in previously unregulated areas or added regulations in areas already regulated.

Type or Direction of Regulation Foreseen:

<u>Emissions</u>	<u>Percent of Total Respondents</u>
More stringent/New areas of regulation	73%
Same/Slightly more stringent	10
No change	10
Same/Slightly less stringent	7

Selected Edited Comments

Tighter standards, especially diesel applications.

Increased regulation for diesel particulates and for special urban area requirements.

Longer durability will be required.

More stringent emission regulation and increased use of emission testing.

Increased control of NOx.

Tighter control of evaporative emissions.

<u>Safety</u>	<u>Percent of Total Respondents</u>
More stringent	92%
No change	8

Selected Edited Comments

Enhanced reinforcement of passenger compartment.

Light-truck and multi-purpose vehicle standards will be increased to passenger car levels.

New regulations will be adopted regarding pedestrian protection and occupant relief after collision.

Seat belt laws will cover all states.

Greatest activity will be in the passive restraint area.

Greater control of fuel spills and flammability.

<u>Fuel Economy (CAFE)</u>	<u>Percent of Total Respondents</u>
No change	43%
More stringent	26
Less stringent	23
Moderate improvement	8

Selected Edited Comments

Modest increase to 30 MPG by 1995.

Freeze at 26 MPG unless we have another energy shock.

Gas guzzler tax will be increased.

No change, market will dictate any improvements.

Continued easing of enforcement.

More severe 1990 thru 1995.

<u>Corrosion</u>	<u>Percent of Total Respondents</u>
No change	59%
More stringent	26
Market driven change only	15

Selected Edited Comments

Regulation is not needed—the market has worked this one out.

Regulation will be safety related.

<u>Damageability</u>	<u>Percent of Total Respondents</u>
More stringent	53%
No change	42
Market driven change only	5

Selected Edited Comments

Bumper law will be increased to 5 mph.

High cost of repairs will drive more regulation.

The insurance industry may be a force behind this area.

The market will dictate any change.

<u>Noise</u>	<u>Percent of Total Respondents</u>
No change	48%
More stringent	44
Less stringent	8

Selected Edited Comments

Urban pollution may lead to local regulatory action.

There will be increased enforcement of current levels.

Trucks, city buses, and motorcycles will receive most attention.

<u>Product Liability</u>	<u>Percent of Total Respondents</u>
Limitations on exposure/liability	44%
Increased exposure/liability	44
No change	12

Selected Edited Comments

There will be control of maximum exposure.

Set limits for all categories of injury will be enacted by state legislatures.

More class action suits are expected.

There will be more manufacturer and supplier liability exposure.

Manufacturers will increasingly attempt to insulate themselves.

<u>Passenger Restraint</u>	<u>Percent of Total Respondents</u>
More stringent	92%
No change	8

Selected Edited Comments

There will be continued pressure pending customer "backlash."

Mandatory safety belts and air bags.

Air bags will be universal by 1995-2000.

Rear-seat passive restraint standards are possible.

Regulation will be level after air bags.

<u>"Lemon Laws"</u>	<u>Percent of Total Respondents</u>
More stringent	93%
No change	7

Selected Edited Comments

Will be increased for both new and used cars.

Will be enacted and enforced.

Eventual national lemon law.

Most states will pass legislation in the 1990s.

Poor repair facilities will intensify this concern.

<u>International Trade</u>	<u>Percent of Total Respondents</u>
More stringent	63%
No change (given same economy)	37

Selected Edited Comments

Consumerism is getting stronger.

No regulation until a recession and unemployment increases.

Canadian free trade will become a problem.

Anti-dumping and local content regulation will increase.

Discussion

The second part of MKT-2 provided the panelists an open-ended question to identify the specific areas where change in the regulatory environment is expect to occur. Overall, the responses to MKT-2B mirror MKT-2A, but more insight is gained, in that the panelists were not forced into responding to only three variables (more, same, less).

Discussion of Panelists' Comments

Representative panelists' responses are given for each category of regulation to highlight specific type, level, and timing of the regulatory action expected.

Comparison of Replies to MKT-2B and T-12B

For the most part, Marketing panelists and Technology panelists are in agreement on the type and direction of regulatory and legislative activity in the areas surveyed. There are, however, a few notable differences.

Fuel Economy:	Only 10% of the Technology panel forecast an increase in legislation in this area, whereas 26% of the Marketing panel expects the application of more stringent regulations.
Corrosion:	Seventy-three percent (73%) of the Technology panel forecast no new regulatory activity or significant change in existing standards versus 59% of the Marketing panel.
Product Liability:	With respect to increased regulatory activity in the area of product liability, 64% of the Technology panelists responded affirmatively versus 44% of the Marketing panel.
"Lemon Laws:"	A significantly larger percentage (93%) of the Marketing panel forecast increased legislative activity with regard to "lemon laws" than did the Technology panel (67%).
International Trade:	Of the total number of panelists responding to this area, 77% of the Technology panelists, versus 63% of the marketing panelists, felt that there will be some type of regulatory activity regarding international trade. Twenty-three percent

(23%) of the Technology and 37% of the Marketing panel forecast a stable atmosphere with no significant changes in current regulations.

See discussion under T-12.

Strategic Considerations

Regulation is expected to be a continuing factor in the automotive industry. Both manufacturers and suppliers must watch trends closely to ensure timely and adequate response. It is imperative that the "high speed," expensive, labor intensive, and panicky approach often used in the past should be avoided if possible. Good planning is essential, as is developing a constructive relationship with regulating agencies to avoid poor, cost-ineffective regulation.

MKT-3. If a “good” year is described as sale of 17 million passenger cars and light trucks in the U.S. and Canada, and 15 million and 13 million units define a “medium” and “weak” year, respectively, what is your expectation of the following business cycle scenarios (1=most likely; 4=least likely).

<u>Rank</u>	<u>1987</u>	<u>1989</u>	<u>1991</u>
1.	Medium	Weak	Good
2.	Weak	Medium	Good
3.	Weak	Good	Medium
4.	Weak	Medium	Weak

Other Responses

<u>1987</u>	<u>1989</u>	<u>1991</u>	<u>Rank</u>	<u># of Responses</u>
Medium	Good	Good	1.	2
Medium	Weak	Medium	1.	2
Good	Good	Good	1.	1
Good	Medium	Weak	1.	1
Good	Medium	Medium	1.	1
Medium	Weak	Weak	1.	1
Weak	Medium	Medium	2.	1
Medium	Medium	Medium	5.	1

Selected Edited Comments

Continuation of the 4- to 6-year cycle expected, with 1985 being a peak year.

Lower prices due to increased competition will result in much higher sales.

Mild recession is built into forecast in late 1988–1989 time frame.

1986 sales are being pulled ahead from 1987. Incentives are becoming a way to do business. Consumers expect them.

1987 will again be supported by incentives and available disposable income. 1988–89, a mild recession is expected, with recovery by 1990–91.

Discussion

The most likely 1987–1989–1991 economic scenario was chosen to be medium-weak-good. The rankings were determined by weighting each scenario by the percentage of total respondents to each variable, in this case, each scenario.

Comparison of Vehicle Manufacturer and Supplier Panelists

Each panel ranked the scenarios in the same manner. The medium-weak-good scenario was weighted as the number one expectation much more heavily by the manufacturers than the suppliers.

Strategic Considerations

This question indicates that although most of the panelists—and a large number of Wall Street analysts—forecast 1987 to be a medium (approximately 15 million units) year, there remains great uncertainty. The auto industry will remain cyclical. To remain competitive within these cycles over the next five years, firms must be willing to operate without the capacity to produce the last incremental sale in good times in order to have low fixed-cost burden in the bad times. Flexibility to change capacity from segment to segment or passenger car to light-truck will play an important role in maintaining operating rates and up-time. The entire cost structure, from market segment identification to design to engineering to manufacturing to distribution, must be streamlined to operate the most efficient system with the lowest cost per unit. The outside factors (general economy, trade legislation, energy uncertainty) could obviously have a profound impact on any scenario.

MKT-4. What is your estimate of retail fuel prices per gallon in the U.S. in 1990? 1995? 2000? *In constant 1986 dollars*, that is, without adjusting for inflation.

Self-Service Retail Price per Gallon

<u>Fuel</u>	<u>Median Response</u>		
	<u>1990</u>	<u>1995</u>	<u>2000</u>
Unleaded Gasoline	\$1.20	1.35	1.60
Diesel Fuel	\$1.20	1.35	1.60
	<u>Interquartile Range</u>		
	<u>1990</u>	<u>1995</u>	<u>2000</u>
Unleaded Gasoline	\$1.08/1.30	1.20/1.50	1.35/1.80
Diesel Fuel	\$1.10/1.35	1.25/1.50	1.36/1.80

Selected Edited Comments

Continued conservation such as the CAFE requirements will keep consumption and price down.

Diesel fuel production capacity will drop due to lower demand, causing steady but moderate price increases. Gasoline prices will continue to climb, but at a slower rate, due to continuing excess supply relative to consumption.

In the year 2000 a substantial price increase will occur as the volume of traditional oil supply diminishes. Prices will increase substantially in order to pay for the development of new oil. Also, a trend to oil supply concentration in the hands of a few will cause price manipulation upward. The cost to put alternate fuels in place, in volume, will be higher than our traditional fuel.

In view of decreased production and exploration, I believe oil producers will gradually gain price advantages. Also, there is a high probability of another oil shock in the next 36 to 48 months. These points put my estimates on the high side of the range.

By the year 2000, alternative fuel availability will force traditional fuel prices lower.

The fuel glut will last through the balance of the 80's, with a slightly increasing supply-limited situation developing through the 90's.

A significant portion of the increase will be added federal taxes.

Discussion

Marketing panelists forecast that unleaded gasoline retail prices will rise to an average of \$1.20 per gallon in 1990, \$1.35 in 1995, and \$1.60 in 2000. The forecast for diesel fuel price per gallon is an exact mirror of the unleaded gasoline forecast. During this time period, fuel prices are expected to increase only three percent per year.

Discussion of Panelists' Comments

Answers to this question were made with the assumption that there would be no international political crises. But many panelists believe such an event is likely. If boycotts and embargoes emerge, the steady price increase of approximately three percent per year would no longer be a valid forecast, as markets would no longer act as the price maker. Overall, prices are expected to remain fairly constant as stable production is expected to be matched up against soft demand. The primary component of the forecast price increase is the expectation of increased or new taxes.

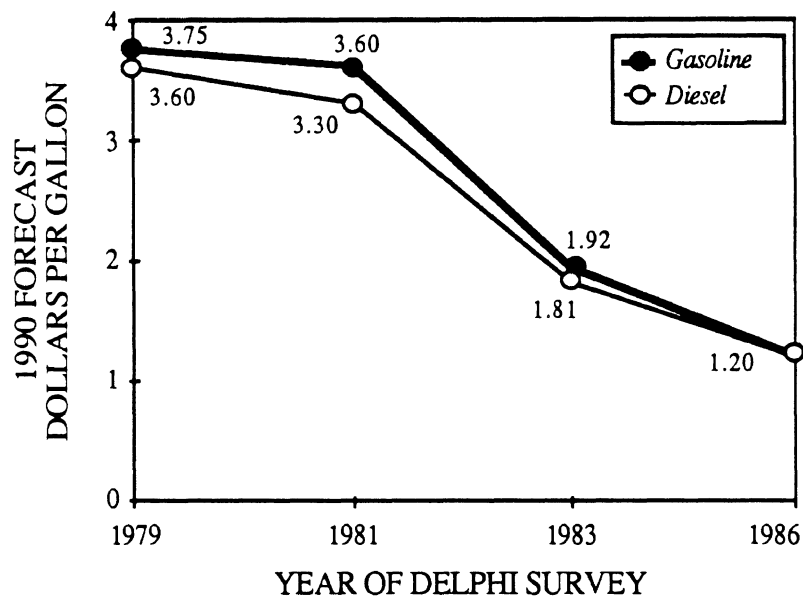
Comparison of Vehicle Manufacturer and Supplier Panelists

Median responses were exactly the same for diesel fuel; suppliers forecast gasoline prices to be a nickel higher than the vehicle manufacturers in 1990 and 1995 (year 2000 forecast was equal).

Comparison of Replies to T-1, MKT-4, and MAT-1

The three panels forecast gasoline and diesel prices to be within 10 cents of each other in every forecast period. The Technology and Marketing panels were essentially the same (the largest difference being 15 cents); Materials' panelists were approximately 15 to 25 percent higher than Technology and Marketing in their 1995 and 2000 forecast.

Trend From Previous Delphi Surveys



Strategic Considerations

Vehicle manufacturers, as the primary driver of market and product development, must be particularly sensitive to political and economic developments that could radically shift actual prices away from the Delphi forecast trend line. Although manufacturers can do very little to reduce the amount of market risk associated with volume fluctuations that

may result from a sudden increase in crude oil prices, manufacturers can reduce the amount of product mix variability by improving fuel economy of larger vehicles and powertrain application options.

MKT-5. What is your estimate of the average retail sales price *in constant 1986 dollars* of cars sold in the U.S. in the listed years?

Average Retail Sales Price

Median Response

	<u>U.S.-produced Passenger Cars</u>	<u>Imported Passenger Cars</u>
Estimated 1985	\$11,600	\$12,600
1990	12,500	13,500
1995	13,800	14,700

Interquartile Range

1990	\$12,100/13,000	13,000/14,000
1995	\$12,600/15,000	13,500/15,800

Selected Edited Comments

Cars are greatly overpriced now. That's why we have the APR financing programs at 2.4 and 2.9%. Prices will drop as the supply of inexpensive imports increases and competition becomes intense.

Favorable macroeconomic indicators will increase demand for larger and sporty cars and push the average retail prices upward.

Imports will be affected by Korean and Brazilian vehicles to hold prices down.

Increased U.S. production by Japanese manufacturers will hold prices down, especially in the small end of the market; also intensified competition in mid-size market due to imports moving up-market will increase average price of imports.

What is an "average retail sales price"—the manufacturers suggested retail price (MSRP) or what the customer actually pays? While manufacturers have and may continue to raise the MSRP, incentives and changes in the dealer discount and profit margins to dealers may indicate that consumers, on average, are paying less in 1986 than they did in 1985.

The price will rise in accordance with the increased use of high technology components.

Discussion

The average retail sales price, in constant dollars, of U.S. produced passenger cars is expected to rise from an estimated \$11,600 in 1985 to \$12,500 in 1990, and \$13,800 in 1995. Average retail sales price, again in constant dollars, of imported passenger cars is expected to increase from an estimated \$12,600 in 1985 to \$13,500 in 1990, and \$14,700

in 1995. The compound year-to-year price increase from 1985 to 1995 (using periods equal to ten) is 1.7% for domestics and 1.5% for imports. As is to be expected due to increased uncertainty, the interquartile low and high range difference increases from \$900 for domestics and \$1,000 for import cars in 1990 to \$2,400 for domestics and \$2,300 for imports in 1995.

Discussion of Panelists' Comments

Panelists forecast price increases of imports to be less than for domestically produced cars (imports increase 17% vs. 19% for domestics over the period of 1985 to 1995) because they think that the import mix is going to be held in check by a large increase of low-priced, entry vehicles from Korea, Mexico, Taiwan, and Brazil. These imports will replace a significant portion of the domestically produced subcompact and compact market. This forecast does not imply that the imports have altered their plans to move up-market: the Japanese are supplementing their low- and mid-market segment through U.S. production, thus moving these vehicles from import to domestically produced lists.

Comparison of Vehicle Manufacturer and Supplier Panelists

The vehicle manufacturer panelists forecast lower vehicle prices for both domestic and import vehicles in each of the forecast periods. The greatest difference occurred in the 1995 import vehicle price forecast: suppliers indicated \$13,500, manufacturers averaged \$12,600.

Strategic Considerations

Over the next ten years the price differential between the average domestically produced and imported passenger cars is expected to remain essentially the same (\$1,000 and \$900 in 1985 and 1995, respectively). This average, of course, does not reflect pricing strategies and manufacturing costs that are associated with individual market segments that may make the differential smaller or larger and have imports selling at prices less than that of domestically produced vehicles.

The key strategic consideration for manufacturers is not the absolute price of their product in the marketplace, but the consumer's perceived value of the product in terms of price in relation to image, styling, status, performance, durability, etc. Selling on cost alone (and this applies to components and subsystems as well as finished vehicles) will force customers to seek products from low cost origins; selling on perceived value will allow manufacturers who may have manufacturing cost deficiencies compete through other product or business attributes.

MKT-6. What is your expectation of the average amount financed and the average maturity (in months) for new passenger car loans in 1990 and 1995?

	<u>Median Response</u>			<u>Interquartile Range</u>	
	<u>Est. 1985</u>	<u>1990</u>	<u>1995</u>	<u>1990</u>	<u>1995</u>
Average Maturity	51 months	52	53	48/55	48/60
Average Amount Financed	\$10,302	\$11,000	\$12,000	\$10,500/12,000	\$11,000/13,000

Selected Edited Comments

Change in federal tax law (interest deduction phased out) will increase number of private leases and may encourage consumers to turn over three- and four- year leases into a new lease on new car, without ever having any equity in the car. GMAC and other finance subsidiaries will use this strategy to encourage shorter trade-in cycles and boost new car sales volume.

Response assumes current interest rate. Higher rates would shorten loan maturity date. Elimination of interest deduction will reduce loan maturity period.

Tax changes will create other ways to finance, such as home equity.

Discussion

The average maturity of a new car loan is expected to increase only two months over the next ten years. The interquartile range for this median is rather large, four years on the low side and five years on the high side. The average amount financed is expected to increase approximately 16% over the next decade to reach \$12,000.

Discussion of Panelists' Comments

Even the individual purchase is now encumbered by consideration of lease vs. buy, tax considerations, opportunity costs of money, etc. These options and considerations were those only of a business executive not too long ago.

Strategic Considerations

As financing becomes a greater consideration of the new car purchase, dealerships and financial arms of the "Big 3" become increasingly more important. Again, this is the type of added value that is considered by the customer when making the purchase decision. Financing will continue to be used as a marketing tool of the U.S. manufacturers. Past sales incentives through subsidized interest rates were too successful in moving large inventories to be ignored.

NOTE: In question 7, and questions 10 through 14, “domestic” includes all vehicles assembled in the U.S. without regard to domestic or foreign ownership of facilities. Also, “foreign” includes all vehicles imported and sold by import and domestic dealers.

MKT-7. *The following is a two-part question.*

MKT-7A. How many domestic- and foreign-produced passenger cars do you forecast will be sold in the U.S. during the following years?

U.S. Sales of Passenger Cars
Millions of Units

Median Response

	<u>Domestic- Produced</u>	<u>Foreign- Produced</u>	<u>Total</u>
Estimated 1985	8.2	2.8	11.0
1990	8.3	3.1	11.4
1995	8.4	3.4	11.8

Interquartile Range

1990	8.0/8.6	3.0/3.5	11.0/11.6
1995	8.0/9	3.1/3.7	11.4/12.2

Selected Edited Comments

I'm optimistic about vehicle demand in the future because I'm optimistic about the U.S. economy.

The U.S. market is saturated. Disinflation, lower standard of living, and no interest deduction will slow down new car sales.

More “imports” (i.e., transplants) will be built in U.S. There will be no overall growth; increases in low-priced import sales cannibalized from the used car market will be offset by the movement of car owners into the truck/van market.

New industrialized nations will aggressively attack the rich U.S. auto market. Traditional U.S. auto makers will respond (in part) by increased captive imports—especially with entry-level vehicles.

I see only slightly increasing demand over the short-term, almost exclusively due to decreased fuel prices. Because of exchange rate normalization, I do not see foreign-produced vehicles increasing market share appreciably.

U.S.-assembled Japanese cars will increase rapidly while traditional domestics will decline by a lesser amount. Increase in imports will be a combined effect of LDC-built econo-cars, upscale Japanese cars, and upscale European cars.

Discussion

Passenger car sales in the U.S. are forecast to increase from the estimated actual 1985 level of 11.0 million to 11.4 million and 11.8 million in 1990 and 1995, respectively. This forecast represents compound annual growth rate between 1985 and 1995 of 0.7%. Foreign-produced sales penetration is forecast to increase from 25% in 1985 to 27% and 29% in 1990 and 1995, respectively. Interquartile range consensus was fair, considering the difficulty of forecasting unit sales several years ahead.

