Capacity, Competition, and Change:

The 1988/1989
OSAT Supplier Survey
Respondent Report

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Executive Summary

The overall results of this survey portray an industry that is changing rapidly, both in its internal bases of competition and in the growing threat of international competition. The bases of competitive success in the automotive supplier industry are changing rapidly and becoming far more multidimensional than in the past. At the same time, there is rapid, if uneven, change in the patterned exchanges between the manufacturers and their suppliers.

The North American industry is likely to face moderately serious overcapacity in the next five years or so, with the traditional manufacturers facing more in passenger cars than light duty trucks, and the New American Manufacturers (NAM's), or transplants, facing more in light trucks than in passenger cars. Traditional suppliers face overcapacity beyond that imposed by the declining demand of their traditional customers, as offshore, New American Suppliers (NAS's), and traditional suppliers seeking new business target additional capacity upon this declining business base. Traditional suppliers are likely to face stiff competition from NAS and offshore suppliers for NAM business, and their opportunities will likely be inadvertently restricted by heightened concern about possible increases in the CAFE fuel economy standards.

The United States is competitively strong, but is probably behind Japan in overall strength. Japan has an edge in production cost, technical capability, and quality. The ratings of ten competitor regions indicate that while only Japan and Canada currently pose moderately serious competitive threats, six more are likely to present such challenges by the year 2000. Respondents indicate that the U.S. industry must pursue numerous broad efforts to improve its competitive situation.

While many of these competitor regions are attractive on a number of competitive dimensions, the United States is likely to receive the majority of capacity investment these companies make in the next few years, although a somewhat lower share of these investments than in the past. Within the United States, the Midsouth has a production cost advantage over the Frostbelt, but the Frostbelt has advantages in technical capacity and material supply.

Introduction

The Office for the Study of Automotive Transportation (OSAT) conducted a survey of North American automotive suppliers during the Fall of 1988 and the Winter of 1989.[1] The survey serves numerous purposes. First, it is designed to provide information to two regional clients on the domestic supplier community's views of their locales. Second, it provides information about emerging overcapacity at the supplier level of the American automotive industry. Third, it provides updated information on a variety of topics of concern to the American supplier community, comparable to information from past surveys conducted by OSAT personnel. These topics include: the rate of implementation of many of the practices that underlie the changing relationships between the manufacturers and their suppliers; supplier perceptions of changes over time in the supplier selection criteria used by their manufacturing customers; and supplier views of the importance of a variety of efforts in improving the overall productivity of the supplier base.

This Respondent Report is a preliminary report of the survey results to date. It is preliminary because data analysis is not yet complete. It is also selective, highlighting those results that are particularly pertinent to the supplier community.

We think that these results provide potentially beneficial information to the domestic supplier industry as it considers its strategic situation over the next four to five years. While these supplier reports are not necessarily accurate descriptions of objective reality, they are the respondents' perceptions of that reality, and are important in a number of ways. First, they identify suppliers' views on numerous issues. These general views provide a basis of comparison for the views and opinions developed within a particular company. The process of checking and questioning the company "conventional wisdom" is an important step in developing a more refined environmental appraisal, and that, in turn, is a critical element of forward planning. Second, it provides information that suggests the planning premises of North American suppliers, so that a company can take these into account in developing and formulating its own strategies and decisions. Third, much of the information is targeted to international competitors, and that may be particularly beneficial for those companies that are only beginning to experience the increasingly international competition in the domestic market.

Method

Sample. Our sample was originally drawn from purchasing records of the Big Three and American Motors Corporation in 1982 for the U.S.-Japan Supplier Survey. For this survey, we included all those companies that responded to the U.S.-Japan Survey. We sent out approximately 200 instruments: 92 have been returned as of May 1, 1989. About one dozen of the original respondent companies have left the automotive business, or have relocated and could not be traced.

Procedures. We mailed the survey, corrected names and addresses of returned material, and then contacted respondents by phone to secure their participation. We mailed a second copy of the questionnaire when required.

[1] Appendix I contains the survey instrument.

Respondents

Our 92 respondents represent a fair cross section of the traditional American supplier industry in terms of geographic distribution, size, and sales. Their locations range from Connecticut to California, but the majority are located in Michigan (34) and Ohio (16). Their size, measured by number of employees, covers a wide range: from 40 employees to 115,000. Four companies have fewer than 20 employees, 23 between 40 and 225, 15 between 250 and 450, and 50 have 500 or more employees.

Twenty-four of the respondents had sales below $20,000,000 in 1987, 38 between $20,000,000 and $100,000,000, and 30 had sales greater than $100,000,000. While domestic automotive vehicle production decreased from 1986 to 1987, 91% of our respondents enjoyed a sales increase from 1986 to 1987. We suspect this reflects three developments. First, the manufacturers probably increased their level of outsourcing, purchasing production goods and services, such as parts, components, and engineering, rather than supplying them in-house. Second, some reduction in the ranks of automotive suppliers occurred, making more business available to survivors. Third, some of these companies undoubtedly increased their nonautomotive sales as they pursued diversification strategies.