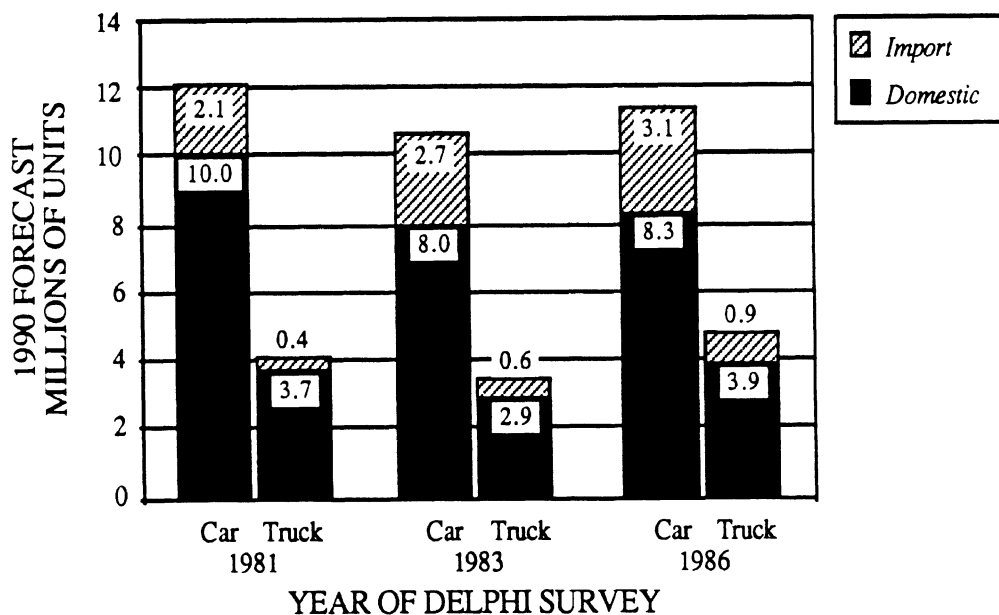
Discussion of Panelists' Comments

Many of the comments suggest that the U.S. passenger car market has matured to the point that demand is almost purely replacement sales. The low annual growth rates attest to this. The primary change indicated by the panelists will be the substitution of "traditional domestic" (GM, Ford, and Chrysler) production with that of the "transplants" (Honda, Mazda, NUMMI, etc.) within the domestic-produced segment.

Comparison of Vehicle Manufacturer and Supplier Panelists

The supplier panel was the most pessimistic concerning domestic passenger car sales (growth of only 100,000 over ten years, compared to 500,000 expected units of growth by the manufacturers). The foreign sales forecasts were within 100,000 units of each other for the two groups.

Trend From Previous Delphi Surveys



Strategic Considerations

The entire U.S. automotive industry (OEMs, component manufacturers, service suppliers, labor, government, etc.) must gear itself for operation as a mature industry in a mature market. Growth will no longer hide inefficiency; competition will no longer shelter the oligopolist; and consumerism will no longer tolerate market insensitivity. Product differentiation and competitive cost positions will allow manufacturers and service entities to provide the greatest value-added to their respective customer. The prudent manufacturer and supplier will try to balance internal manufacturing capability with external market conditions.

MKT-7B. How many domestic- and foreign-produced trucks do you forecast will be sold in the U.S. during the following years?

<u>U.S. Sales of Trucks</u>			
<i>Millions of Units</i>			
<u>Median Response</u>			
	<u>Domestic- Produced*</u>	<u>Foreign- Produced*</u>	<u>Total</u>
Estimated 1985	3.8	0.7	4.5
1990	3.9	0.9	4.8
1995	4.0	1.0	5.0
<u>Interquartile Range</u>			
1990	3.8/4.0	0.8/1.0	4.6/4.9
1995	3.9/4.2	0.9/1.1	4.9/5.2

Selected Edited Comments

Car/truck blurring will continue. Increased imports will occur in the light, medium, and heavy-duty segments.

Greater foreign focus will be on niche truck segments. More innovation will come from imports.

Growth of van-type vehicles will continue replacing conventional station wagon (car) business.

Imported medium trucks will wipe out domestic trucks.

Passenger-car/light truck split is a tough call. Classification of new vehicles and four-wheel drive in cars complicates the issue. Car/truck vehicle classifications are losing meaning; need to think of total vehicle market with various "functional" segments, e.g., personal use, government, small fleet, commercial, etc.

Will be a growth area for second and third vehicles.

Discussion

Truck sales in the U.S. are forecast to increase from the estimated level of 4.5 million in 1985 to 4.8 million in 1990 and 5 million in 1995. This forecast represents a compound annual growth rate of 1.3% between 1985 and 1990 and 0.8% between 1990 and 1995. Foreign-produced sales penetration is forecast to increase from 16% in 1985 to 19% and 20% in 1990 and 1995, respectively. Interquartile range consensus was fair.

Discussion of Panelists' Comments

Panelists' comments indicate the continuing shift of sales to light trucks at the expense of passenger cars as a primary driver for light-truck sales growth. Foreign-produced vehicles are seen encroaching into every truck segment classification.

Comparison of Vehicle Manufacturer and Supplier Panelists

There were no significant differences between the two panels.

Trend From Previous Delphi Surveys

See chart from MKT-7A.

Strategic Considerations

See strategic considerations under MKT-7A.

- MKT-8.** What is your estimate (in thousands of units) of the number of passenger cars which will be marketed by U.S. car companies as "captive imports" (manufactured overseas and sold in the U.S. through a domestic OEM) and transplants (manufactured under foreign management in the U.S., e.g., NUMMI) in 1990 and 1995?

U.S. Sales of Captive Imports/Transplants
Thousands of Units

Manufacturing <u>Source</u>	Est. <u>1985</u>	<u>Median Response</u>		<u>Interquartile Range</u>	
		<u>1990</u>	<u>1995</u>	<u>1990</u>	<u>1995</u>
<i>General Motors</i>					
Import	85	150	200	120/200	150/300
Transplant	36	100	200	95/160	135/200
<i>Ford</i>					
Import	9	50	100	25/100	120/150
Transplant	0	100	120	50/120	100/150
<i>Chrysler</i>					
Import	150	130	150	120/150	125/195
Transplant	0	95	125	60/100	100/150

Selected Edited Comments

Chrysler will be increasingly dependent upon imports.

Discussion

The total "Big 3" captive imports of passenger cars is expected to increase from the present rate of 244,000 units per year to 450,000 in 1995. Total "Big 3" transplant sales are forecast to increase by an even greater percentage, increasing from 36,000 units to 445,000 units in 1995. The interquartile ranges are large for all years, companies, and production locations. This uncertainty is a reflection of the reservations that the OEMs have concerning the future automotive market, especially their ability to be competitive within the subcompact and compact segments.

Comparison of Vehicle Manufacturer and Supplier Panelists

Generally, the manufacturers forecast greater captive import and transplant sales for each manufacturer. The greatest discrepancy was for 1995 GM captive imports, which the manufacturers predicted to be 50,000 units higher than the suppliers.

Strategic Considerations

The domestic manufacturers will increasingly use captive transplant and import vehicles to supplement their product offerings, particularly in small cars. The ability to tap the resource of existing automobile platforms greatly increases the flexibility the OEMs have in meeting emerging market niches. Success within the marketplace will be won by those who move from concept to customer in the least amount of time and cost. "Namebadge" engineering is the only burden carried by the OEM as a vehicle is prepared

to be sold through the OEM's dealership network. And time is certainly saved by supplementing a product line with an existing product: it is basically marketing a product "off-the-shelf." Although contractual agreements usually exist as to how many vehicles an OEM must purchase throughout a model year, this is a small burden compared to carrying fixed costs of a manufacturing program through an extend market downturn. As a percent of total sales, Chrysler will become the most dependent upon captives for their marketing effort.

While many vehicles will be brought in or built from existing designs, there is a growing trend to develop vehicles with the U.S. market as a key part of the marketing strategy, e.g., Daewoo building an Opel-designed product for Pontiac.

MKT-9. What is the expected sales level (in thousands of units) of captive imports by U.S. OEMs under these various import restriction scenarios by 1990?

	<u>U.S. Sales of Captive Imports</u>			
	<i>Thousands of Units</i>			
	<u>Median Response</u>		<u>Interquartile Range</u>	
	<u>Cars</u>	<u>Trucks</u>	<u>Cars</u>	<u>Trucks</u>
With domestic content legislation or quotas or other restrictions	250	60	245/345	50/75
No import restrictions	440	100	400/500	85/125

Selected Edited Comments

Assumes tariffs will remain on trucks.

Captive imports from Korea and Taiwan will not be under the application of the severe restriction.

Import restrictions will no longer be necessary; "natural" market forces will limit imports.

Restrictions will not be imposed.

Domestic dealers in U.S. do a poor job of selling and servicing captives. With restrictions, import dealers will skim price premiums. Without restrictions, import dealers will get the volume boost.

Discussion

Captive passenger car imports are seen as growing only slightly through 1990 if the market is operating under domestic content legislation, quotas, or other forms of restrictions; without restrictions, estimated captive import passenger car sales are estimated to almost double, from the present 244,000 units to 440,000 units by 1990. The captive import truck market is viewed in the same manner, consistent with today's volumes under domestic content legislation and expanding in a sizable manner (seven percent per year) without legislation. The interquartile range is reasonable. The uncertainty is modest.

Comparison of Vehicle Manufacturer and Supplier Panelists

There was a very good consensus between the panels.

Strategic Considerations

Apparently a trade-off is made between maintaining competitiveness, either through use of captive imports to provide a competitive product lineup (import use nearly doubles for both passenger cars and light trucks without import restrictions) or the use of protective trade legislation, which would allow the present mix of domestic-production/captive imports to remain competitive.

- MKT-10.** How many domestic-and foreign-produced light trucks (0-6,000 lbs. and 6,001-14,000 lbs. GVW) do you forecast will be sold in the U.S. during the following years in the two weight classes indicated?

U.S. Sales of Trucks: 0-6,000 lbs. GVW
Thousands of Units

Median Response

	<u>Domestic Production*</u>	<u>Foreign Production*</u>	<u>Total</u>
Est. 1985	2,408	770	3,178
1990	2500	820	3320
1995	2600	900	3500

Interquartile Response

1990	2,410/2,550	800/850	3,250/3,376
1995	2,400/2,700	800/915	3,300/3,600

U.S. Sales of Trucks: 6,001-14,000 lbs. GVW
Thousands of Units

Median Response

	<u>Domestic Production*</u>	<u>Foreign Production*</u>	<u>Total</u>
Est. 1985	1,290	10	1,300
1990	1,300	15	1,315
1995	1,350	20	1,370

Interquartile Response

1990	1,290/1,320	12/15	1,310/1,350
1995	1,290/1,389	12/25	1,321/1,400

*See note page 18.

Selected Edited Comments

There is growth potential in the compact sport utility segment.

Imports will expand to fill special market niches.

Mini-vans will take away market share. Foreign producers will increase prices and sacrifice market share.

The domestic-produced trucks weighing 6,000-14,000 lbs. will hardly increase because of the stagnation of the total truck market and the growth of the Japanese imports.

Discussion

Sales of light trucks (14,000 GVW pounds and less) are predicted to rise steadily to a level of 4.87 million units per year in 1995. This relates to a compound average annual growth rate of 0.8%. Of the total class, the GVW class of 6,000 pounds and under paces the overall growth trend at approximately one percent per year. Projected foreign-produced sales rise from 17% to 19% during the period of 1985 to 1995 (with the greatest inroads being made in the 6,000 pound and under class).

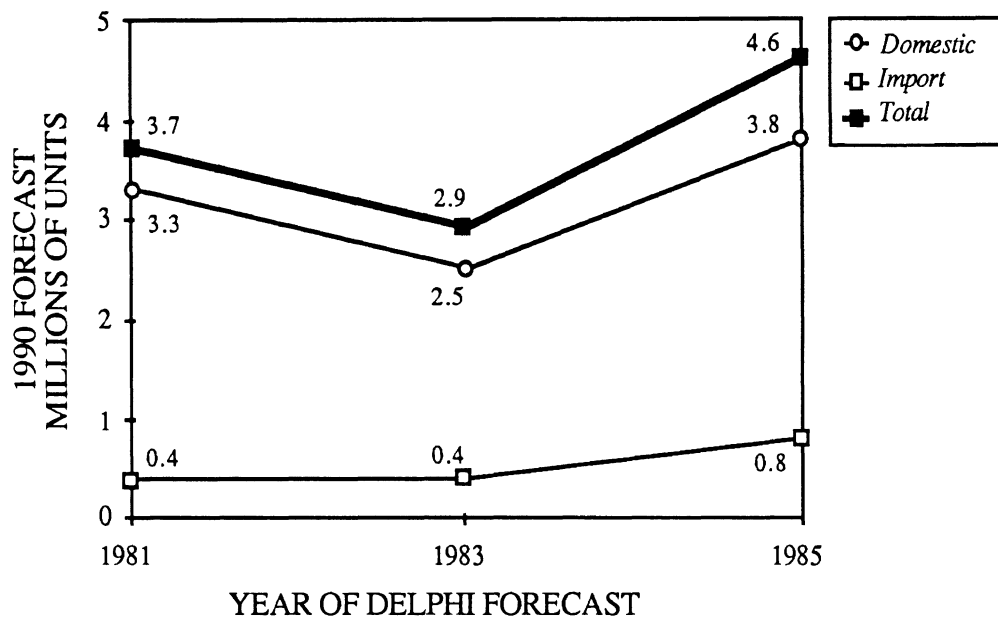
Discussion of Panelists' Comments

Product proliferation within this segment is seen as the most significant development. It is thought that imports will be most competitive within the light-truck segment's smaller niches.

Comparison of Vehicle Manufacturer and Supplier Panelists

Both panels were generally in agreement. The only major difference was in the 1995 under 6,000 pounds GVW truck forecast. For this forecast the manufacturers predicted 100,000 more domestic vehicles and 50,000 fewer imported vehicles to be sold.

Trend From Previous Delphi Surveys



Strategic Considerations

The light-truck segment can be viewed as a microcosm of the overall market. The total segment is projected to grow only 0.8% per year over the next ten-years, yet there will be significant restructuring of the sub-segments as the compact pickup, van, and utility vehicles cannibalize their larger stable mates. (Please refer to MKT-27). Growth of the light-truck market itself will come slightly from new sales, but generally will be from a trade-off from the passenger car market. Rear-wheel-drive component manufacturers appear to have a steady market opportunity (considering the overall market and limited growth by foreign-manufacturers, but year-to-year economic cycles may interrupt the growth between 1987 and 1995) and front-wheel-drive component makers benefit from the fact that FWD entries into the light-truck passenger-carrying segments typically will use off-the-shelf passenger car components. Key to an individual manufacturer's success will be identification of market niches early, the flexibility to meet these niches with product in a timely manner, and the proper cost structures to provide the consumer the greatest perceived value for dollar spent.

MKT-11. How many domestic- and foreign-produced vans do you forecast will be sold in the U.S. during the following years?

	<u>U.S. Sales of Vans</u> <i>Thousands of Units</i>				
	<u>Median Response</u>				
		<u>Domestic-Produced*</u>		<u>Foreign-Produced*</u>	
	<u>Est.</u> <u>1985</u>	<u>1990</u>	<u>1995</u>	<u>1990</u>	<u>1995</u>
Standard	529	520	510	16	16
Compact/Mini	<u>404</u>	<u>500</u>	<u>550</u>	<u>70</u>	<u>75</u>
TOTAL	933	1,020	1,060	86	91
	<u>Interquartile Range</u>				
Standard		500/520	475/510	15/17	15/19
Compact/Mini		450/500	500/600	63/75	70/90

*See note on page 18.

Selected Edited Comments

Customer acceptance continues to rise in compact/mini segment. Everyone will increase efforts to capture share. Passenger car sales will be affected negatively as acceptance grows.

There is a dynamic growth potential for mini vans.

Foreign producers will increase prices and sacrifice market share. Compact/mini segment will see significant growth at the expense of standard vans.

Standard vans will remain steady due to buyer needs (compact vans not a substitute) and cheap fuel. Compact van growth will be due to passenger car/truck segment blurring, new entrants, and rapid product evolution.

“Stretching” of compact/mini vans will cause a further shift away from standard vans.

Discussion

Sales of domestic vans are forecast to increase from the estimated 1985 level of 933,000 units to 1.2 million and 1.6 million in 1990 and 1995, respectively. The compact/mini segment of the domestic total van market is expected to grow from the present 43% to 49% in 1990 and 52% in 1995. Projections have foreign-produced vehicles with a penetration rate of eight percent through 1995.

Discussion of Panelists' Comments

The compact and mini-compact van segment is viewed as one key growth segment (in terms of units) within the automotive industry. The rate at which foreign-produced introductions are made will be increased. As more vehicles are introduced into this segment there will be a blurring of the differentiation between passenger cars and compact vans and standard vans and compact vans.

Comparison of Vehicle Manufacturer and Supplier Panelists

The only significant difference between the two panels was for the 1990 domestic-produced standard van forecast. For that period, manufacturers expected sales of an additional 10,000 (or 2%) standard vans. In all other categories, the panels were within 1,000 units of each other.

Trend From Previous Delphi Surveys

Comparing the 1983 Delphi with the most recent forecast indicates the unanticipated acceptance of the van (both standard and compact-sized) within the marketplace as a form of personal transportation. The 1983 survey forecast a 1985 domestic van market to equal 312,000 (actual results were 933,000 units). With this knowledge, the 1986 survey increased the domestic 1990 market to 1.2 million units (from the 1983 survey forecast of 340,000 units).

Strategic Considerations

The van market will be extremely competitive as manufacturers fight for market share in this growing market segment (especially in the context of an overall market where growth is expected to be relatively flat). For component manufacturers, the opportunity exists to serve a growing automotive segment where traditional domestic production is forecast to remain fairly competitive through 1995. The variety of product offerings will be a significant contributor to success as market niches are developed between the passenger car market and the van market (front-wheel-drive, rear-wheel-drive, four-wheel-drive, seating arrangement, entry arrangement, etc. variations) and within the van market itself (towing and load capacity, wheel base, overall length, drivetrain option, etc. variations). Within all these niches form follows the intended function; product introductions will be made to meet end-user functions if it is thought that the market niche is large enough to justify the increased product-offering complexity.

Also the explosive growth that was not anticipated in the earlier forecast should be a fair warning that indeed more "mini vans" may be in the minds of product planners.

MKT-12. How many domestic- and foreign-produced medium-duty trucks (14,001-26,000 lbs. GVW) do you forecast will be sold in the U.S. during the following years in the weight class indicated?

U.S. Sales of Trucks: 14,001-26,000 lbs. GVW
Thousands of Units

Median Response

	<u>Domestic-*</u> <u>Produced</u>	<u>Foreign-*</u> <u>Produced</u>	<u>Total</u>
Estimated 1985	53	1	54
1990	51	3	54
1995	51	4	55

Interquartile Range

1990	50/55	1/10	54/60
1995	45/57	1/15	55/65

* See note on page 18.

Selected Edited Comments

Japanese class 5 and 6, and Brazilian Ford Cargo will be key imports.

Foreign-produced sales will reach 25% of the combined class 6 and 7 market.

Discussion

Medium-duty truck sales are expected to increase very slightly from 54,000 in 1985 to 58,000 in 1995. The total amount of this increase is from foreign-produced vehicles; domestic-produced medium-duty trucks are projected to maintain a constant 53,000 annual unit sales level through 1995. The interquartile ranges show a large degree of uncertainty, especially within the foreign-produced segment.

Discussion of Panelists' Comments

There is a great deal of concern about foreign penetration into the medium-duty truck segment. Much of this penetration is seen being made through captive imports on behalf of the traditional domestics. However, the exact dependency upon captive imports is uncertain.

Comparison of Vehicle Manufacturer and Supplier Panelists

Each panel forecast the various volumes within 3,000 units of each other. The manufacturer's panel predicted higher foreign import levels for both 1990 and 1995.

Trend From Previous Delphi Surveys

The total, projected 1990 market of medium-duty trucks has been reduced to 58,000 from the 1983 survey projection of 76,000.

Strategic Considerations

The medium- and heavy-duty truck markets are being reshaped by many external forces: the overall economy, route deregulation, weight and axle limit relaxation, tax reform, trucking firm consolidation, etc. The forecast indicates for domestic manufacturers a flat market operating under a relatively large degree of risk from potential foreign import penetration. It appears that the domestic medium-duty truck industry is presently operating within a window of opportunity where it will be making the product and business decisions that will determine its success vis-a-vis foreign competition.

MKT-13. How many domestic-and foreign-produced heavy-duty trucks (26,001–33,000 lbs. GVW) do you forecast will be sold in the U.S. during the following years in the weight class indicated?

U.S. Sales of Trucks: 26,001–33,000 lbs. GVW
Thousands of Units

Median Response

	<u>Domestic-*</u> <u>Produced</u>	<u>Foreign-*</u> <u>Produced</u>	<u>Total</u>
Estimated 1985	97	0.5	97.5
1990	98	1.0	99.0
1995	99	1.0	100.0

Interquartile Range

1990	96/100	0.5/2	98/101
1995	95/103	0.5/5	99/106

*See note on page 18.

Selected Edited Comments

As in passenger cars, domestic dealers will do a poor job of selling and servicing captive imports. The Japanese truck dealer network will develop and succeed.

Class 7 is expanding due to change in truck regulations favoring double trailers.

Customer desire for customized chassis, bodies, axles, engines, and transmissions will reduce foreign entry rate compared to medium duty.

Discussion

The heavy-duty truck sales forecast through 1995 is almost flat, increasing from 1985's unit sales of 97,500 to 100,000. Over the ten-year period, import penetration is expected to be negligible. The interquartile ranges are fairly close for domestically produced vehicles; interquartile ranges for foreign-produced vehicles indicate a degree of uncertainty leaning in the direction of higher unit sales.

Discussion of Panelists' Comments

Comments suggest that the customer base and external forces may provide the domestic heavy-duty truck barriers to foreign entry in a relatively stable market. However, foreign import penetration should not be considered impossible.

Comparison of Vehicle Manufacturer and Supplier Panelists

The two panels were essentially equal.

Trend From Previous Delphi Surveys

The 1983 Delphi also indicated a flat market (although with some growth: one percent per year). The 1990 forecasted market size has been increased 24,000 units (100,000 vs. 76,000) since the last survey.

Strategic Considerations

With the projected flat market through 1995, all real sales increases must be made through expansion of market share. The cost involved with increasing market share may force some of the smaller firms (or smaller divisions) out of the business or to consolidate operations. As with the medium-duty market, supplier-customer relationships must be structured to provide the greatest value-added for both parties. This effort will be particularly important in this low-volume, highly customized market. Bundled products or services, methods to expedite orders or service, product offerings that reduce customer operating costs or improve operating ease will all contribute to the competitiveness of a manufacturer's product. The real role of the foreign producer may be as a partner with a traditional U.S. producer, e.g., G.M. with Volvo/White. These associations could create paths for import penetration.

MKT-14. How many domestic- and foreign-produced extra-heavy-duty trucks (33,001 lbs. GVW and over) do you forecast will be sold in the U.S. during the following years in the weight class indicated?

U.S Sales of Trucks: 33,001 lbs. and Over GVW
Thousands of Units

Median Response

	<u>Domestic-*</u> <u>Produced</u>	<u>Foreign-*</u> <u>Produced</u>	<u>Total</u>
Estimated 1985	132	0	132
1990	134	0	134
1995	134	0	134

Interquartile Range

1990	130/135	0/1	130/136
1995	130/138	0/2.5	130/140

*See note on page 18.

Selected Edited Comments

Fuel cost will dictate the use of more efficient rail transportation in 1995.

Low purchase price will secure some share for Japanese Class 8's.

The Japanese currently manufacture class 8 tractors and trucks for other markets. We expect these will soon follow their medium-duty entries.

Discussion

Extra-heavy-duty truck sales are predicted to remain flat from current levels of 132,000 units annually to 134,000 by 1995. It is indicated that there may be a slight penetration of imported vehicles. However, foreign vehicles within this segment would most likely be sourced through transplant facilities. Interquartile ranges are fairly close.

Discussion of Panelists' Comments

Some panelists think that the natural evolution of foreign firms in the passenger car market from subcompacts to full-sized and luxury vehicles will be repeated within the truck market: from compact pickups to Class 8.

Comparison of Vehicle Manufacturer and Supplier Panelists

Manufacturers were slightly more bullish about domestic-produced sales for 1990 and 1995. The two panels were within 6,000 units of each other.

Trend From Previous Delphi Surveys

The 1983 Delphi forecast a slowly growing Class 8 market (1.4% per year) from 1981 to 1990. Since the 1983 Delphi, the overall projected 1990 market size has been increased 23%, from 109,000 units (1983 survey) to 134,000 units (1986 survey).

Strategic Considerations

See discussion under MKT-13.

MKT-15. What do you predict worldwide passenger car production volume will be for these major vehicle manufacturers in the following years?

Worldwide Passenger Car Production

Millions of Units

<u>Manufacturer</u>	<u>Estimated</u> <u>1984</u>	<u>Median Response</u>		<u>Interquartile Range</u>	
		<u>1990</u>	<u>1995</u>	<u>1990</u>	<u>1995</u>
GM	6.1	6.0	6.0	5.8/6.3	5.6/6.7
Ford	3.6	3.6	3.7	3.4/3.8	3.4/4.0
Toyota	2.4	2.6	2.8	2.5/3.0	2.7/3.2
Nissan	1.8	2.0	2.2	1.8/2.0	1.9/2.4
AMC/Renault	1.8	1.6	1.5	1.5/1.8	1.4/1.7
VW	1.6	1.6	1.6	1.5/1.7	1.5/1.8
Chrysler	1.3	1.4	1.5	1.2/1.5	1.1/1.7
Peugeot-Citroen	1.3	1.3	1.3	1.2/1.3	1.1/1.3
Fiat	1.2	1.2	1.2	1.1/1.2	1.0/1.3
Honda	0.9	1.1	1.4	1.0/1.2	1.2/1.5
Mazda	0.8	1.0	1.1	0.9/1.0	1.0/1.2
Mitsubishi	0.6	0.7	0.8	0.7/0.8	0.7/1.0
Daimler-Benz	0.5	0.5	0.5	0.5/0.6	0.5/0.6
British Leland	0.4	0.4	0.3	0.3/0.4	0.2/0.4
BMW	0.4	0.4	0.4	0.4/0.4	0.4/0.5
Audi	0.3	0.3	0.3	0.3/0.4	0.3/0.4
Alfa-Romeo	0.2	0.2	0.2	0.2/0.2	0.2/0.2
Volvo	0.2	0.2	0.2	0.2/0.3	0.2/0.3
Subaru	0.2	0.3	0.3	0.2/0.3	0.2/0.4
Isuzu	0.1	0.2	0.2	0.1/0.2	0.1/0.3
Hyundai	0.09	0.2	0.5	0.1/0.5	0.2/1.0
SAAB	0.07	0.09	0.09	0.07/0.1	0.07/0.11
Daewoo	0.0	0.1	0.1	0.05/0.15	0.06/0.3
Others:					
Bombardier	0.0	0.1	0.2		
Porsche	0.04	0.1	0.2		
Yugo	0.0	0.03	0.04		
KIA	0.06	0.1	0.2		

Selected Edited Comments

Due to continued development of third world countries and China, the demand for cars will increase worldwide.

Increases in 1995 and beyond will come from development of third world countries.

Discussion

From 1984 levels, world production of the major automotive producers is expected to maintain its general relationships through 1995. The spread between the five largest producers is expected to be reduced from 4.5 million in 1984 to 4.4 million in 1995. The next five, positions six through ten, are seen becoming more competitive with the spread being reduced 43% from 700,000 to 400,000. The major winners are seen to be Honda, Toyota, Nissan, and Mazda. The only firm projected to lose a significant amount is AMC/Renault. The interquartile ranges are fairly close; the greatest differences are found in the forecasts for 1995 and smaller firms whose success is uncertain (i.e., Hyundai and Daewoo).

Discussion of Panelists' Comments

Sales growth will occur primarily in the third world countries, which are in the early part of their market's product life cycles. Furthermore, these areas will provide a market for the less sophisticated product produced by the new manufacturers of Eastern Europe and the Pacific ring.

Comparison of Vehicle Manufacturer and Supplier Panelists

No category had a greater difference between the two panels than 200,000 units.

Trend From Previous Delphi Surveys

The major differences in the 1990 forecast between the 1986 and the 1983 Delphi survey can be found in the forecasts of GM (reduced 500,000 units), VW (reduced 400,000 units), Ford (reduced 300,000 units), and Nissan (reduced 300,000 units).

Strategic Considerations

It appears that the major competitors have been identified through the middle of the next decade. No manufacturer is expected to retreat from the world market, although this table does not forecast economic cycles which could force some manufacturers to get out of the business or to consolidate operations with firms of greater strength. No major changes of ranking are forecast, although there is a great deal of uncertainty as to the exact strength of the Korean firms (note the interquartile ranges are from 260,000 to 1.7 million units). Although this table indicates relative stability of production in the world market, the marketing of these vehicles will involve intense competition within the local market and market segment.

The results from some of the lower volume manufacturers, e.g., Hyundai and Saab may already be dated by recent expansion. We suspect that on a percentage basis the lower volume manufacturers could expand significantly. It must be remembered that panelists are primarily focused on the higher volume producers.

MKT-16. What do you predict worldwide total truck and bus production volume will be for these major vehicle manufacturers in the following years?

Worldwide Truck and Bus Production
Millions of Units

<u>Manufacturer</u>	Estimated <u>1984</u>	<u>Median Response</u>		<u>Interquartile Range</u>	
		<u>1990</u>	<u>1995</u>	<u>1990</u>	<u>1995</u>
GM	1.6	1.5	1.5	1.5/1.7	1.4/1.7
Ford	1.4	1.4	1.4	1.4/1.5	1.4/1.5
Toyota	1.0	1.1	1.2	1.0/1.1	1.1/1.2
Nissan	0.6	0.7	0.8	0.6/0.8	0.7/0.8
Suzuki	0.5	0.5	0.5	0.5/0.6	0.5/0.6
Mitsubishi	0.5	0.5	0.6	0.5/0.6	0.5/0.6
Mazda	0.4	0.4	0.4	0.4/0.5	0.4/0.6
Daihatsu	0.4	0.4	0.4	0.4/0.5	0.4/0.5
Subaru	0.3	0.3	0.3	0.3/0.4	0.3/0.4
Isuzu	0.3	0.3	0.3	0.3/0.4	0.3/0.5
AMC/Renault	0.2	0.2	0.2	0.2/0.3	0.2/0.3
Chrysler	0.2	0.2	0.2	0.2/0.3	0.2/0.4
AMC	0.2	0.2	0.2	0.2/0.2	0.2/0.2
Peugeot-Citroen	0.1	0.1	0.1	0.1/0.1	0.1/0.1
Daimler-Benz	0.1	0.1	0.1	0.1/0.2	0.1/0.1
British Leland	0.07	0.07	0.07	0.05/0.07	0.05/0.07
Hino	0.06	0.07	0.08	0.06/0.09	0.06/0.1
Volvo	0.02	0.02	0.02	0.02/0.03	0.02/0.03
SAAB-Scania	0.01	0.01	0.01	0.01/0.01	0.01/0.01

Discussion

Compared to 1984 levels, world production of the major truck and bus producers is expected to maintain its general relationships through 1995. The spread between the five largest producers is expected to be reduced from 1.1 million (1984) to 900,000 in 1995. No major change within the overall ranking of firms is expected. The world truck and bus market is forecast to remain relatively flat through 1995. The interquartile ranges are fairly close in both of the forecast years and for all corporations.

Comparison of Vehicle Manufacturer and Supplier Panelists

Both panels were consistent with each other; each category was within 100,000 units of the other.

Trend From Previous Delphi Surveys

Of the companies asked under both the 1983 and the 1986 surveys, the major differences for the 1990 forecast were Nissan (300,000 unit reduction), Toyota (200,000 unit increase), and Mitsubishi (200,000 unit increase). All other 1986 survey forecasts for 1990 production were within 100,000 units of the 1983 survey.

Strategic Considerations

In addition to the comments made under MKT-15, note that the makeup of the production behind these forecasts should be considered. For example, GM as a single entity within the U.S. will be completely out of heavy-duty production by 1990 (although GM may continue to market GM nameplates of these segments). Other firms will be rationalizing international production also, and thus, although the forecasts appear relatively stable through 1995, the exact segments (light-duty vs. medium- and heavy-duty; overroad tractors vs. medium platforms, pickups, vans, and utilities) where the production is focused may differ from the 1984 mix.

MKT-17. What will be the total production capacity (in millions) of U.S. and Canadian domestic and transplant facilities in 1990 and 1995?

Annual Production Capacity
Millions of Units

	<u>Median Response</u>		<u>Interquartile Ranges</u>	
	<u>Traditional Domestic</u>	<u>Transplant</u>	<u>Traditional Domestic</u>	<u>Transplant</u>
1990	11.0	2.1	10.0/11.5	2.0/2.5
1995	10.0	3.0	9.0/11.0	2.5/3.5

Selected Edited Comments

Assumes car and truck.

Old capacity will be phased out. Excess capacity will remain.

Much excess capacity will exist due to imports building here in U.S.

Traditional domestic production capacity will be sized to the market. Older, less efficient plants will be closed and not replaced.

Discussion

Panelists project 1990 to 1995 capacity to remain constant at 13.1 and 13 million units, respectively. Note the panelists forecast 12.3 million units of sales (MKT-7A and MKT-10) for the U.S. in 1995. Assuming that Canadian sales are approximately 1.1 million units, this would relate to capacity utilization of 103%.

Discussion of Panelists' Comments

Panelists indicate the transformation of U.S. and Canadian passenger car and light-truck production capacity: the elimination of older, traditional domestic capacity and the increase of transplant capacity. How this will balance out and compare with future sales will determine the amount of excess capacity.

Comparison of Vehicle Manufacturer and Supplier Panelists

Manufacturers forecast a greater reduction in traditional domestic capacity (10 million vs. 11 million in 1990 and 9.5 million vs. 10 million in 1995). Projections of transplant production are exactly alike.

Strategic Considerations

Present estimates of total North American car and truck overcapacity range from 10 to 15 percent. Based on 1986 output of 13.2 million units, this relates to 2.3 to 1.5 million units of excess capacity. No type of production—passenger car, light-, medium, and heavy-truck; new and old; domestic and transplant—will be exempt from the possibility of closure. Realities of the mature U.S. and Canadian market will require that all manufacturing capabilities are matched realistically with market requirements. This may

include a change in philosophy that a firm should maintain production capacity to meet 100% of a boom market. It may be in the long-term interest of the firm to forego sales in strong years in order to maintain a cost structure that will allow competitiveness during the lean years. Transplants will continue to increase their influence over the North American final assembly and supplier markets.

- MKT-18.** What is your forecast of the volume of cars and trucks assembled in U.S. facilities by all foreign vehicle manufacturers (include NUMMI and other joint ventures) in 1990 and 1995?

U.S. Production of Transplant Vehicles
Thousands of Units

	<u>Median Response</u>		<u>Interquartile Range</u>	
	<u>Cars</u>	<u>Light Trucks</u>	<u>Cars</u>	<u>Light Trucks</u>
Estimated 1985	300	110		
1990	1,000	175	700/1,370	150/200
1995	1,300	200	1,000/1,800	170/250

Selected Edited Comments

Assume Canada is to be included as "U.S."

Could be higher depending on dollar/yen.

Once transplant capacity is built, domestic sourcing of foreign nameplates will be at or near capacity to help reduce pure import penetration and protectionist sentiment.

Discussion

Forecast transplant production of passenger vehicles are expected to increase rapidly from the present level of 300,000 units to 1.3 million units in 1992. Light-truck production is also expected to double during the same period. The interquartile ranges are large for both segments and indicate uncertainty as to the capacity installation rate and the ability of the transplants to sell the capacity which will be installed over the next ten years.

Discussion of Panelists' Comments

Panelists believe that the two key driving forces behind the transplant expansion are political and yen/dollar relationships. After the investment has been made in this additional capacity, efforts will be made to keep these operations at full-capacity.

Comparison of Vehicle Manufacturer and Supplier Panelists

Supplier expectations for transplant production are significantly higher than that of the manufacturers. Suppliers expect 150,000 and 200,000 more passenger vehicles and 50,000 and 30,000 more light trucks in 1990 and 1995, respectively.

Trend From Previous Delphi Surveys

The present forecast has been radically increased from the past three Delphi surveys. The previous forecasts for 1990 transplant passenger car sales were 600,000, 500,000, and 500,000 in 1979, 1981, and 1983, respectively. Transplant light-truck sales forecast for 1990 were reported at 250,000 and 250,000 in 1981 and 1983, respectively. The

primary change in the environment which resulted in this dramatic change was probably the perceived threat of U.S. protectionist action against the Japanese. This, helped by the timely devaluation of the dollar, quickened Japanese plans to assemble vehicles in the U.S. Political intervention in the trade and monetary arenas is always the hardest variable to time and quantify for forecasting purposes.

Strategic Considerations

The magnitude and quickness of transplant capacity expansion will result in many social and economic questions. As over-capacity exists presently within the industry, the expected expansion of plants by 1.1 million transplant units will force some plants to close—most likely older domestic plants. As this occurs, the supplier infrastructure that was needed to support the domestic nameplates with 90 to 95% local content will face over-capacity concerns, because transplant vehicles typically have only 20 to 30% local content. Reduced integration of the domestic manufacturers could partially mitigate this effect. This could cause a chain effect of employment reductions throughout the automotive and community service sectors. In addition to this chain of events reducing the potential OEM market for suppliers, foreign component manufacturers and subsystem assemblers are setting up shop within the U.S. to serve both transplants and traditional domestics. This environment will force inefficient manufacturers out of business. Business operations will need to be consolidated vertically and horizontally to provide products with a greater value-added in order to provide customers low-cost, timely solutions. In simple terms, the U.S. industry is in for tumultuous times.

We are inclined to believe that these forecasts are more conservative than they should be in light of recent trends and plant announcements. Questions MKT-19A and -19B approached the same issue in a different manner: the panelists were prompted with specific transplant facilities. This approach resulted in a much larger forecast for transplant production.

MKT-19. *The following is a two-part question.*

MKT-19A. The following foreign companies presently have or will have passenger car assembly facilities in the U.S. or Canada. In addition to the companies already noted, what additional facilities do you foresee will be planned or in place by the years 1990 and 1995? What will be their ownership status: wholly-owned (W-O) or joint-venture (J-V)? For all the companies, how many vehicles do you estimate they will assemble in the years listed?

North American Assembly Volume
Thousand of Units

<u>Ownership Status</u>	<u>Median Response</u>		<u>Interquartile Range</u>	
	<u>1990</u>	<u>1995</u>	<u>1990</u>	<u>1995</u>
Toyota: W-O in KY	200	225	175/200	200/250
W-O in Canada	50	80	50/50	60/100
J-V/GM (NUMMI)	200	240	200/240	200/250
Nissan: W-O in TN	150	200	125/200	180/250
Honda: W-O in OH	300	324	250/300	300/360
W-O in Canada	60	100	50/80	75/100
Mazda: W-O in MI	180	240	150/220	220/250
Mitsubishi: J-V/Chrysler (Diamond Star)	180	225	140/200	200/240
Suzuki: J-V/GM in Canada	50	75	50/100	70/150
Subaru/Isuzu J-V				
Subaru	40	60	30/50	50/75
Isuzu	30	50	20/50	30/60
Hyundai: W-O in Canada	90	100	60/100	100/150
VW: W-O in PA	80	95	60/100	55/120
Renault/AMC: W-O US	50	50	50/50	0/70
W-O Canada	60	60	50/60	50/75
Daewoo	50	50	0/50	25/100
Others :				
Volvo/CAN W-O	20	20	10/20	10/30
Bombardier/Daihatsu J-V	<u>50</u>	<u>100</u>	50/50	70/125
TOTAL	1,840	2,294		

Selected Edited Comments

Growth in Canada will be sustained only if the favorable trade with U.S. is maintained. The position of the yen will influence the Japanese decision to produce in the U.S. Currently it seems advantageous for them to do so.

Hyundai will need someone's help to run a plant in North America (may collaborate with Diamond Star).

Subaru may collaborate with VW in North America.

Discussion

This question presents the breakout of volume for North American transplant sales. By 1995 it is expected that 17 transplant assembly facilities will be in operation. Total transplant production is expected to be 1.8 million units annually in 1990 with an increase to 2.3 million by 1995. Removing the Canadian portion of these estimates, the replies to this question indicated much higher rates of sales for U.S. transplant facilities than did question MKT-18 (1.0 million to 1.4 million for 1990 and 1.3 million to 1.7 million for 1995 in questions MKT-18 and MKT-19A, respectively). The higher response rates may have resulted from the fact that the panelists were prompted with specific facilities in MKT-19A, while MKT-18 asked for a total figure without any prompts of which facilities to include. The interquartile ranges are fairly close for all manufacturers. For most manufacturers the mean tends to be closer to the higher (usually full-capacity) quartile figure.

Note that the Subaru/Isuzu operation was asked under both passenger cars and light-trucks due to the multi-purpose nature of the vehicles scheduled to be produced.

Discussion of Panelists' Comments

Underlying all of these projections is the state of international trade relations and currency exchange rates. Both are very difficult to predict and thus add the greatest amount of uncertainty to projected transplant volume levels.

Comparison of Vehicle Manufacturer and Supplier Panelists

Overall, the vehicle manufacturers and the suppliers were in fairly close agreement on all categories.