These suppliers are dependent on the auto industry, averaging about 58% of their sales to the manufacturers and another 20% to other suppliers. One-third of our respondents placed no less than 85% of their dollar sales with the automotive manufacturers, while 70% secured at least 50% of their sales from the manufacturers. Their import-export activity is typical of the industry, sourcing roughly 15% of their production materials and goods offshore, and exporting about 6% of their sales. Only six of these companies report exporting more than 15% of their sales.

Products

We asked respondents to report up to three major products they supply the manufacturers and up to three they provide other suppliers. These 88 companies supply at least 326 parts and components to manufacturers and other suppliers for eventual on-board use in light vehicle production. Table 1 displays their major product categories. These cover a wide range of parts and components for a variety of systems and subsystems, including: seats (20%); body (17%); brake, wheel, and tire (10%); engine (7%); transmission (7%); steering (6%); and chassis (6%). The balance of their part and component production is divided between products not covered in our coding protocol (17%) and the four remaining categories (10%) of that protocol.[2]

Table 1
Supplier Products, by Type

Product Type	Percent of Products
Seats	20%
Body	17%
Not categorized	17%
Brakes, wheels, tires	10%
Engine	7%
Transmission	7%
Steering	6%
Chassis	6%
Other categories	10%
Total	100%

[2]See page 8 of Appendix I for a detailed listing of our coding protocol.

The majority (58%) of these products are marketed directly to the manufacturers. Eighty-eight respondents provided product information, and 87 of those companies market to the manufacturers. As illustrated in Figure 1, most suppliers provide more than one product or product family to the manufacturers. Only 32% specialize in one product or family, while 48% supply at least three, and possibly more, products to the manufacturers.

But 42% of these products are marketed between suppliers, and that suggests the complex marketing arrangements characteristic of the North American automotive industry. The suppliers marketing of products, then, breaks out about 3:2 between manufacturing customers and other supplier customers. On the other hand, we report above that supplier dollar sales break out about 3:1 between manufacturers and suppliers. We suspect that this reflects two aspects of the industry: first, sales to manufacturers typically are farther along the value-added chain of industry production; and second, the volumes represented by manufacturer sales are considerably higher than those represented by sales to other suppliers. This suggests that the rationalization of the industry, at least in terms of a reduced supplier base, is more developed at the supplier-manufacturer interface than it is within the supplier base itself.

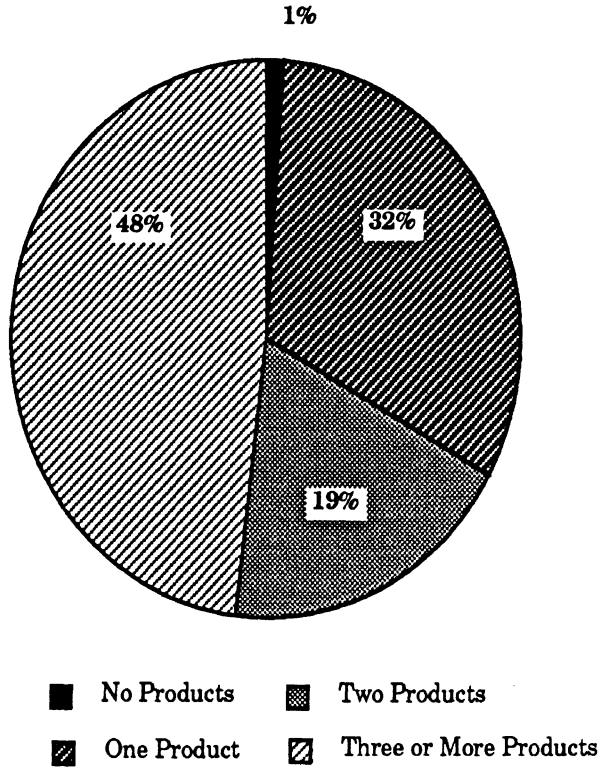

Figure 1: Number of Products Supplied to Manufacturers, by Percent of Suppliers

Figure 2 displays the suppliers' patterns of providing products to other suppliers. Seventy-three of our respondents (83% of those providing product information) supply products to other suppliers, including one with no manufacturers as customers. Seventeen percent, then, supply only the manufacturers, while another 38% supply one product, 17% two products, and 28% three (or more) products to other suppliers. The pattern of providing products to other suppliers is somewhat different from the pattern of supplying the manufacturers: 48% supply three or more products to the manufacturers, but only 28% supply three or more products to other suppliers.