Trend From Previous Delphi Surveys

See discussion under MKT-18.

Strategic Considerations

For the OEMs, the response to this question indicates the importance of the U.S. market—primarily to the Japanese, but also to a variety of others. Transplant production is seen as a tool to protect foreign manufacturers from retaliatory protectionary legislation by the U.S. Congress.

Historically, U.S. manufacturers responded in the same manner when European countries fought U.S. exports in the early 1900s through tariffs, quotas, and the like. Recent foreign exchange fluctuations have made the transplant strategy more economically

based, but protection—and expansion—of U.S. market share is the true objective behind transplant expansion. Foreign nameplate competition will continue, only from a different origin of production: domestic rather than import. Please see MKT-18 Strategic Considerations for supplier implications.

Clearly once foreign manufacturers have established capacity in the U.S. and developed their infrastructure, they will be serious long-term competitors to the domestic manufacturers. Furthermore, they could scale up their capacity far easier than establishing new capacity, so significant expansion is possible if circumstances warrant it.

MKT-19B. In addition to Nissan, which of the following companies will have U.S./Canadian light truck or van assembly facilities by the years 1990 and 1995? What will be their ownership status? How many trucks or vans will they assemble in the U.S. or Canada in those years?

North American Assembly Volume
Thousands of Units

Median Response

<u>Ownership Status</u>		<u>Type of Vehicle</u>	<u>1990</u>	<u>1995</u>
Nissan	W-O in TN	Light Truck	150	160
Toyota	W-O	Light Truck	100	150
Mazda	W-O	Light Truck	0	50
Suzuki		Light Truck	25	50
Subaru/Isuzu	J-V			
	Subaru	FWD Station wagon	40	50
	Isuzu	Compact util.	50	50
AMC – Donga	J-V	Van	10	20
Mitsubishi	J-V with Chrysler	Light Truck	<u>55</u>	<u>75</u>
TOTAL			430	605

Interquartile Range

Nissan	W-O in TN	Light Truck	100/200	150/200
Toyota	W-O	Light Truck	50/200	100/200
Mazda	W-O	Light Truck	0/25	0/100
Suzuki		Light Truck	0/50	0/100
Subaru/Isuzu	J-V			
	Subaru	FWD Station wagon	25/50	40/90
	Isuzu	Compact util.	10/50	30/70
AMC – Donga	J-V	Van	0/30	0/35
Mitsubishi	J-V with Chrysler	Light Truck	0/100	25/150

Selected Edited Comments

I don't believe Japanese firms will make major move in light truck area. Specific niche they will penetrate is in cars.

Key to this chart is not the capacity as such, but rather how easily capacity/mix can be varied from passenger cars to light trucks.

The market for light trucks and vans will be mature by 1990 and will be able to be supported by the current channels of supply. Suzuki may prefer Canada because of a better market climate for its class of vehicles (car and truck).

The Nissan truck experience has not been nearly as successful as the Honda and Toyota car plants. Plus, trucks are extremely competitive; it's not worth building them here.

Discussion

This question presents the breakout of volume for North American transplant sales. By 1995 it is expected that as many as eight foreign manufacturers will be manufacturing light trucks in the U.S. and Canada. These vehicles will be in a variety of segments: pickup, van, and utility. The major production will be through wholly-owned facilities, while the lower production volumes will be served through joint ventures.

Discussion of Panelists' Comments

Overall, the comments suggested that the transplant capacity will be concentrated in the passenger car market. An important consideration was raised: there is significant importance in not just the pure capacity of the transplants but the flexibility of that capacity. The Japanese are known for the flexibility of their home assembly plants. As this capability is transferred to the U.S. and Canada, the complexity of the transplant issue increases, because capacity can be shifted between passenger car segments and the light-truck market to target "hot" segments and increase the competitive pressure on the domestic manufacturers that much more.

Comparison of Vehicle Manufacturer and Supplier Panelists

It appears that the manufacturers believe that the primary transplant action will occur in passenger cars and not light trucks. There were great differences as to the number of participants and the volumes of transplant light-truck production; in both cases the manufactures were on the low end of the predictions.

Trend From Previous Delphi Surveys

See discussion under MKT-18.

Strategic Considerations

See MKT-18 and MKT-19A.

MKT-20. There has been discussion that the automotive industry is being re-concentrated in the Great Lakes region. What are your expectations for the number of *passenger car* and *light-truck assembly* plants in the following regions?

Passenger Cars: Number of Assembly Plants

<u>Region</u>	<u>Current</u>	<u>Median Response</u>		<u>Interquartile Range</u>	
		<u>1990</u>	<u>1995</u>	<u>1990</u>	<u>1995</u>
Pacific States(CA, OR, WA)	2	2	2	2/2	2/2
Mountain (WY,CO,UT)	0	0	0	0/0	0/0
Plains (TX, MO, KS)	8	8	8	7/8	7/8
Great Lakes (WI, IL, IN, OH, MI)	22	20	20	20/21	18/20
South (KY, TN, GA)	5	6	7	6/6	7/7
East Coast (NY, PA, DE, NJ, MA)	7	6	5	6/6	5/5

Light Trucks: Number of Assembly Plants

<u>Region</u>	<u>Current</u>	<u>Median Response</u>		<u>Interquartile Range</u>	
		<u>1990</u>	<u>1995</u>	<u>1990</u>	<u>1995</u>
Pacific States (CA, OR, WA)	0	0	0	0/0	0/0
Mountain (WY,CO,UT)	0	0	0	0/0	0/0
Plains (TX, MO, KS)	4	4	4	4/4	4/4
Great Lakes (WI, IL, IN, OH, MI)	9	9	9	8/9	8/9
South (KY, TN, GA)	3	4	4	3/4	3/4
East Coast (NY, PA, DE, NJ, MA)	1	1	1	1/1	1/1

Selected Edited Comments

Excess capacity will cause some closings.

The success of NUMMI, together with abundance of hi-tech engineers and engineering centers, will cause Japan/Korean automakers to establish plants in Washington and Oregon.

Discussion

The only major changes are seen within the passenger car segment. The panelists see older facilities of the Great Lakes and East Coast being taken out of production, while the Southern states gain two new plants (transplant facilities). The interquartile ranges are large, especially for the 1995 period. It appears that the Great Lakes will continue to be the heart of the auto industry, although the interquartile range indicates some uncertainty as to whether the number of plants will decrease or increase.

Comparison of Vehicle Manufacturer and Supplier Panelists

There were no significant differences.

Strategic Considerations

The Great Lakes region will continue to be the largest region of auto production in the U.S. It will also remain the site of key headquarters; research and development facilities; and engineering, purchasing, and sales staffs. Because of this continued concentration of assets and resources, regional approaches and cooperation on common business problems and opportunities would appear a key way for the region to gain a competitive advantage over other regions in the U.S. and help achieve an international standard.

MKT-21. What share of the U.S. passenger car market do you predict will be supplied by U.S. and foreign vehicle manufacturers?

U.S. Passenger Car Market
Percent Share

<u>Manufacturer</u>	<u>Est.</u> <u>1985</u>	<u>Median Response</u>		<u>Interquartile Range</u>	
		<u>1990</u>	<u>1995</u>	<u>1990</u>	<u>1995</u>
GM	42.2%	40.5%	38.9%	38.0/40.0%	35.0/39.0%
Ford	18.9	18.0	17.4	17.0/19.0	16.0/18.9
Chrysler	11.3	11.0	10.3	10.0/11.5	10.0/11.2
AMC/Renault	1.2	1.0	0.5	0.8/1.0	0.4/1.0
VW of America	2.0	1.5	1.6	1.3/2.0	1.0/2.0
Domestic Joint Ventures (e.g. NUMMI, Diamond-Star)	0.3	1.8	2.1	1.0/3.5	1.0/4.0
Japanese-Manufactured in U.S. (e.g., Honda, Nissan)	1.6	3.5	5.2	2.6/5.0	3.6/8.0
Other Foreign Manufacturers in U.S.	0.0	0.0	0.5	0.0/0.5	0.1/1.0
Japanese Imports	18.5	18.0	18.4	17.0/19.0	16.0/19.0
Other Imports (Produced outside N. America)	<u>4.0</u>	<u>4.7</u>	5.1	4.3/5.5	4.4/6.5
TOTAL	100%	100%	100%		

Selected Edited Comments

Anticipate U.S. restrictions on imports.

Believe AMC/Renault will be absorbed by another manufacturer before 1990. Current best bet is Chrysler.

GM's share assumption is based on reduced costs and eventual benefit from world class technology.

Traditional domestic loyalties will erode as older buyers die and are not replaced by younger, domestically loyal buyers. (Younger buyers will retain their import preferences as they age.) Transplants producing in the U.S. will mitigate patriotic bias towards buying "imports." Import movement up-market will help them retain younger buyers as they age.

By 1995, the American car manufacturers will have solved their significant problems. Conversely, the Japanese will have become “westernized” and their industry will be problem-plagued.

The only major shift is a reduction of Japanese imports. Japanese transplants will replace imports

Discussion

The marketing panelists forecast a continued decline of “Big 3” market share: each “Big 3” company is expected to lose approximately seven to nine percent of its current share. This portion of the market is projected to be won by U.S.-based Japanese facilities (a gain of 3.6 market share points over the next ten years), domestic joint-ventures (a 1.8 percent market share gain), and other imports (a 1.1 percent market share gain). Interquartile ranges are reasonably close throughout the various firms/categories and sample years for the U.S. “Big 3.” The spread is much greater for all other categories.

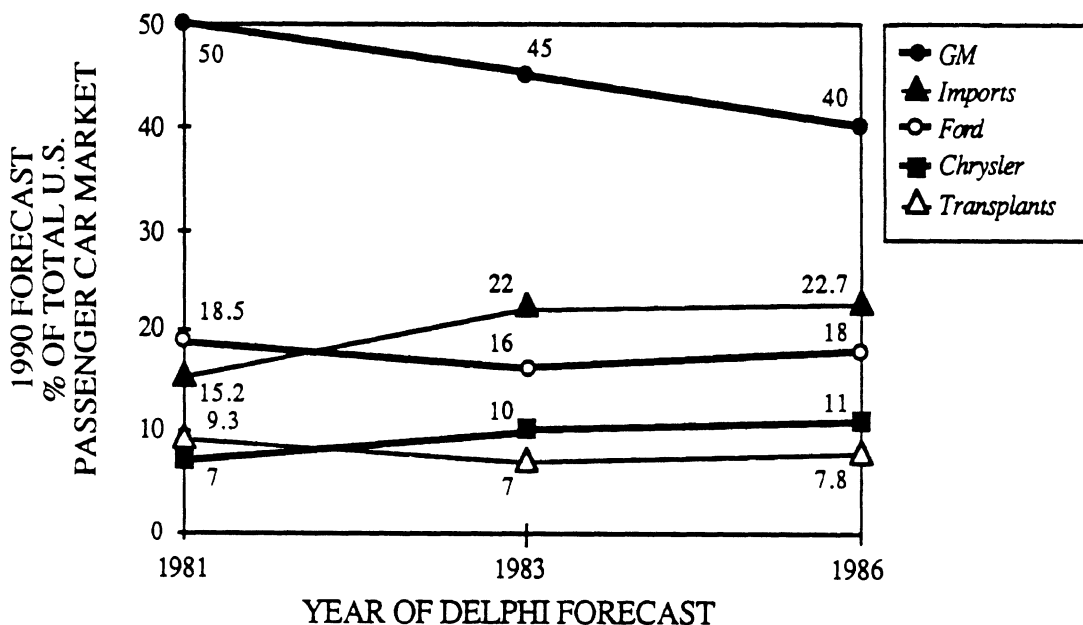
Discussion of Panelists’ Comments

There is a general consensus that transplant volume will expand greatly, traditional domestics will increase their dependence upon captive imports and transplants to supplement product offerings, and that the traditional domestics face a tough battle to maintain present market share levels.

Comparison of Vehicle Manufacturer and Supplier Panelists

The two panels were within one percentage point in every category.

Trend From Previous Delphi Surveys



Strategic Considerations

The Big 3 are expected to face an ever-increasing battle for market share. It is forecast that sales of domestic-produced Big 3 products will decline by six points over the next ten years (this compares well to MKT-7A, which forecasted an approximate five point decline). Suppliers who are dependent upon traditional Big 3 production will face a compounded problem: market rates are declining in a stagnant market, OEMs are shifting a greater part of business cycle risk upon suppliers as they "decontent" their internal supply capabilities, and the number of competitors is increasing due to the significant increase in transplant component operations. It appears that suppliers must diversify their customer base (preferably increasing business with transplants) and compete not strictly on cost or price but on value delivered. The relatively wide separation in quartile range for most categories suggests reasonable uncertainty on the part of the panelists; e.g., the 1995 transplant range is from 3.6 to 8% of market share. Clearly, fierce competition will be a way of life for the next decade.

MKT-22. What share of the U.S. light trucks (0-14,000 GVW) market do you predict will be supplied by U.S. and foreign vehicle manufacturers?

	<u>U.S. Light Truck Market</u> <i>Percent Share</i>				
	<u>Est.</u> <u>1985</u>	<u>Median Response</u>		<u>Interquartile Range</u>	
		<u>1990</u>	<u>1995</u>	<u>1990</u>	<u>1995</u>
GM	35.8%	35.4%	34.4%	34.4/35.5%	33.0/35.7%
Ford	27.3	27.2	27.1	26.1/27.9	25.8/27.7
Japanese Imports	16.5	16.6	17.2	15.0/17.6	14.5/18.0
Chrysler	13.4	13.4	13.3	13.0/14.0	12.0/14.5
AMC/Renault	4.1	4.0	3.5	3.0/4.0	3.0/4.0
Japanese-Manufactured in U.S.	2.5	3.0	4.0	2.8/4.0	3.0/5.0
VW of America	0.4	0.3	0.3	0.0/0.4	0.0/0.4
Other Foreign Manufacturers in U.S.	0.0	0.0	0.0	0.0/0.5	0.0/1.0
Other Imports (Produced outside N. America)	<u>0.0</u>	<u>0.1</u>	0.2	0.0/1.0	0.0/0.2
TOTAL	100%	100%	100%		

Selected Edited Comments

Chrysler's greatest growth potential over the next ten years will be in the light-truck market. Ford and GM will lose share to Chrysler and imports.

Discussion

Panelists believe that the "Big 3" market share of the U.S. light-truck market will decline from its present 76.5 percent to 74.8 percent by 1995. Most of this loss will be to U.S.-based Japanese facilities. The interquartile ranges are fairly good across all segments, although there seems to be some uncertainty as to volume of Japanese imports that will be replaced or supplemented by U.S. production.

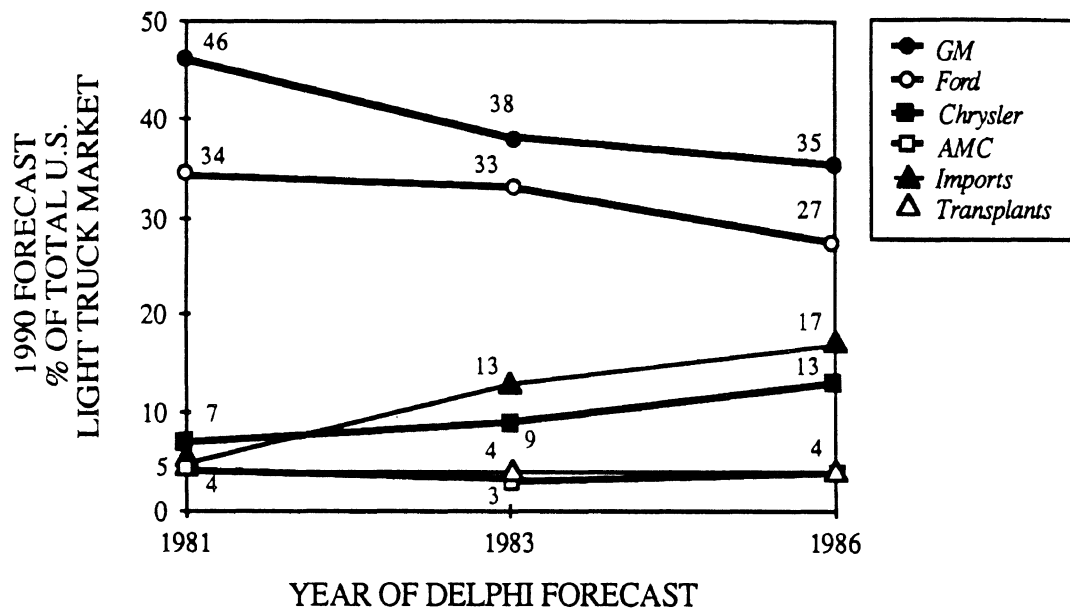
Discussion of Panelists' Comments

The most significant comment accurately characterizes the transformation occurring at Chrysler.

Comparison of Vehicle Manufacturer and Supplier Panelists

There is close agreement; the two panels were within one percentage point in every category.

Trend From Previous Delphi Surveys



Strategic Considerations

It is viewed that the domestic position is somewhat more defensible in the light-truck market than in the passenger car market. Owing in part, no doubt, to the 25% tariff imposed on light-truck vehicles entering the U.S. The Japanese strategy appears to concentrate primarily on the passenger car market. (Only Nissan and, shortly, Isuzu produce or are planning to produce, compact utility or pickup truck vehicles within the U.S.)

MKT-23. What is your estimate of the foreign import share of the U.S. *passenger car* market in the following years?

U.S. Import Passenger Car Market
Percent Share

Median Response

<u>Country of Origin</u>	<u>Est. 1985</u>	<u>1990</u>	<u>1995</u>
Japan	18.5%	20.0%	20.0%
Korea & Other Asia	0.0	2.0	2.5
Western Europe	5.5	5.3	5.4
Latin America	0.0	0.2	0.5
Other (Yugoslavia, etc.)	<u>**</u>	<u>0.6</u>	<u>0.5</u>
TOTAL	24.0%	28.1%	28.9%

**Less than 0.

5%.

Interquartile Range

Japan	18.0/22.0	17.0/23.0
Korea & Other Asia	1.0/3.0	1.5/4.0
Western Europe	5.0/6.0	4.5/6.0
Latin America	0.0/1.0	0.0/1.0
Other (Yugoslavia, etc.)	0.1/1.0	0.5/1.0

Selected Edited Comments

Assumed Latin America to include Mexico.

Japanese firms will shift production to U.S. sites while taking direct imports upscale. Both low-priced captives and Japanese nameplate shares will increase. Hyundai is likely to be the only direct importer from Korea; all other Korean imports will be captive. All Latin American imports will be captive. Vehicles from the Eastern Bloc, China, and India will be technologically deficient for the U.S. market and will not sell in great volumes.

Discussion

It is forecast that over the next ten years Japan will remain the dominant country of origin for imported passenger cars. Overall foreign penetration is expected to grow from its present estimate of 24% to 28.9% by 1995. This increase is to be supported primarily by new shipments from Korea and other Asian countries, Latin America, and Other (non-European or Japanese countries). Japan also is expected to modestly increase

imports into the U.S., but this effort will be moderated by new transplant production capacity within the U.S. Interquartile ranges are fairly close, with expectations ranging toward greater import penetration.

Discussion of Panelists' Comments

Comments indicate a general pattern of the Japanese supplementing mid-priced imports with transplant capacity while increasing the direct importation of higher-priced models, and other non-European countries concentrating on low-priced entry-level vehicles (primarily captive imports).

Comparison of Vehicle Manufacturer and Supplier Panelists

All category medians were within one percentage point of each other. The supplier panelists believed that Latin American and "Other" countries would contribute a greater amount of the total import sales.

Trend From Previous Delphi Surveys

The overall forecast for import market share in 1990 has been steadily increased over the last three surveys, from 15.8% in 1981 to 27% in 1983 to this year's estimate of 29%. The most significant change has been in the portioning of the total import pie: Korea, Latin America, and "other" countries such as Yugoslavia have all made major advances in their domestic automotive industries. The Japanese portion of the mix has fallen in light of this growth and the increase of Japanese transplant capacity in the U.S.

Strategic Considerations

As industries mature, individual countries can no longer monopolize world production. Manufacturing technologies become distributed and entry-level skill requirements are reduced to the point that the basic product can be made literally anywhere in the world. This fact is evident as the forecast for import penetration into the U.S. passenger car market is 29% for 1995. Reviewing world production data, it appears that the U.S./Canadian, Japanese, and European production levels have all plateaued at approximately 27-33% each of the total world vehicle production. In the early 1900's the U.S. owned well over 90% of the entire world market itself.

A very small slice (approximately five percent) remains for the other countries, not covered above, to divide. International sourcing patterns suggest that these smaller countries will expand their output, but total output of these industries will be spread over dozens of nations (although primarily concentrated in Korea, Mexico, and Brazil).

Obviously, two key factors will determine the import penetration: (1) Currency valuation compared to the dollar and (2) political environment. We believe it is safe to assume that the trade issue will be of great significance in the next several years. This prospect is amplified by the fact that the trade issue has such a broad political base presently from agriculture and forest products to motor vehicles and steel to electronics and telecommunications. The present level of negative trade balance is probably unacceptable and will be rectified by one force or another. The next economic downturn could trigger particularly strong trade action.

There was a discrepancy between the forecasts of MKT-21 and MKT-23. Total import penetration in question MKT-23 is approximately five market share points higher for both forecast periods. In part, this can be explained by captive imports which panelists

most likely included as a part of the "Big 3" market shares in MKT-21, but listed separately in MKT-23. Relating this to MKT-8, approximately three points of the difference may be due to captive imports.

MKT-24. What share of the U.S. market for imported (noncaptive) passenger cars will be supplied by these manufacturers? *Exclude cars sold through domestic producers.*

<u>U.S. Import Passenger Car Market</u>					
<i>Percent Share</i>					
<u>Manufacturer</u>	<u>Est. 1985</u>	<u>Median Response</u>		<u>Interquartile Range</u>	
		<u>1990</u>	<u>1995</u>	<u>1990</u>	<u>1995</u>
Toyota	23.6%	23.3%	22.8%	21.6/24.0%	20.0/24.0%
Nissan	20.4	20.0	20.0	18.3/21.0	16.0/20.8
Honda	15.5	16.0	15.7	15.2/17.0	15.0/17.0
Mazda	8.0	8.0	8.1	7.9/9.0	7.6/9.0
Subaru	6.8	6.8	6.9	6.5/7.0	6.2/7.0
Volkswagen	5.4	5.0	5.1	4.7/5.2	4.0/5.0
Volvo	4.0	4.0	4.0	3.8/4.0	3.6/4.0
Mercedes	3.3	3.3	3.3	3.0/3.5	3.0/3.6
BMW	3.3	3.3	3.3	3.0/3.5	3.0/3.5
Audi	2.8	2.8	2.8	2.6/3.0	2.6/3.0
Mitsubishi	1.9	2.0	2.0	1.9/2.0	1.9/2.2
Saab	1.5	1.5	1.5	1.0/1.5	1.0/1.5
Hyundai	0.0	1.0	1.5	0.5/3.0	1.0/5.0
Other	<u>3.5</u>	<u>3.0</u>	<u>3.0</u>	2.4/4.0	2.0/4.4
TOTAL	100%	100%	100%		

Selected Edited Comments

Firms will build or increase North American assembly capacity during the 1986–1995 time frame.

Toyota, Nissan, Honda, and Mazda percent share will shrink due to North American transplant operations.

Honda estimate includes Acura. Nissan and Toyota also includes upscale franchises.

Discussion

Individual manufacturers' market shares of the U.S. passenger car import market are expected to change very little between estimated 1985 levels and the 1995 forecast. However, those of Toyota and Nissan are expected to shrink modestly.

Discussion of Panelists' Comments

Transplant capacity of Toyota, Nissan, Honda, and Mazda is seen as the primary reason these corporations will experience flat or declining market share (although total company sales are increased when transplant sales are considered).

Comparison of Vehicle Manufacturer and Supplier Panelists

All category medians for both panels are within one-half of one percentage point of each other, except for the forecasts for Nissan (manufacturers forecast market shares up to three points lower) and Honda (manufacturers forecast market shares up to three points higher).

Strategic Considerations

For domestic component suppliers, the shift of Japanese sourcing from imports to transplant facilities does offer some opportunity for increased business (limited, of course, to the amount of actual manufacturing-supported value-added that is produced in the U.S. and to the openness of the procurement bid procedure). For the OEM, the actual sourcing of the Japanese vehicle is not as much a concern as is the competitiveness of the domestic products vis-a-vis the foreign nameplates on the showroom floor (Honda Accords and Civics offer the same quality and price whether sourced from Japan or Ohio). Some vehicles manufactured in the U.S. are very profitable because the product package (including styling, performance, warranty, etc.) allows the manufacturer to charge a premium price.

The differences in the manufacturers' and suppliers' forecast for Nissan and Honda are significant. The relative performance of these companies could change significantly.

MKT-25. What share of the U.S. market for imported (noncaptive) light trucks will be supplied by these manufacturers? Exclude light trucks sold through domestic producers.

<u>Manufacturer</u>	<u>U.S. Import Light Truck Market</u>				
	<u>Est.</u> <u>1985</u>	<u>Percent Share</u> <u>Median Response</u>		<u>Interquartile Range</u>	
		<u>1990</u>	<u>1995</u>	<u>1990</u>	<u>1995</u>
Toyota	47.2%	46.6%	46.2%	45.0/47.2%	43.0/47.4%
Nissan	21.2	21.0	21.1	20.0/21.2	20.0/21.5
Mazda	16.6	16.4	16.5	15.0/17.0	15.0/17.0
Isuzu	11.2	11.0	11.0	10.6/12.0	10.0/11.5
Mitsubishi	3.8	4.0	4.0	3.5/4.0	3.3/5.0
Other	<u>0.0</u>	<u>1.0</u>	<u>1.2</u>	0.0/2.0	0.0/3.0
TOTAL	100%	100%	100%		

Selected Edited Comments

Expect Toyota to establish a North American assembly site by 1995.

Discussion

Individual manufacturers' market shares of the U.S. light-truck import market are expected to change very little between estimated 1985 levels and the 1995 forecast. Interquartile ranges are very close.

Comparison of Vehicle Manufacturer and Supplier Panelists

There were no significant differences between the two panels except for the 1995 forecast for Nissan, which the manufacturers predicted to be much lower than the suppliers.

Trend From Previous Delphi Surveys

The most significant change has been the success of Isuzu and Mitsubishi at the expense of Nissan and Mazda. Toyota forecasts remain essentially unchanged.

Strategic Considerations

Market share gains within this segment are being made through the introduction of specialized, compact-utility vehicles and specialized compact-pickup packages (such as turbos, turbo diesels, sport packages, etc.). This indicates that the target marketing efforts being made within the passenger car market are also applicable to the light-truck market. The introduction of these vehicles also shows the skill that the Japanese have in identifying a U.S. market niche and executing a product to meet the demand.

MKT-26. Indicate your projections for total U.S. market shares for the passenger car classes listed below in the years 1990 and 1995.

U.S. Passenger Car Segmentation
Median Results

Segment	<u>1990</u>		<u>1995</u>	
	<u>Traditional Domestic</u>	<u>Import</u>	<u>Traditional Domestic</u>	<u>Import</u>
Subcompact – Regular	12%	22%	11%	22%
Subcompact – Specialty	5	13	5	12
Compact – Regular	20	26	20	25
Compact – Specialty	10	11	10	11
Intermediate – Regular	24	13	23	14
Intermediate – Specialty	9	6	10	6
Full-Size	10	1	10	1
Luxury – Regular	6	5	6	5
Luxury – Specialty	4	3	5	4
	<u>100%</u>	<u>100%</u>	<u>100%</u>	<u>100%</u>

Interquartile Ranges

Subcompact – Regular	10/13%	20/25%	10/12%	20/23%
Subcompact – Specialty	5/5	10/15	5/6	11/14
Compact – Regular	20/20	23/27	18/21	23/25
Compact – Specialty	10/10	10/13	10/12	10/14
Intermediate – Regular	22/25	10/15	20/23	11/15
Intermediate – Specialty	8/10	5/8	9/12	5/8
Full-Size	10/10	0/2	9/11	0/2
Luxury – Regular	5/6	5/6	5/6	5/6
Luxury – Specialty	4/5	3/5	4/5	3/5

Selected Edited Comments

An aging population will place a higher demand on specialty cars.

Answer for North America (U.S. and Canada).

Loss of traditional domestic full-size market is due to aging of younger buyers and older buyers (traditionally “full-size” buyers) dropping out of the domestic market; imports are moving up-market.

Specialty vehicles will gain in importance as a way to be distinctive in an increasingly blurry market.

Discussion

This question presents the panelists' forecast of traditional domestic and import product mix by nine segments. The forecast indicates no significant changes between 1990 and 1995 and is within four percentage points in every segment of the 1986 mix. The major changes projected from present are a shift away from full-size and compact specialty sales in the mix of traditional domestics to a higher concentration of subcompact specialty and compact regular vehicles. The interquartile ranges are fairly close.

Discussion of Panelists' Comments

The comments indicate two major challenges for the domestic producers: the ability to differentiate within a crowded marketplace through specialty vehicles and the need to win back and build loyalty with customers lost to imports.

Comparison of Vehicle Manufacturer and Supplier Panelists

Each panel was within two percentage points of each other on every median.

Strategic Considerations

The stability indicated in the above market segmentation is the sum total of the intense competition by individual corporations for market share. Mature markets are characterized by flat sales growth, over-capacity, and intense competition through product differentiation, predatory pricing, and heightened promotion. All characteristics result in the reduction of margins. Successful corporations will be those that identify and pursue new market segments, win competitors' customers, meet customers' perceived needs and ideals, and compete creatively through all avenues of the marketing mix (product, price, promotion, and distribution).

Please see tables on page 67 for examples of segmentation.

MKT-27. Indicate your projections for total U.S. market share for the light-truck classes listed below in the years 1990 and 1995.

<u>U. S. Light-Truck Segmentation</u>				
<u>Median Results</u>				
<u>Segment</u>	<u>1990</u>		<u>1995</u>	
	<u>Traditional Domestic</u>	<u>Import</u>	<u>Traditional Domestic</u>	<u>Import</u>
Compact – Pickup	25%	66%	26%	62%
Regular – Pickup	29	0	26	1
Compact – Van	15	17	21	19
Regular – Van	15	2	12	1
Compact – Utility	10	13	10	15
Regular – Utility	6	2	5	2
	<u>100%</u>	<u>100%</u>	<u>100%</u>	<u>100%</u>

<u>Interquartile Ranges</u>				
Compact – Pickup	22/25%	60/66%	23/30%	60/65%
Regular – Pickup	28/30	0/5	25/27	0/5
Compact – Van	15/18	12/20	17/22	15/20
Regular – Van	12/15	0/5	10/15	0/3
Compact – Utility	10/12	10/15	10/15	10/15
Regular – Utility	5/8	0/5	5/6	0/5

Selected Edited Comments

Answer for North America (U.S. and Canada).

The U.S. will dominate in large, light truck categories. The U.S., due to production capability, will be the strength in compact van and compact utility. Imports will continue to be the leader in the compact pickup area.

I believe the manufacturers will concentrate more on the compact van and utility markets—staying away from the full-size pickup and full-size van markets.

Discussion

The product mix of both the traditional domestic and import manufacturers is forecast to remain relatively the same through 1995. There is an expected continued shift towards the compact segment of the light-truck market. Interquartile ranges are fairly close.

Comparison of Vehicle Manufacturer and Supplier Panelists

The only significant difference between the two panels was in the 1990 forecast: the supplier forecast contained a larger percent of compact pickups, at the expense of regular pickups and regular vans, in the mix. All other categories were essentially the same.

Strategic Considerations

Although the relative mix of the light-truck market is forecast to remain constant, marketing of the light truck will become increasingly challenging. The passenger car and light-truck segments have become blurred, forming what can be considered a new segment: the "multi-purpose" vehicle. Manufacturers will continue to focus on the increased acceptance of the light truck as a primary vehicle, and the many types of customer needs (passenger, cargo, and towing capabilities; reliable transportation; etc.) that can be met through a light-truck package. As a result, a proliferation of vehicles will be marketed in between the segments identified above: mid-sized pickups, extended compact vans, and four-door compact utilities on extended wheelbases, etc.

VEHICLE SEGMENTATION EXAMPLES

<u>Passenger Cars</u>	<u>Domestic</u>	<u>Foreign</u>
Subcompact – Regular	Chevette, Escort, Horizon	Civic, Corolla, Sentra, Tercel, B23
Subcompact – Specialty	Fiero, EXP, Turismo	CRX, Prelude, RX-7 MR-2, Scirocco
Compact – Regular	Cavalier, Tempo, Reliant	Accord, Camry, 626 Stanza, Tredia
Compact – Specialty	Camaro, Grand Am Mustang, Laser	Celica, 300ZX, Supra 200 SX, Impulse
Intermediate – Regular	Celebrity, Cutlass Supreme Taurus, New Yorker	Volvo 740, Maxima, Cressida Saab 900, Audi 4000
Intermediate – Specialty	Monte Carlo, Thunderbird Le Baron GTS, Eagle	Saab 900, Volvo GLT 740 Turbo
Full-size	Caprice, Crown Victoria Grand Fury	
Luxury – Regular	Cadillac, 98 Town Car	Audi 5000, BMW, Mercedes Volvo 760, Saab 9000
Luxury – Specialty	Corvette, Toronado, Seville Continental, Mark VII	Porsche, Audi 5000, Quattro, Jaguar, Ferrari
<u>Light Truck</u>	<u>Domestic</u>	<u>Foreign</u>
Compact – Pickup	S10, Ranger	Nissan, Mazda, Toyota
Regular – Pickup	GM, Ford, and Chrysler Conventionals	
Compact – Van	Astro, Aerostar, Caravan	Toyota Van
Regular – Van	Chevy Van, Econoline, Tradesman	VW Vanagon
Compact – Utility	S/T Blazer, Bronco II, Cherokee	Trooper, Montero
Regular – Utility	Blazer, Bronco, Wagoneer	

MKT-28. Indicate your projections for total U.S. market shares for the EPA* passenger car classes listed below in the years 1990 and 1995.

EPA Class Size	Est. 1985	<u>Median Response</u>		<u>Interquartile Range</u>	
		<u>1990</u>	<u>1995</u>	<u>1990</u>	<u>1995</u>
Two-seat	2%	2%	3%	2/3%	2/4%
Minicompact	0	1	2	1/2	1/4
Subcompact	11	11	12	10/13	10/15
Compact	32	34	34	31/35	31/36
Midsized	37	37	35	34/38	30/39
Large	<u>18</u>	<u>15</u>	<u>14</u>	15/18	10/17
TOTAL	100%	100%	100%		

*This is the first Delphi survey in which we are using EPA classification rather than a constantly changing industry classification. See page 70 for a reference of passenger car models by EPA classification.

Selected Edited Comments

The aging population and smaller family size will cause a trend to smaller cars.

Prices will be higher due to technological improvements, which will force people to buy smaller cars.

EPA classification does not correlate well with market segmentation. What similarity is there between a Fiero and a 560 SL other than 2 seats?

Macro-economic and demographic forces forecasted over the next decade seem to suggest that the distribution has just about stabilized.

Minicompacts will gain some acceptance in the U.S. because of low pricing, urban congestion, and superior gas mileage. Large cars will increase share because of diminished price differential between large and midsize car segments.

Two seats very near saturation today—limited future growth. Minis have strong potential, somewhere between five and ten points.

Discussion

The marketing panelists project a continued shift away from the traditional large and midsize vehicle segments and into the compact, subcompact, minicompact, and two-seat segments. The segments with the largest forecast change (from present to 1995) are the large segment, with a 22% decline, and the minicompact segment, which is expected to increase to 2% of the market from zero today.

The interquartile range appears quite narrow. However, the range as a percentage of the median is substantial in some cases, indicating reasonable uncertainty.

Discussion of Panelists' Comments

Overall, the panelists believe that the market shares as presented by the EPA segmentation scheme will be fairly constant between 1990 and 1995, the significant changes occurring between 1985 and 1990. American demographic and economic parameters are seen to have stabilized and thus could result in a relatively stable long-term market segmentation.

Comparison of Vehicle Manufacturer and Supplier Panelists

Both panels were essentially the same, with all responses within two percentage points of each other.

Strategic Considerations

In terms of vehicle dimensions, there will be a continued shift towards the small end of the market. This shift will be more evolutionary than revolutionary (the greatest percent point change, three, is spread out over five years) and is expected to remain fairly constant in the early 1990s. The shift can be tied into other trends such as increased penetration rates for four and six cylinder engines, increased use of front wheel drive, and reduction of weight. However, the EPA classification scheme does not permit adequate market/profit projections due to its dependence on vehicle size and not market served (for example, both the Ford Taurus and the Continental are classified as midsized but result in thousands of dollars difference in the profit statement of Ford Motor Company). Therefore, this question was reasked with industry classifications. (Please see MKT-26.)

1986
EPA CLASSIFICATION

	MINICOMPACT	SUBCOMPACT	COMPACT	MID SIZE	LARGE	TWO SEATER
Subcompact		Chevette, T1000, Sentra, Turismo, Charger	Escort, Lynx, Horizon Omni, Encore, Alliance, Golf			Fiero, EXP
Compact		Camaro, Firebird, Mustang, Capri, Laser, Daytona, Accord	Cavalier, T2000, Firenza, Skyhawk, Tempo, Topaz, Grand Am, Calais, Somerset, Skylark	Le Baron, Reliant, Aries		
Intermediate			Thunderbird, Cougar, Eagle	Celebrity, 6000, Bonneville, Ciera, Supreme, Century, LTD, Marquis, Caravelle, New Yorker, 600, Monte Carlo, Grand Prix, Regal, GTS, Lancer		
Full Size				Diplomat, Grand Fury, Fifth Avenue	Chevrolet, Pontiac, 88, Le Sabre, Crown Victoria, Grand Marquis	
Luxury			Cimarron	Toronado, Riviera, Seville, Eldorado, Continental, Mark VII	98, Electra, Deville, Town Car	Corvette
	GTV, Sprint, RX-7, 911, Cabriolet, Forssa	Coupe, Quattro, 4000S, Spectrum Civic, Prelude, Accord, I-Mark, Impulse, XJ-8, X3-6, 190, Cordia, Mirage, Starion, Tredia, Pulsar NX, Sentra, 200 SX, 300 ZX 2+2, Colt, Conquest, Fuego, Corniche II, Subaru XT, Forssa V, Celica, Supra, Corolla Sport, Tercel, Scirocco	5-Series, Nova, 323, 626, 300E, 560 Sec, XR471, Galant, Maxima, Stanza, 505, Camarique, 900, Subaru Sedan 3-door, Camry, Corolla, Cressida, GTI, Jetta, Jetta GLI, Quantum, 240DL/GL	5000 CS, 500 S, 420 SRL, 560 SRL, Silverspur, 740/760	9000	Spider, X 1/9, Civic, Coupe, 560 SI, 300ZX, XT-DI, 11R2

DOMESTIC

IMPORT

MKT-29. What is your forecast of U.S. passenger car market shares by body type?

Passenger Car Body Mix

	<u>Est. 1985</u>	<u>Median Response</u>		<u>Interquartile Range</u>	
		<u>1990</u>	<u>1995</u>	<u>1990</u>	<u>1995</u>
4-door Sedan	47.0%	47%	47%	45/49%	43/50%
4-door Hatchback	7.0	7	7	6/8	6/9
4-door Station Wagon	<u>8.0</u>	<u>8</u>	<u>7</u>	7/9	6/10
<u>Subtotal 4-door</u>	62.0	62	61		
2-door Sedan	24.0	24	24	22/25	22/26
2-door Hatchback	13.5	13	14	12.5/14.5	12/15
Convertible	<u>0.5</u>	<u>1</u>	<u>1</u>	0.5/1	0.5/1
<u>Subtotal 2-door</u>	38.0	38	39		

Selected Edited Comments

I see no significant change in percent of body mix.

Not much change, except for a small growth in convertibles at the expense of other 2-door vehicles.

Passenger cars will be an overall smaller market—4-door wagons will be replaced by mini-vans and utility trucks.

Two-seat segment will add to convertible share. Hatchbacks shaped like notchbacks will take some sedan share. FWD passenger-car-based people vans will continue to take station wagon share.

Discussion

Forecasts of body type mix in 1990 and 1995 in the U.S. passenger car market show a remarkably little change from the present. The 1995 forecast is within one market share point of the present mix in each of the six categories. The interquartile ranges display a high degree of consensus on this forecast for all years under consideration.

Discussion of Panelists' Comments

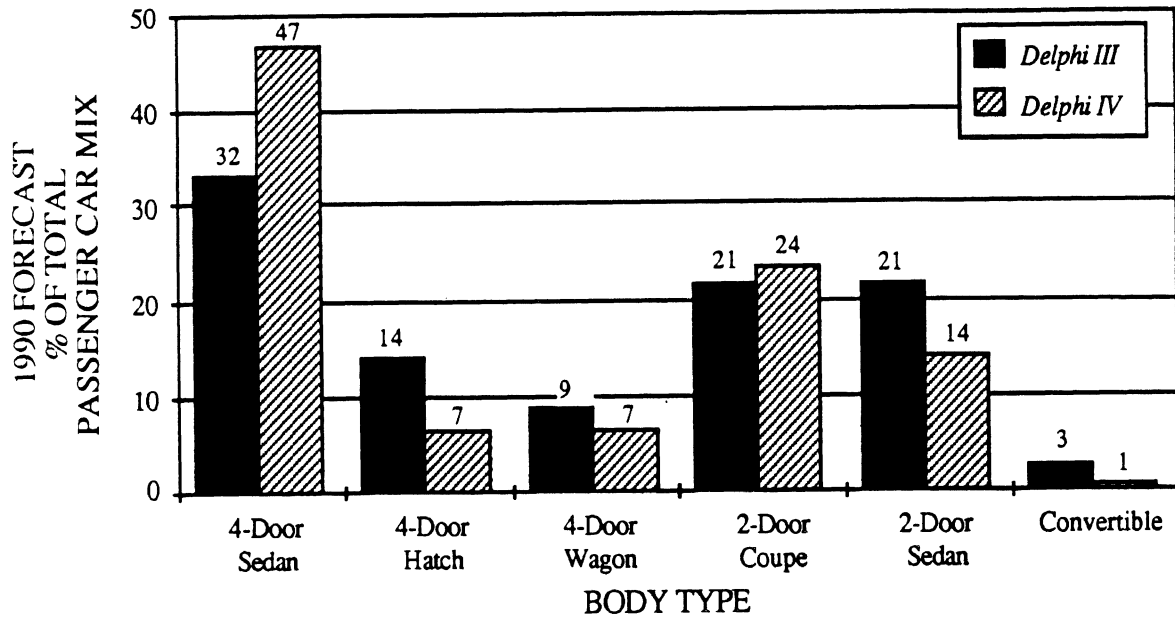
The panelists' comments were limited to noting the slight growth of convertible sales within the two-door segment and the shift away from passenger-car station wagons and into the light-truck mini-van segment.

The stability of the present market is perhaps leading our panelists to their expectations for a stable model mix future. One wonders what their reaction would have been in a more unstable market.

Comparison of Vehicle Manufacturer and Supplier Panelists

Both panels were within one to two percentage points of each other in every body-style category.

Trend From Previous Delphi Surveys



Strategic Considerations

In a world where form follows function, the forecast for four-door vehicles as a percentage of total passenger car mix has been increased from the past Delphi forecast to the 1985 share: 62 percent. The forecast indicates that manufacturers of door-related components may expect this mix to stay constant through 1995. For the domestic car companies, this preference for four-door could should be met by introducing high performance in a four-door skin.

MKT-30. It has been suggested that vehicle size will cease to be the primary distinguishing feature of U.S.-produced passenger cars and that instead the market will be divided into Lower Technology/High Volume (e.g., Cavalier, Escort, Aries) and High Technology/Lower Volume (e.g., Corvette, Mark VII, LeBaron GTS) segments. In your opinion, what other features will be used to distinguish vehicles from one another within each segment to achieve product differentiation? Please rank the following feature that might be used (1 = most emphasis, 7 = least emphasis).

<u>Low Technology/High Volume</u>		<u>High Technology/Low Volume</u>	
<u>Ranking</u>		<u>Ranking</u>	
1.	Economics	1.	Design
2.	Durability	2.	Technical
3.	Design	3.	Comfort
4.	Engine	4.	Engine
5.	Utility	5.	Durability
6.	Comfort	6.	Economics
7.	Technical	7.	Utility

<u>Single Responses</u>	<u>Ranking</u>	<u>Single Responses</u>	<u>Ranking</u>
Safety	4	Safety	2
Fun to Drive	6	Exclusivity	4
Handling	3	Fun to Drive	4
Image	5	Handling	1
		Image	2

Selected Edited Comments

Don't agree with "high/lower" technology dichotomy. I think size and function will be dominant distinguishing characteristics.

Market won't be sharply segmented; it will be a continuum. Buyers will expect value, style, performance, and features at all price levels.

A record number of product choices will be available in the U.S. in the next ten years. It will be a market of many small niches, which each OEM will attempt to get into through differentiation. These questions should be directed toward the public, not this audience.

Discussion

The responses to this question generally fall within the expected: attributes for low-technology/high-volume cars focus on economics and durability-related functions, while high-technology/low-volume vehicles focus on design, comfort, and component

technology. It appears that the panelists answered this question, with more consideration for the attributes that match with a high-volume/low-volume segmentation and not to the high technology/low technology issue. This observation is made in the context of panelists' comments.

Discussion of Panelists' Comments

As with MKT-31, the panelists disagreed with a segmentation that is "too simple" and focuses on the product offered and not on the customer function served. We agree with this observation, but a simple breakdown is often helpful in developing the basic issues.

Comparison of Vehicle Manufacturer and Supplier Panelists

The overall average ranking for both groups was almost exact. There were wider variations in ranking within each category for the manufacturers than the suppliers.

Strategic Considerations

See discussion under MKT-31.

MKT-31. It has been suggested that the U.S. passenger car market will consist of two major segments: Lower Technology/High Volume (e.g., Cavalier, Escort, Aries), and High Technology/Lower Volume (e.g., Corvette, Mark VII, LeBaron GTS). Please provide an estimate of the percent share for these two market segments in the years indicated.

	<u>Median Response</u>	
	<u>1990</u>	<u>1995</u>
Lower Technology/High Volume	70%	65%
High Technology/Lower Volume	30	35
	<u>Interquartile Range</u>	
Lower Technology/High Volume	60/80%	60/80%
High Technology/Lower Volume	15/35	20/40

Selected Edited Comments

All models will embrace a "higher technology."

I disagree with the premise. The greatest level of technology will be put in areas of greatest competition and volume potential (small- and mid-size vehicles).

Overly simplistic segmentation; a continuous spectrum will develop. Example: the GTS is not really in the high-tech class. It is a basic volume car with a generous option sheet.

Not a realistic form of segmentation. Taurus is considered to be a "high-technology" car, but will be a high volume vehicle.

The lower-tech cars will offer pretty much the same advantages as the high tech cars.

Estimate is based on unit sales, not sales dollars.

Discussion

The market mix between the defined segments of "lower technology/high volume" and "high technology/lower volume" was forecast to be 70% and 30% in 1990 and 65% and 35% in 1995, respectively. The interquartile ranges were relatively large due to the broad segment classification and uncertainty of the panelists as to exactly how various vehicles would be categorized.

Discussion of Panelists' Comments

The panelists disagreed with this type of segment dichotomy. At the root of the disagreement is the segmentation's focus on the product and not the customer to be served. This is why the segmentation scheme is viewed as "too simplistic"; consumer tastes and wants are sliced into very thin market niches.

Comparison of Vehicle Manufacturer and Supplier Panelists

Both panels were very close, with median responses being between one and three percentage points of each other.

Strategic Considerations

The comments made on this question indicate the necessity of relating all business activities—in addition to the product itself—back to the customer. Technology should not be applied at any production volume strictly for technology's sake. The technology must match the function to be served in a manner that provides customer value. It is also clear that the market is expected to be highly fragmented—in effect, made up of many niches. Therefore, the concept of two segments is overly simplistic but still generally useful to broadly characterize the market.

MKT-32. Indicate your estimate of how U.S. vehicles compare today and will compare in 1990 and 1995 with *Japanese* vehicles.

	Percent of Total Respondents for Each Variable		
	<u>Higher Quality</u>	<u>About Equal</u>	<u>Lower Quality</u>
<u>Fit and Finish</u>			
Today	0%	9%	91%
1990	4	72	24
1995	13	78	9
<u>Basic Structural Integrity of Body and Chassis</u>			
Today	32	46	22
1990	32	60	8
1995	34	63	3
<u>Engine & Drivetrain Integrity and Durability</u>			
Today	22	25	53
1990	16	61	23
1995	23	68	9
<u>Maintenance Requirements</u>			
Today	15	34	51
1990	8	69	23
1995	11	81	8
<u>Corrosion Resistance</u>			
Today	60	28	12
1990	44	55	1
1995	39	58	3
<u>Ride & Comfort</u>			
Today	51	33	16
1990	35	58	7
1995	35	64	1
<u>Styling</u>			
Today	29	42	29
1990	23	69	8
1995	24	72	4

Percent of
Total Respondents for Each Variable

	<u>Higher Quality</u>	<u>About Equal</u>	<u>Lower Quality</u>
<u>Handling</u>			
Today	15%	46%	39%
1990	15	70	15
1995	19	71	10
<u>Safety</u>			
Today	72	24	4
1990	62	35	3
1995	53	46	1
<u>Total Car Reliability</u>			
Today	14	13	73
1990	11	56	33
1995	14	71	15
<u>Fuel Economy</u>			
Today	3	15	82
1990	4	44	52
1995	8	61	31
<u>Driveability</u>			
Today	14	47	39
1990	14	70	16
1995	15	81	4

Selected Edited Comments

The Japanese are the pace setters for functional, well engineered and built, affordable, high-volume cars. U.S. car makers will be doing well if they can keep the pace by 1995.

Ride and comfort of 1990 and 1995 will be equal but only for larger cars; differences will remain in small cars (U.S. at the disadvantage).

Discussion

The responses to this question indicate that the Japanese presently enjoy a competitive advantage in fit and finish, engine and drivetrain integrity and reliability, maintenance requirements, total car reliability, and fuel economy. The U.S. holds advantages in corrosion resistance, ride and comfort, and safety. By 1992, the only advantage—one way or the other—will be held by the U.S. in safety. There is a clear convergence within all product attributes to the classification "about equal."

Comparison of Vehicle Manufacturer and Supplier Panelists

There were several categories where the vehicle manufacturers and the suppliers differed. For basic structural integrity of body and chassis, suppliers viewed this attribute as equal from the present through 1995. Manufacturers see the domestics having an edge now and in 1990. Manufacturers view maintenance requirements as equal through all three time periods; suppliers feel foreign firms hold an edge now with the countries evening out in the future. A third area of difference was corrosion resistance, where the manufacturers forecast a U.S. advantage through 1995; only in the present will the suppliers give the edge to the domestics.

Comparison of Replies to MKT-32 and T-7

Both panels forecast that each vehicle attribute, except safety, will be non-differentiated by 1995. The only advantage—to Japan or the U.S.—is seen to be the U.S.'s edge in safety.

Trend From Previous Delphi Surveys

The results from the 1983 survey were very similar. The 1983 survey shows all product attribute advantages held by either the U.S. or Japan would be equalized by 1990. The 1986 survey shows the U.S. maintaining an advantage in safety and the Japanese holding onto an advantage in fuel economy.

Strategic Considerations

If, as forecast, U.S. and Japanese cars reach parity on quality, these items will become less significant in product-differentiation. Other factors, such as technology, styling, price, and selling and sourcing, will increase in competitive importance.

It is clear that today's customer is more quality conscious than in the recent past. Increasingly, world-class quality, however it is measured, is likely to become a basic demand. All vehicles will have to meet these requirements. Quality parity is not an option for any manufacturer or supplier that will be successful.

MKT-33. Indicate your estimate of how U.S. vehicles compare today and will compare in 1990 and 1995 with *German* vehicles.

	Percent of Total Respondents for Each Variable		
	<u>Higher Quality</u>	<u>About Equal</u>	<u>Lower Quality</u>
<u>Fit and Finish</u>			
Today	0%	21%	79%
1990	3	53	44
1995	8	66	26
<u>Basic Structural Integrity of Body and Chassis</u>			
Today	4	31	65
1990	1	56	43
1995	8	58	34
<u>Engine & Drivetrain Integrity and Durability</u>			
Today	2	34	64
1990	4	52	44
1995	4	64	32
<u>Maintenance Requirements</u>			
Today	38	40	22
1990	28	60	12
1995	28	63	9
<u>Corrosion Resistance</u>			
Today	29	52	19
1990	26	64	10
1995	25	68	7
<u>Ride & Comfort</u>			
Today	36	33	31
1990	30	47	23
1995	31	53	16
<u>Styling</u>			
Today	31	30	39
1990	30	46	24
1995	31	53	16

Percent of
Total Respondents for Each Variable

	<u>Higher Quality</u>	<u>About Equal</u>	<u>Lower Quality</u>
<u>Handling</u>			
Today	1%	15%	84%
1990	3	40	57
1995	6	54	40
<u>Safety</u>			
Today	22	48	30
1990	23	55	22
1995	25	58	17
<u>Total Car Reliability</u>			
Today	9	43	48
1990	7	68	25
1995	13	69	18
<u>Fuel Economy</u>			
Today	22	52	26
1990	23	64	13
1995	25	65	10
<u>Driveability</u>			
Today	9	33	58
1990	9	55	36
1995	12	59	29

Selected Edited Comments

Europeans demand more genuine performance from their cars and are less impressed by glitter. Their marketplace is more competitive and their products reflect it.

It is very difficult selecting a standard German vehicle (VW vs. BMW). If a Volkswagen were used, the rating would be significantly different.

Discussion

The responses to this question indicate that the Germans presently maintain a competitive advantage in fit and finish, basic structural integrity of body and chassis, engine and drivetrain integrity and durability, styling, handling, total car reliability, and drivability. The U.S. holds an advantage only in corrosion resistance, maintenance requirements, and ride and comfort. By 1995, every product attribute is forecast to be "about equal" between the two countries.

Discussion of Panelists' Comments

The difficulty of categorizing an entire industry that produces products for a diverse market was accurately noted. The question's intent is to try to bridge specific product comparisons and gauge the perceptions of "German heritage" behind the vehicle.

Comparison of Vehicle Manufacturer and Supplier Panelists

There is an apparent difference of tastes between the two panelists. Manufacturers regarded domestic vehicles' ride and comfort and styling to be superior to the Germans' in all three time periods. Suppliers see U.S. vehicles on par only after 1990. Corrosion resistance is forecasted to remain an advantage for domestics by manufacturers; suppliers see this attribute equal. Both panels agree that there will be no major differences in the various attributes by 1995.

Comparison of Replies to MKT-33 and T-8

Both panels think American and German vehicles will be equivalent in each vehicle attribute by 1995.

Strategic Considerations

See discussion under MKT-32.

MKT-34. Quality has become an important issue, particularly in comparing U.S.-produced vehicles with foreign-produced vehicles. Rank-order (most important = 1, least important = 12) the *quality* factors you believe are the most important *from the perspective of the U.S. consumer*.

Ranking

- | | |
|-----|-----------------------|
| 1. | Total car reliability |
| 2. | Styling |
| 3. | Fit and finish |
| 4. | Engine and drivetrain |
| 5. | Driveability |
| 6. | Basic structure |
| | |
| 7. | Handling |
| 8. | Ride and comfort |
| 9. | Maintenance |
| 10. | Fuel economy |
| 11. | Corrosion resistance |
| 12. | Safety |

Single responses

Ranking

- | | |
|-----|-----------------------------|
| 3. | Total vehicle life costs |
| 4. | State of the art technology |
| 13. | Dealer service |
| 14. | Resale value |

Selected Edited Comments

Assumed this is rated after customer has had experience with the vehicle vs. qualities he/she may consider important at the time of purchase.

The customers cannot break down quality. They look at it as a total: every item is equally important.

When buying a new car, the consumer can evaluate some items himself, has access to comparative data for some items, and must rely on expectations for the rest. The real test of quality is satisfaction over time. Styling and fit/finish are forgotten over time. High quality over time generates repeat business.

Note that rankings are affected by many external factors. Fuel economy is a low-priority item at this time, but could shoot back up to the top of the list if gasoline prices rise again.

Discussion

In order to force a ranking out of these twelve attributes, each position was determined by calculating the number of responses for each attribute for that given position. Thus, fit and finish is ranked fourth because it received the greatest response within the fourth position (13%). The second and third highest-percentage response is given for reference to

show, for example, that fit and finish was also within the top three responses for rankings one, two, and three. Total car reliability (ranked first) was by far the response with the greatest consensus.

Discussion of Panelists' Comments

The comments to this question present two excellent observations: (1) that many factors influence vehicle purchase decisions (trade press, friends, consumer groups, etc.) are used for judgment of attributes that the customer perceives as being important but cannot judge alone, and (2) that while fit and finish and styling may initially get the consumer into the showroom, it is the evaluation of an ever-changing weighting scheme during the personal (or acquaintance's) experience with a manufacturer's vehicle that will determine if the manufacturer is considered in subsequent purchase decisions. The purchaser's total involvement from purchase to use to reinforcement of the original purchase decision must be satisfied.

Comparison of Vehicle Manufacturer and Supplier Panelists

Both panels were in agreement as to the number one criterion: total car reliability. Of the next five criteria, the suppliers chose higher marks for appearance- and customer convenience-related items (styling, ride and comfort, fit and finish), while the manufacturers gave more significant rankings to the mechanical-related attributes (engine and drivetrain integrity, driveability, and handling).

Strategic Considerations

The list presented above presents the primary criteria the marketing panel believes customers use in purchase decisions: both the initial buying decision and the subsequent decision to include the vehicle's manufacturer on the list for replacement consideration. The entire list is generic and must be applied to all vehicles in all classes (a manufacturer's entry-level vehicle must be as reliable as its most expensive vehicle, or a repeat sale to scale-up a manufacturer's product offering will be doubtful). The list also indicates how every business function (design, styling, engineering, marketing, procurement, finance, sales, etc.) is responsible for at least one element that contributes to customer satisfaction. Only through the strong teamwork of all functions can the customer be completely satisfied.

MKT-35. Excluding obvious advancements such as electronics, on-board computers, aerodynamics, and turbo/supercharging, what new product concepts have the most growth potential? List in order of potential—highest first.

	<u>Percent of Total Respondents for Each Variable</u>
Anti-lock braking system	35%
Four-wheel steering	28
Four-wheel drive	24
Active suspensions	15
Plastic body panels	15
Composite fiber structural components	11

Other responses:

Continuously variable transmissions, traction control, 2- and 3-cylinder engines, puncture-proof tires, seating advances, cellular car phones, computer/vehicle hookups, multiplexing, ceramics, anti-collision devices, early-warning diagnostics, map/navigational aids, CRT displays, greater HP/L engines, drive by wire, lifetime maintenance systems, reduced NVH, electric steering, electric engines, natural gas engines, new finishes, voice-activated controls, continuously variable displacement a/c compressors, and heads-up displays.

Selected Edited Comments

What we know today as "options" will become "standard" in many cases as we move through the forecast period. Option packaging will play an important role.

Discussion

Typical in an open-ended question, the panelists gave a laundry list of new concepts that are expected to be applied to the motor vehicle through the 1995 forecast period. The overall list presents a good "brainstorm" of the possibilities. Please see question MKT-49 to gain better insight into the penetration rates that are expected by the top four responses.

Strategic Considerations

It cannot be said that the automobile will become a generic, commodity-like product. The variety and range of convenience, safety, performance, and structural advances that may be applied to the automobile are so numerous that the highest response to this question drew only 35%, and some thirty different responses were offered. Advances will be made through materials, electronics, and new designs of existing components. Each has the ability to provide a portion of the product differentiation that will be needed to sell vehicles in a crowded marketplace. Suppliers from all segments of the industry will be able to participate with the OEMs in providing some form of differentiation.

A number of the items (anti-lock braking, four-wheel drive, plastic body panels, and structural composites) are already being used in special applications. The inference is that the use level should expand significantly.

MKT-36. What will be the market penetration rate in 1990 and 1995 (in percentages) for U.S.-produced passenger cars and light trucks of the following systems/components?

Median Response

<u>System/Component</u>	<u>Passenger Car</u>		<u>Light Truck</u>	
	<u>1990</u>	<u>1995</u>	<u>1990</u>	<u>1995</u>
Anti-lock braking system	10%	25%	10%	25%
Active four-wheel steering	2	5	1	3
Active suspension (ride)	8	15	5	10
Plastic body panels	5	15	5	10

Interquartile Range

Anti-lock braking system	10/15%	25/45%	10/17%	20/50%
Active four-wheel steering	1/3	5/7	0/2	2/5
Active suspension (ride)	5/9	12/17	1/5	7/12
Plastic body panels	5/6	10/20	2/5	7/12

Selected Edited Comments

Plastic body panels 1986 to 1990: No change from present. Could be steel/plastic combination.

ABS is a likely candidate for forced legislation.

Government regulations and costs will be the guiding factors, not market demand.

Plastic caps, bumpers, fascia, rocker trim are common and will become almost universal. Fiero-style construction is expensive and heavy—will not see widespread use.

ABS could be much higher; could be legislated and/or required because of litigation. Four-wheel steering more of a gimmick than a valid technology.

Active four-wheel steering would possibly become a mechanism to be widely in use in the future, but the percentage of installation would remain low for awhile on account of the cost.

Discussion

Each of the four advanced systems and materials was shown to have relatively quick acceptance rates. Even a rate of 7% for active four-wheel steering equates to approximately 600,000 units (based on the panelists' forecast of 8.4 million sales units in 1995). This is far beyond what would be defined as a low-volume niche application.

Discussion of Panelists' Comments

Several panelists noted a strong likelihood for legislation which could push the penetration rate of anti-lock braking systems far beyond what the market would demand. The design, manufacturing, and marketing juries still appear to be deliberating the success of plastic panels. The rate of application for 1990/1995 is much below what was expected five years ago.

Comparison of Vehicle Manufacturer and Supplier Panelists

The greatest differences appear in the forecasts of anti-lock braking systems. The manufacturers are much more bullish on passenger car installation rates (up to 35% by 1995), while the suppliers are more optimistic about light-truck installation rates (7% greater rate than manufacturers). Suppliers also see active suspension having a greater application on light trucks (5% higher penetration rate). All other categories were within three points of each other.

Strategic Considerations

Product innovations will be a continuing source of differentiation for the vehicle manufacturers. The advances listed above are seen as product innovations that have the greatest growth potential. As each product has a high degree of interdependence with the integrity and performance of the overall vehicle, it is likely that these systems will be developed and applied through close cooperation between the OEM engineering and purchasing staffs and the suppliers. In each case, the supplier has an opportunity to provide the OEM with subsystems.

- MKT-37.** Do you view the trend of increased luxury options (A/C, power windows, seats and locks, entertainment, etc.) in compact and sub-compact passenger cars as increasing, remaining the same, or decreasing?

	<u>Percent of Total Response</u>
Increasing	75%
Remain Same	21
Decreasing	4

Selected Edited Comments

There will be an increased emphasis on passenger comfort, convenience, and product innovation.

This trend will continue as long as our economy doesn't have any long down turns. The "back to basics" market segment will most likely go for a 1960 VW rather than a stripped down Honda Accord.

This will be the major way to differentiate products—especially as designs move more and more to the "aero" look.

Discussion

There is general consensus that vehicle size and vehicle cost are not directly related as they had once been. Over the next ten years, 75% forecast a greater level of "luxury options" to be ordered on subcompact and compact vehicles.

Discussion of Panelists' Comments

Although styling is still seen as important (indicated in several previous questions), panelists view the interior, various options, and the driver-vehicle interface as a primary method of product differentiation over the next decade. The comment concerning the 1960 VW is interesting and gives support to maintaining, where appropriate, at least one basic transportation model within the product lineup.

Comparison of Vehicle Manufacturer and Supplier Panelists

Both panels foresee the increased use of luxury options within the subcompact and compact market segments. Differences arose in the categories "remain the same" (25% for suppliers vs. 10% manufacturers) and "decreasing" (2% for suppliers vs. 10% for manufacturers).

Strategic Considerations

Old relationship standards such as price to vehicle weight or wheelbase have been declining in accuracy over the last ten years and may be even less correlated during the next ten years. Marketing efforts should be reevaluated to sell not just the exterior styling (many, but not all, foresee exteriors merging into a common "vanilla" flavor) but the interior, the performance, the driver/vehicle interface, selling and servicing system, and comfort and convenience features. Customer education will become much more important

because everyone has an eye for attractive styling but may have a hard time understanding the benefits of lateral seat support, ergonomic instrument panel design, anti-lock brake systems, four-wheel drive, etc. This will place a significant burden on the marketing organizations and dealership network to carry out the marketing objectives of the manufacturers.

MKT-38. What percent of U.S.-produced light duty vehicles (passenger cars, light trucks, vans) will utilize 4-wheel drive in the following years?

Median Response

	Percent Passenger <u>Cars</u>	Percent Light <u>Trucks</u>	Percent <u>Vans</u>
Estimated 1985	1.3%	*	*
1990	2.5	27	5
1995	3.5	31	8

Interquartile Range

1990	2/3	25/30	3/5
1995	2.5/5	28/35	5/10

* *NOTE: Estimated separate percentages for 1985 were not available for light trucks and vans. Therefore, panelists were provided with a combined percentage of 29.1% as a reference point.*

Selected Edited Comments

As four-wheel drive becomes more common and consumers realize the benefits, prices will drop and penetration will increase. Penalties (fuel consumption) are a thing of the past with tire technology.

Four-wheel drive for passenger vehicles will be a growth area the imports will capitalize on. Standard light trucks will grow slowly unless technology achievements alter the relative pricing.

Four-wheel drive will have greater appeal to sporty buyers than to functional buyers. Price will be a strong discriminant of four-wheel-drive demand in cars.

I believe four-wheel-drive car enthusiasts will shift to some degree to the light truck segment.

I don't think demand is all that great. Cost per unit value added is an important factor, and I don't see cost coming down appreciably.

Some light-truck four-wheel-drive buyers will switch to four-wheel-drive cars. Increased four-wheel-drive interest will be in cars rather than light trucks or vans.

We can see some reasonable growth in four-wheel-drive activity if the auto makers can produce an efficient and reliable system at a reasonable cost and the public awareness of the safety and performance advantages can be increased.

More pulling power will be necessary to accommodate R.V. trailers.

Discussion

Market penetration of four-wheel-drive passenger cars is expected to double from the present rate to 2.5% in 1990 and increase further to 3.5% in 1995. Light-truck usage is also expected to grow: from a present rate of 29% to 32% and 39% in 1990 and 1995, respectively. A large portion of this growth is from the application of four-wheel drive to vans. The interquartile ranges are close within passenger cars and reasonably close within the light-truck segments.

Discussion of Panelists' Comments

There is some debate as to the real support for four-wheel-drive demand: fad, performance only, safety/function, or some combination of the three. Most do agree that costs will decline as volumes increase to the point that customers will consider the option a valuable alternative.

Comparison of Vehicle Manufacturer and Supplier Panelists

There was a very good consensus between the vehicle manufacturers and the supplier panelists. The greatest difference was the 1995 passenger car forecast: three vs. five percent for suppliers and manufacturers, respectively.

Comparison of Replies to MKT-38 and T-25

The Technology panelists' forecast was twice the Marketing panelists' penetration rate in 1990 and four times the rate in 1995. The wide variation in the technology and marketing panels forecast is cause for concern. Perhaps the greater optimism of the technology panel reflects engineers tendency to be deeply interested in *new* technology. Developments must be watched closely.

Strategic Considerations

The four-wheel-drive market will continue to be dominated by the market for light-duty truck vehicles. Within this market, the van segment is expected to benefit from the greatest percentage gain of four-wheel-drive penetration. This gain is compounded because the van/utility segments are the fastest-growing segments within light trucks in terms of unit volumes.

The foreign manufacturers are likely to be more aggressive in the four-wheel-drive passenger car market in the U.S. and test its viability. Domestic will undoubtedly follow the foreign manufacturers' lead. Some believe the four-wheel-drive passenger car could be faddish and not a long-term market, particularly if the price premium is excessive. Four-wheel drive appears to offer vehicle manufacturers an additional method of product differentiate and drivetrain-oriented component suppliers an additional market outside of typical light-truck applications.

MKT-39. Within the U.S. market, what is your estimate of the average life of new cars and the length of time new car buyers will keep their cars?

	<u>Median Response</u>		
	<i>In Years</i>		
	<u>Present</u>	<u>1990</u>	<u>1995</u>
Average life of new cars	9	10	12
Length of ownership by new car owners	4	4.5	6
 <u>Interquartile Range</u>			
Average life of new cars	7.5/11	8/12	10/13
Length of ownership by new car owners	3/5	3.5/5	4/5.5

Selected Edited Comments

Improvements in reliability and corrosion resistance will extend car life and ownership.

Length of financing contracts and increasing vehicle durability are forcing new cars to be kept longer.

A general trend; with an aging population, new car ownership time will decrease slightly.

Discussion

The average life of new cars in the U.S. is expected to increase from the estimated 1986 level of nine years to 10 years in 1990 and 12 years in 1995. New car buyers, who now keep their new car for an estimated average of four years, are expected to retain ownership for up to six years by 1995. The interquartile ranges are fairly close for these median forecasts.

Discussion of Panelists' Comments

Product improvements and longer financial encumbrances are seen as the two major forces driving the extension of average car life and length of ownership.

Comparison of Vehicle Manufacturer and Supplier Panelists

The 1990 and 1995 forecasts are essentially the same for both panels.

Trend From Previous Delphi Surveys

The trend for the 1990 forecast of average life of new cars has been reduced by two years in each of the last three Delphi surveys: 14 years (1981) to 12 years (1983) to 10 years (1986). Average length of car ownership remained the same over the past two surveys: 4.5 years. The decline of average life from 14 to 10 years does not suggest a reversal of the trend to longer car life but definitely indicates that panelists now forecast the trend to be more moderate than previously believed.

Strategic Considerations

Car sales and car life are directly related. An increase in vehicle life of one year can be interpreted to mean that during the period in which the longevity increase took place there was a loss of sales approximately equal to an average year's sales during the period. The reduction of the 1990 forecast average from 14 years (1983 survey) to the present estimate of 10 years is a positive direction for domestic OEMs. It is important to note that advances in corrosion resistance and vehicle reliability may support the forecast of increased average life of a vehicle buy may not support the increase of average length of new car ownership.

MKT-40. Historically, major platform changes were made every 3 to 4 years but are getting further apart. On the average, how long will U.S. passenger car model runs be on cars introduced in the following years?

	<u>Length of Model Run</u> <i>In Years</i>	
	<u>Median Response</u>	<u>Interquartile Range</u>
1990	5	4/6
1995	6	5/7

Selected Edited Comments

Cosmetic changes will continue on an annual model year basis.

Faster "model" changes are expected as more body panels made of plastic are introduced, simplifying and reducing costs of appearance changes.

Lead times will be cut down to three years while platform changes will be further apart. Face lifts and body changes will decrease.

Platforms may be good for two development cycles or up to 10 years (along with engine/transmission/suspension). Body shells will be re-engineered on five year cycles. Plastic front and rear fenders, etc., will be re-styled as desired.

Consumer need will limit platform to a maximum life of eight years.

Model changeover has to be faster to be competitive.

Discussion

Model runs are expected to be five years, on the average, over the next decade. There is a good consensus on this forecast.

Discussion of Panelists' Comments

The life of the mechanical underpinnings of a vehicle (platforms and drivetrains) is seen being extended, while annual changes to style-sensitive components (body panels, grills, etc.) are seen becoming more likely due to a shortening of lead time and the increased use of plastics.

Comparison of Vehicle Manufacturer and Supplier Panelists

The median response for the two panels was equal for both years. Interquartile ranges were also equal.

Trend From Previous Delphi Surveys

The 1981 survey forecasted an average length of a 1990 model run to be eight years. The 1983 and 1986 results are identical at a five-year average.

Strategic Considerations

There is a definite trend by each vehicle manufacturer to consolidate numerous platforms, drivetrains, and suspension components into a few system packages that can be used with a variety of body styles and configurations and thus targeted to a variety of markets. The goal will be to spread the cost of the heavily capitalized drivetrain and stamping facilities over as many units as possible. Cost savings within this area can then be applied to providing more frequent body and trim updates to keep vehicles competitive with new imported vehicles and within new customer niches as they appear. Within this environment, the flexibility and ability of suppliers to meet cost, quality, and product objectives will be paramount.

Lead time is obviously a critical issue. Generally U.S. manufacturers must shorten it substantially. Once the major and very expensive engine redesigns are brought on stream in the next ten years, funding for shortened model change intervals will be possible.

MKT-41. What are your estimates of the present and future percentages (dollar volume basis) of parts, components, and materials that the following U.S.-located companies will produce in-house in the U.S.?

Parts, Components, and Materials
Percent Sourced In-House

	<u>Median Response</u>			<u>Interquartile Range</u>		
	<u>Present Estimate</u>	<u>1990</u>	<u>1995</u>	<u>Present Estimate</u>	<u>1990</u>	<u>1995</u>
GM	70%	58%	50%	65/70%	50/60%	45/55%
Ford	50	45	40	50/50	45/48	40/40
Chrysler	40	35	30	30/40	30/35	25/35
AMC/Renault	35	30	25	25/35	20/30	20/25
VW of America	30	30	30	25/30	20/30	20/25
NUMMI	25	25	25	20/25	25/30	25/30
Nissan	20	20	25	20/20	20/30	20/30
Toyota	20	25	25	20/20	20/30	20/30
Honda	20	25	25	20/20	20/30	20/30
Mazda	20	25	25	20/25	20/30	20/30
Diamond-Star	20	25	25	20/25	20/30	20/30

Selected Edited Comments

Dollar value is assumed.

Assuming GM supplying NUMMI and Chrysler supplying Diamond-Star are not considered "in-house" sources.

Chrysler is investing in selected captive supplier subsidiaries in the U.S. and elsewhere (example: Hunstville, AL Electronics) and will probably increase its in-house content.

Would prefer a clearer definition—is the desired answer the "value added" in-house—is the "cost" for the "finished component" or "finished component less raw material cost?"

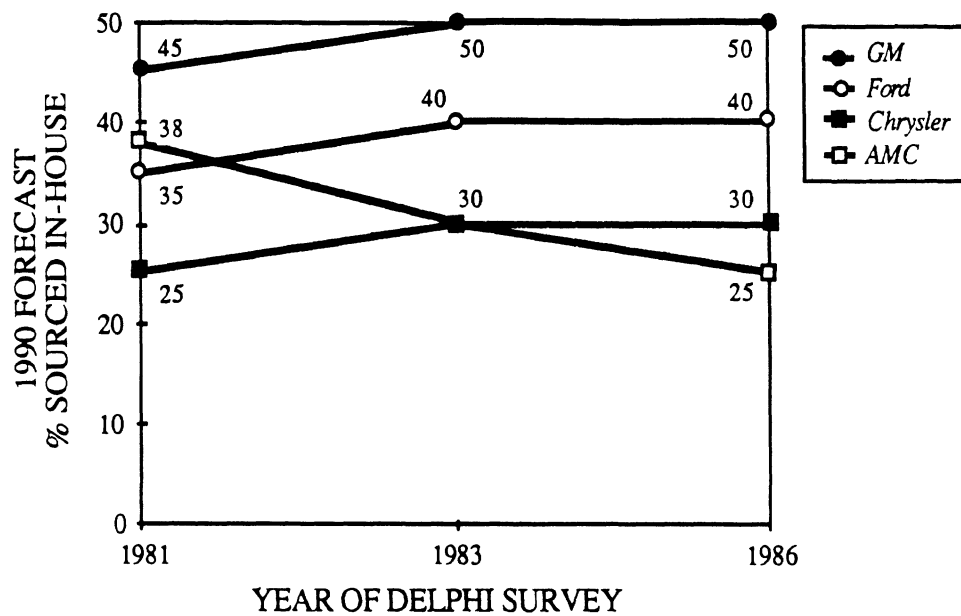
Discussion

The general trend through 1995 is a continued reduction of "Big 3" captive sourcing and a small increase in captive sourcing by the Japanese transplant operations. The greatest percentage changes occur by General Motors and AMC/Renault, each of which is forecast to reduce the percentage of captive sourcing by 28.5% between 1986 and by 1995. The interquartile ranges are very close for most companies on the present estimate and increase slightly over the two time periods.

Comparison of Vehicle Manufacturer and Supplier Panelists

The 1995 forecast for in-house sourcing is the same for the two panels. Minor variations exist for the present and the 1990 forecast.

Trend From Previous Delphi Surveys



Strategic Considerations

The replies to this question infer very significant implications for both independent and captive supplier alike and, of course, the manufacturers' car groups. A reduction by GM, Ford, and Chrysler to the captive supply rates indicated by 1995 involves the transfer of tens of billions of dollars of supply contracts from captive operations to independent suppliers. The exact size of this new business opportunity will be determined by the total size of the U.S. market, the market share of the "Big 3," the amount of foreign outsourcing, and the type of applied product and process technology. There is clearly a window of opportunity for the aggressive supplier to develop a significant amount of new business if it is presently or potentially meeting world class standards in terms of cost, quality, and customer satisfaction.

The expected trend to higher levels of integration by the Japanese manufacturers is very interesting in light of their past history. One wonders how their "family" supply groups are factored into the equation.

MKT-42. *The following is a two part question.*

MKT-42A. If there is no domestic-content legislation in the U.S., what percentage of parts, components, subassemblies, etc., purchased (dollar volume basis) by domestic U.S.-owned vehicle manufacturers are currently sourced outside the U.S. and will be in the years 1990 and 1995?

<u>Median Response</u>			
<u>Outside Parts Source</u>	<u>Current Estimate</u>	<u>1990</u>	<u>1995</u>
Canada	10%	8%	8%
Western Europe	3	3	4
Japan	8	9	10
Korea & other Asia	1	4	6
Mexico and South America	2	5	5
Total % of Outside Parts Sourcing	24%	29%	33%

<u>Interquartile Range</u>			
Canada	5/10%	5/10%	5/10%
Western Europe	2/5	2/5	2/5
Japan	3/10	5/12	6/15
Korea & other Asia	1/2	2/7	3/10
Mexico and South America	1.5/5	2/6	4/10
Total % of Outside Parts Sourcing	15/25%	22/36%	27/40%

Selected Edited Comments

Canadian figure distorts the results, since Canadian-sourced parts are used in assembly plants in U.S. and Canada, which in turn serve U.S. and Canadian markets.

Dollar exchange rate will determine sourcing percentage.

Discussion

Foreign sourcing of components and subassemblies for use in vehicles produced by domestic U.S.-owned vehicle manufacturers is expected to increase from an estimated 1986 figure of 24% to 29% and 33% in 1990 and 1995, respectively. The world areas benefiting from the greatest portion of the 13% increase over the next 10 years are Korea and other Asia (5% increase) and Mexico and South America (3% increase). The only country expected to lose contributed value is Canada (2%). The wide interquartile ranges indicate uncertainty even in the current year. This stems partly from the wide range of foreign content from one model to another, with some disguised in subsystem components.

Discussion of Panelists' Comments

As with all sourcing decisions, foreign currency rates are seen as a major decision factor.

Comparison of Vehicle Manufacturer and Supplier Panelists

Vehicle manufacturers forecast overall outsourcing to be eight percentage points higher than that of the suppliers: 27% vs. 35% and 32% vs. 40% for 1990 and 1995, respectively. Making up this difference are greater sourcing expectations from Japan and Korea. From the manufacturers' standpoint, Canada will play a smaller role than the suppliers believe.

Comparison of Replies to MKT-42A and T-86

Compared to the Marketing panel, the Technology panel forecast is 25–30% higher on outside parts sourcing. The major individual difference between the two panels is the greater forecast reliance by the Technology panelists in 1995 on the countries of Korea and other Asian countries, South America, and Mexico.

Trend From Previous Delphi Surveys

The forecast for 1990 foreign content percentage of U.S.-produced vehicles (by U.S.-owned vehicle manufacturers) increased from 20% (1983 survey forecast) to 29%. The major gains were made by Japanese sources (5 to 9%) and Canadian sources (6 to 8%).

Strategic Considerations

Clearly the trend to offshore sourcing continues. The broad interquartile range indicates great uncertainty of future forecasts and an incomplete data base of current vehicle contents. Since the U.S. and Canada are generally thought of together, it is typical to discount the Canadian contribution. However, with the AutoPact coming under increased political pressure, it is prudent to track Canadian trends.

Obviously, exchange rates, local content, and general trade factors around the world can introduce considerable volatility in the actual level of offshore sourcing in the years ahead. Generally, the offshore sourcing includes sourcing outside of the U.S. but within the same corporate family. The growth of sourcing in Asia (not including Japan) and Latin/South America is expected to be spectacular. Suppliers as well as manufacturers must think worldwide.

MKT-42B. If there is no domestic content legislation for the U.S., what percentage of parts, components, subassemblies, etc., purchased (dollar volume basis) by U.S.-based but foreign-owned vehicle manufacturers (VWoA, Toyota, Nissan, Honda, Mazda, Mitsubishi) will be sourced within the U.S./Canada and what percent will be sourced outside the U.S.?

<u>Parts Source</u>	<u>Median Response</u>		
	<u>Current Estimate</u>	<u>1990</u>	<u>1995</u>
U.S./Canada	30%	35%	40%
Internationally Sourced	70%	65%	60%
	<u>Interquartile Range</u>		
U.S./Canada	20/40%	20/44%	20/50%
Internationally Sourced	60/80%	50/79%	40/78%

Selected Edited Comments

Assumed that the quality difference between Japan and U.S. will be reduced by 1995 and that the yen to dollar relationship will continue at the level of 170-180 yen/dollar.

The near-term goal is a 50/50 sourcing mix. However, the long-term mix will favor U.S./Canada sourcing as new supplier relationships are nurtured and strengthened.

Most of the gain in U.S./Canadian content will be from North American operations owned and run by Japanese suppliers.

Discussion

U.S. and Canadian sourcing of components by foreign transplant operations is expected to rise during the period of 1986 to 1990: 30 to 35% of the total vehicle. The increase between 1990 and 1995 is expected to be only 5%, from 35% to 40%. This forecast does indicate an overall trend to source components within the U.S. and Canada, but does not forecast inter-period variations of the yen/dollar exchange rate, which will fluctuate and affect sourcing patterns. The wide interquartile ranges indicate that there is limited consensus, i.e., opinions vary considerably.

Discussion of Panelists' Comments

Although increasing production of transplant-produced vehicles is expected to rely more on North American sourcing, traditional domestic suppliers may continue to find this market hard to crack due to the increase of foreign-owned component supply capacity within the U.S. and Canada.

Comparison of Vehicle Manufacturer and Supplier Panelists

In every category, vehicle manufacturers' expectations of domestic sourcing by the transplants is ten percentage points lower. This difference may be a reflection of the suppliers' anticipated success in breaking into the transplant market.

Comparison of Replies to MKT-42B and T-86

Both panels are in general agreement that transplant sourcing will be 30 to 35% domestic in 1990. The Marketing panel is more optimistic on domestic sourcing by the transplants in 1995 (40% to 30%).

Strategic Considerations

Careful attention should be given to the wide interquartile ranges. This is a good measure of the volatility and uncertainty of this issue. Of course, both trade restraints and further change in exchange rates could have an enormous impact on sourcing decisions. Increasingly, we sense that the Japanese manufacturers, and, to a certain extent suppliers, are becoming comfortable with North American quality and cost. However, an overriding consideration is the political implications of international sourcing decisions.

MKT-43. What major component parts and materials for "traditional domestic" produced U.S. passenger cars and light trucks are candidates for high volume, off-shore sourcing (outside U.S. and Canada)? What are the most likely countries from which these components and materials will be sourced?

Of major vehicle components considered likely candidates for high volume, off-shore sourcing, the leading candidates were (in terms of percent of total responses:)

Components

<u>Off-shore Components</u>	<u>Percent of Total Respondents for Each Variable</u>
Engines	86%
Transmissions	69
Electronics	41
Wiring Harnesses	17

(Other off-shore components, with lesser percentages were axles/suspension components, brakes, castings, cylinder heads, interior trim, instrument panels, mechanical components, stampings, tires, wheels.)

Within these groups, the source country breakdown is as follows:

Engines = 86%

Source Country:

Japan	64%
Mexico	28
Brazil	24

(Other responses of lesser percentages included Asia, Korea, South America, and Taiwan.)

Transmissions = 69%

Source Country:

Japan	70%
Korea	30
Mexico	25

(Other responses of lesser percentages included Asia, Brazil, Canada, France, and Germany, South America, and Taiwan.)

Electronics = 41%

Source Country:

Japan	67%
Korea	50
Germany	17
Taiwan	17

(Other responses of lesser percentages included Europe and the Far East.)

Wiring Harnesses = 17%

Source Country:

Korea	40%
Taiwan	40
Mexico	20

(Other responses of lesser percentages included South America and Southeast Asia.)

Materials

Of major vehicle materials considered likely candidates for high-volume off-shore sourcing, the leading candidates were (in terms of percent of total responses):

<u>Off-shore Materials</u>	<u>Percent of Total Respondents for Each Variable</u>
Steel/Sheet Metal	77%
Castings	23
Aluminum	23
Forgings	15
Others:	
Textiles	

Within these groups, the source country breakdown is as follows:

Steel/Sheet Metal = 77%

Japan	80%
Korea	40
Brazil	20

(Other responses of lesser percentages included Europe, Germany, Mexico, and Venezuela.)

Castings = 23%

Mexico	67%
--------	-----

(Other respondents were equally divided between Brazil, Italy, Japan, and Korea.)

Aluminum = 23%

Japan	33%
Taiwan	33
Venezuela	33

Forgings = 15%

Japan	50%
Mexico	50%

Discussion

This question sought to gain an insight into the key components and materials for which the U.S. is believed to have lost a competitive advantage, and the potential replacement sources. The greatest consensus within components was on engines (from Japan) and transmissions (from Japan), with each of these responses indicated on more than 60% of the surveys. Within materials, steel (from Japan) was the primary response indicated on more than 70% of the returns. Both castings and forgings represent "value added" materials and could have been listed under the heading of components.

Comparison of Replies to MKT-43 and T-87

Although the weights for both panels were different, the top three choices for components and materials were the same. Also, within each major component and material the two panels selected a similar set of likely sourcing countries.

Strategic Considerations

There are no major surprises indicated by the panelists' response to MKT-43. Each component, material, and source country is similar to present sourcing patterns. A key strategic consideration is the dollar value or unit volume of the selected components and materials. Consideration of international standards for setting quality and cost benchmarks will be mandatory. As the world's base of manufacturing and product engineering expertise becomes more diffuse, suppliers will need to use all business functions (from concept to customer) in an effort to maintain competitive advantage. Future automotive component manufacturing will be judged not by manufacturing capacities (the world is over capacity in many industrial goods and services) but by marketing capabilities (i.e., how a supplier delivers value to the customer).

- MKT-44.** With respect to Japanese auto companies building cars in the U.S. (either independently or as a joint venture), what components, parts, or materials (e.g., engines, transmissions, heads, connecting rods, steels, etc.) are the most likely to be brought into the U.S. from Japan, and which are the most likely to be made (or assembled) domestically?

<u>Component</u>	<u>Percent of Total Respondents for Each Variable</u>
<i>Japanese-Sourced Components</i>	
Engine	94%
Transmissions	78
Axles/Suspension Components	36
Electronics	36
<i>Domestically Sourced Components</i>	
Wheels/Tires	72%
Seating/Interior Trim	48
Bodies/Steel Stampings	41
Battery/Electrical Components	41
<i>Japanese-Sourced Materials</i>	
Steel/Sheet Metal	84%
Cast Aluminum	21
Cast Iron	16
Cold Forgings	11
<i>Domestically Sourced Materials</i>	
Plastic	73%
Paint/Finishes	67
Glass	53
Fabric/Fibers	40
Steel/Sheet Metal	40

Selected Edited Comments

Few raw materials are cheaper in Japan.

Domestic-sourced components are those that are not integrated into the vehicle design.

Discussion

Foreign sourcing by Japanese transplant facilities is expected to be concentrated in the drivetrain area for components and steel for materials. Primary candidates for domestic sourcing include wheels, tires, seating, and interior trim for discrete components and plastic, paint/finishes, and glass within the material category. Each of these components

or materials was mentioned in more than 45% of the survey returns. The responses presented in the table above represent the primary classifications of answers provided by the panelists.

Strategic Considerations

Domestic sourcing of components for transplant facilities is believed to be limited to items with low weight-to-value ratios (wheels/tires/batteries), bulky subassemblies (seating/plastic bumpers and interior assemblies), or items easily subject to damage (bodies/steel stampings/glass). Components that are well integrated into the overall vehicle (drivetrain and certain axle/suspension components) will continue to be sourced from Japan. This is not to say that no drivetrain sourcing will occur in the U.S. for Japanese transplant vehicles. Honda will be expanding its U.S. operations into engine production; however, this facility will primarily assemble Japanese components. Domestic suppliers will face high barriers of entry concerning those components and materials flagged for Japanese sourcing.

Political and exchange rate factors could alter the sourcing list significantly. In addition, much will depend on how successful the Japanese view sourcing presently in North America. Every good experience will prompt expansion, whereas a negative experience will prompt the converse. Also, the Japanese are highly "relational" in their contacts with suppliers; i.e., they slowly develop strong long-term relationships that become the foundation for business ties. North American suppliers that have the patience to develop and nurture the relationship could be successful in bringing business in from the Japanese, assuming that cost and quality criteria can be met.

MKT-45. If there is no domestic content legislation, what percentage of U.S. aftermarket service parts, components, and subassemblies for passenger cars will be manufactured in the U.S. or will be sourced outside of the U.S. by 1990?

	<u>Median Response</u>	<u>Interquartile Response</u>
Manufactured in U.S.	63%	55/65%
Sourced outside U.S.	37	30/40

Selected Edited Comments

“Foreign” parts suppliers will relocate to North America— especially Canada.

Discussion

Foreign sourcing of U.S. aftermarket service parts is expected to reach 37% by 1990. The interquartile ranges are fairly high, indicating uncertainty among the panelists. Some of this uncertainty can certainly be explained by the comment presented above: there is a great amount of debate concerning the “third wave” or the amount of foreign transplant component manufacturing that will occur in the U.S. over the next five years.

Comparison of Vehicle Manufacturer and Supplier Panelists

The median results were within five percentage points of each other; the manufacturers believe a greater percentage will be sourced within the United States.

Strategic Considerations

Suppliers to the U.S. aftermarket will face additional competition from import and transplant sourcing. With this increase in competition, it is imperative that the component suppliers have a cost-structure that is internationally competitive. In addition, suppliers should look for innovative business methods that provide customers a bundled package of services (such as design or product engineering, JIT delivery, financial arrangements, etc.) that allow the manufacturer to charge a premium price (and cover manufacturing cost differentials) for both the component and the services provided. Domestic suppliers must search all their internal business functions for specific areas where they can provide value to a customer in a cost-effective manner.

MKT-46. What percent of the U.S. automotive supplier industry's output will be sold to the following markets (on a dollar volume basis, including parts, subassemblies, components, materials, etc.)?

	<u>Median Result</u>		<u>Interquartile Range</u>	
	<u>1990</u>	<u>1995</u>	<u>1990</u>	<u>1995</u>
To OEM within U.S.:				
<i>U.S.-Owned</i>	55%	50%	55/60%	48/55%
<i>Foreign-Owned</i>	<u>10</u>	<u>15</u>	10/10	15/20
Subtotal	<u>70</u>	<u>70</u>		
To U.S. Aftermarket:	25	25	22/30	20/30
Outside U.S.:	<u>5</u>	<u>5</u>	5/7	5/10
TOTAL	100%	100%		

Selected Edited Comments

OEM will accelerate outsourcing to suppliers.

Surviving U.S. suppliers will really become global entities.

Transplant supplier facilities will "sell" capacity to U.S. manufacturers. This will result in more competitive pressure on U.S. suppliers.

Percentage based on a \$2.6 billion market.

Discussion

The U.S. supplier industry is expected to keep a relatively constant sales mix between OEM, aftermarket, and export sales through 1995. The most significant expectation is the transfer from U.S.-owned OEM sales to the foreign-owned transplants. Interquartile ranges are fairly close; the largest variations exist in the 1995 forecast.

Discussion of Panelists' Comments

Comments indicate both the opportunities and problems that face the supplier industry: domestic OEM decontenting of captive supply and increasing capacity of foreign transplants are increasing contract opportunities, but, at the same time, domestic OEM overseas sourcing and transplant sourcing to traditional "family" suppliers is decreasing contract opportunities.

Comparison of Vehicle Manufacturer and Supplier Panelists

As compared to the suppliers, the vehicle manufacturers forecast a sales mix five to ten percent lower for U.S. owned OEM sales. Manufacturers forecasts a strengthening of sales to the U.S. aftermarket within the overall sales mix.

Trend From Previous Delphi Surveys

The 1986 survey results in essentially the same as in the 1983 survey. There appeared to be a shift in expectations away from the aftermarket and domestically-owned OEM portion of the sales mix and an increase in the level of sales to U.S.-based, foreign-owned OEMs.

Strategic Considerations

The most significant implication that this question shows is that the U.S. automotive supplier will have to adjust to dealing with a new customer: the foreign transplant. Two important considerations must be kept in mind:

1. This question forecasts sales mix, not overall sales volume. Although the sales mix remains relatively constant, volumes behind the mix may be substantially less.
2. The response to the segment "U.S.-owned OEM" may be misleading: the ultimate destination of 50 to 55% of the suppliers' sales mix may end up in domestic vehicles but the route to final assembly may be radically different. There is a general feeling that the supply tiers within the industry will be restructured such that suppliers who serve assembly plants directly today may be relegated to a lower level of the supply chain. Therefore, even a response of 50% of the sales mix to U.S.-owned OEMs may come about through an entirely different set of customers: not the OEMs directly but through one, two, or three supply levels. The "retiering" of the industry is a major issue as is the potential growing trend for material suppliers to integrate downstream.

MKT-47. *The following is a two-part question.*

MKT-47A. With the continuing introduction of increasingly complex electronic componentry and sub-assemblies, what impact do you foresee on dealer's service operations? On the "do-it-yourself" market? Please comment.

<u>Dealer Service</u>	<u>Percent of Total Respondents for Each Variable</u>
Increased need for mechanic training and diagnostic equipment	40%
Increased use of dealer servicing (independent service shops not qualified)	28
Development of new "expert" service franchises	13
Less ability to diagnose accurately (increased trial-and-error part replacement)	13

Other responses: More factory sponsored diagnostic systems that are integrated with on-board computers, increased need for standardization, longer warranties on repair service, more costly repair, service department volume may fall with an increased level of reliability, increased volume of sophisticated repair—reduction of non-sophisticated repair (shocks, exhaust, etc.), increased dealer mechanic labor rates/benefits/incentive packages, and increased inability to handle "first time" service requests.

<u>Do-it-yourself</u>	<u>Percent of Total Respondents for Each Variable</u>
Overall decrease	43%
Increase of minor, routine maintenance; decrease of major repairs	32
Almost all to be eliminated	21

Other responses: repair difficulties will increase the volume of rebuilds and will drive an increase of more affordable trouble-shooting tools.

Selected Edited Comments

Sophisticated computer analysis systems will be tied to the factory.

Dealer service operations will increase; so will expert specialized repair shops.

Warranty programs are bringing consumers back to dealer shops. Dealers are still not equipped physically or mentally to handle service problems.

There is a great opportunity for dealers, but they need to better their image, or "muffler shop"-type operations will get into the segment (may enter anyway).

Minor do-it-yourself items are increasing, but all major work will be done by dealers.

Almost all do-it-yourself items will be completely eliminated.

There will be less and less the do-it-yourselfer can do. The more "creative" people will find ways to wire around some of this gear.

DIY will decline primarily to oil/lube changes, some brake work, and care of body and interior surfaces. In a decade or so, car electronics will self-diagnose, allowing the owner to replace control boxes, assemblies, etc.

Discussion

It is the opinion of the marketing panelists that the DIY market is being forced to just minor, routine maintenance activities. This is forcing a greater number of motorists to turn to the dealer for service requirements. However, the panelists believe that a significant amount of time and capital is needed for mechanic training and diagnostic equipment investment in order to upgrade the dealership facilities.

Discussion of Panelists' Comments

The comments point out the significant business opportunity that exists within the automotive service business (for both OEM franchise dealerships and independents): higher product technology is forcing the shadetree mechanic out of business; yet it is seen that there is no operation which can provide consistent, high value service.

Comparison of Replies to MKT-47A and T-94A

It is difficult to compare open-ended questions such as MKT-47A and T-94. However, comparing the types of responses and comments, it appears that both panels agree on the general conclusions that were presented in the Discussion section.

Strategic Considerations

It appears the complexity of today's vehicle systems will increase the need at new car dealerships for sophisticated equipment and well-trained mechanics. A complementary trend is the increasing length of new car warranties. These two trends are forcing increased attention on the distribution and service aspects of the concept to customer systems. The capital forecast to equip and staff a high-quality service center could force a consolidation of service sites to the new car dealerships and a few franchise operations.

The manufacturers need to commit as much time and effort on their distribution chains as they have in new product development, design and manufacturing. This investment is essential to obtain repeat sales. Suppliers could use the service side of OEM sales to create additional value for the customer. It would not be difficult to imagine a system supplier developing service diagnostic and repair equipment jointly with an OEM or providing training for dealership technicians.

MKT-47B. Which components or sub-systems do you expect will become more important for do-it-yourself service, and which ones less important by 1990?

<u>More Important</u>	<u>Percent of Total Respondents for Each Variable</u>
Routine replacement items/fluids	38%
Tires/Wheels/Brakes/Shocks	27
Electronics/"black box" systems	15

(Other responses included: Tune-ups, entertainment, accessories, cooling, customizing, electrical, exhaust/emissions, body, fuel system, turbos, and none.)

<u>Less Important</u>	<u>Percent of Total Respondents for Each Variable</u>
Ignition System	46%
Non-module Electronics	38
Fuel Injection System	38
All Engine Components	20

(Other responses included: Brakes, emission controls, suspension, HVAC, transmissions, and safety items.)

Selected Edited Comments

All key subsystems are becoming less accessible: fuel system, ignition system, brakes, shocks/struts, exhaust, cooling, and A/C. Fortunately, most cars won't need as much attention to these items.

Routine fluid checks, oil changes, will be easier to do but probably fewer people will do them.

Electronics which are not in assemblies or modules will be hard for the do-it-yourselfer to service. More systems (i.e., tune-ups) will have lower maintenance requirements and some will be factory sealed and fixed.

Discussion

Mirroring the responses given in MKT-47A, the panelists think the routine replacement and maintenance of vehicle fluids and components will be the primary DIY activity. Less important aspects of the DIY activity will be the more complicated systems of the ignition, fuel injection, and other non-module electronics. What cannot be replaced in an easy "pull-out, plug-in" fashion is seen requiring sophisticated diagnostic equipment and routines—far beyond the skill or tool investment level of the home mechanic.

Discussion of Panelists' Comments

Less accessible systems, more reliability, greater complexity, and sealed-for-life systems are seen driving the DIY market to the very basics.

Comparison of Replies to MKT-47B and T-94

See discussion under T-94.

Strategic Considerations

See discussion under T-94.

MKT-48. What is your estimate of the yearly growth rate, the percent change, in size of the future U.S. aftermarket for these parts? (If you foresee a decrease, please precede your percentage forecast with a minus sign.)

<u>Components</u>	<u>Percent Yearly Growth</u>			
	<u>Median Response</u>		<u>Interquartile Range</u>	
	<u>1990</u>	<u>1995</u>	<u>1990</u>	<u>1995</u>
Electronic/Electrical	5	4	3/5	3/9
Brakes	2	2	1/3	2/2.9
Shock Absorbers	2	2	0/3	0/3
Engine Tune-up	1	1	-2/3	-3/3
Batteries	1	1	0/2	0/2
Exhaust Systems	1	0	-1/3	-2/2
Tires	0	0	-1/1	0/1
Spark plugs	-1%	-1%	-2/1.5%	-2/1%
Other: Glass	2	3	2	3
Parts Market Total*	2%	1.8%	0/2%	0/2%

*Note that individual percents for each part will not add up to the Parts Market Total, which is a separate estimate; a judgment-weighted average of the increases or declines in the *total of all individual parts*, including those not listed.

Discussion

With the exception of spark plugs, exhaust systems, and tires, all aftermarket segments are forecasted to have some growth through 1995: from one to five percent. Relative to the small base of the median results, the interquartile ranges are relatively large. However interpreted, these data indicate that respondents do not expect substantial growth in the aftermarket during the next ten years. Electronic/electrical, brakes, and glass are the only categories in which growth is predicted on the lower-quartile range.

Comparison of Vehicle Manufacturer and Supplier Panelists

With the exception of exhaust systems, tires, and batteries, where both panels forecast zero to one percent growth, the manufacturers were more optimistic about growth expectations in every category. Overall, suppliers see the total aftermarket growth to be approximately one percent per year vs. the manufacturers' expectations of three to four percent annually.

Comparison of Replies to MKT-48 and T-93

Neither panel agreed on the percentage of yearly growth for any category.

Trend From Previous Delphi Surveys

The two forecasts for the year 1990 are essentially the same. The only major difference was that of tires, for which the 1986 forecast calls for zero growth and the 1983 survey forecasted a 2% growth. All other categories, including the total parts market, were within one percent, plus or minus.

Strategic Considerations

The view of the aftermarket is certainly mixed when considering the data in this question. It is evident that quality improvements throughout some areas of the vehicle, particularly in the powertrain together with reduced number of engine cylinders, will generally reduce the powertrain aftermarket potential. Furthermore, it is increasingly clear that the manufacturers are expected to deliver ever-increasing quality to their customers, which in some respects, might be interpreted as vehicles built with higher quality, lower maintenance requirement components which would infer shrinkage of the aftermarket potential. Also, it was noted that electrical and electronic aftermarket components would be expected to increase. However, with the maturing of this technology, and therefore improved reliability of these components, it is believed that this dimension of the aftermarket must be watched very carefully. While there is no question that the use of electronics will increase, the aftermarket requirements are perhaps more uncertain than

Another factor is the role of diagnostics. As diagnostics are improved certain items needing repair are more likely to be replaced. However, at the same time, those not needing repair or replacement are probably not going to be replaced until the need is demonstrated. That is, future replacement may be based on need rather than schedule. The impact on the aftermarket of this strategy at this point is uncertain. are suggested.

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