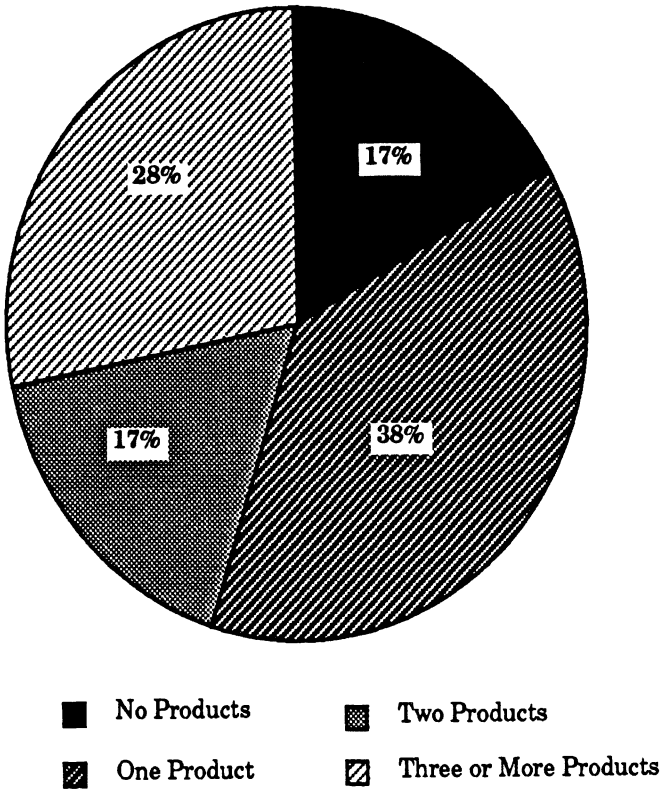

Figure 2: Number of Products Supplied to Other Suppliers, by Percent of Suppliers

Capacity Issues

Overcapacity. There is little question that the traditional American suppliers see themselves facing a serious issue of overcapacity as we move into the 1990's. Typical estimates of manufacturer overcapacity by 1992/1993 are on the order of 30%. That is, there will be as much as 130% of required Big Three capacity targeted on the North American automotive market by that time. This reflects anticipated increases in import market share and the market success of the new North American facilities of Japanese and Korean manufacturers, or NAM's[3]. The internationalization of sourcing changes the patterns of supplier capacity as well, although not necessarily in exact parallel with manufacturer capacity.

Alternative Estimates. Before we turn to supplier views of overcapacity, we provide some of our own estimates of that overcapacity. Table 2 presents the U.S. light vehicle market for 1988, and rough projections for that market in 1993.[4] These data reflect the manufacturing source, rather than the marketing unit, because it is the manufacturer's build that determines demand from the supplier industry.[5] Table 2 also displays our projection for the 1993 vehicle market. We see a market that is some 4.5% larger, with light trucks maintaining about a 32% share. NAM's about double their market share, moving to 15.5% in cars and 9.6% in light trucks. Imports slightly increase their share of the car market to just about 31%, while taking a somewhat larger share (15.4%) of the truck market. Traditional domestic vehicles lose share in cars, falling to 53.6%, and even more in light trucks, to 75%. To be sure, the traditional manufacturers' *retail* share of the light vehicle market (64.0%) will be higher than their *manufacturing* share (60.5%), since they will likely source about 570,000 North American NAM cars and light trucks. Traditional manufacturers' retail market share will also be higher to the extent that they source captive imports from offshore manufacturers.

Table 2
1988 and 1993 U.S. Light Vehicle Markets, by Production Sources
(millions of vehicles)

Source	1988	1993
Passenger Car		
Traditional Domestic	6.7 (62.3%)	5.9 (53.6%)
NAMs	0.8 (7.5%)	1.7 (15.5%)
Import	3.1 (29.2%)	3.4 (30.9%)
Total Passenger Car	10.6 (100%)	11.0 (100%)
Light Truck		
Traditional Domestic	4.2 (83.7%)	3.9 (75.0%)
NAMs	0.1 (4.1%)	0.5 (9.6%)
Import	0.6 (12.2%)	0.8 (15.4%)
Total Light Truck	4.9 (100%)	5.2 (100%)

[3]For "New American Manufacturers," the U.S. and Canadian assembly operations of Japanese and Korean manufacturers, such as Mazda's Flat Rock, Michigan plant.

[4]Detailed breakouts for the Canadian market are not readily available, but it generally is some 10% of the U.S. market, with a somewhat higher proportion of imported cars (33.7% in 1987) and a somewhat lower proportion of imported trucks (10.3% in 1987).

[5]The manufacturers' purchase vehicles for retail from other manufacturers (captive imports and NAM's), and those vehicles are typically included in sales figures. Such vehicles are assigned to their manufacturing source in Table 1.

Table 3 displays our straight-time North American capacity estimates for the traditional domestic manufacturers. These estimates suggest an overcapacity of about 36% (8.0/5.9 million) in cars and 23% (4.8/3.9 million) in light trucks, for a total straight-time overcapacity of over 31% (12.8/9.8 million). This is in line with most published estimates. However, our estimates compare North American capacity to the U.S. market. If we include the Canadian market, overcapacity falls to about 20% in cars (8.0/6.7 million) and just under 10% (4.8/4.4 million) in trucks. This suggests a total North American light duty vehicle overcapacity of just over 16% (12.8/11.0 million) for the traditional North American manufacturers.[6]

Table 3
Traditional North American
1993 Estimated Manufacturing Capacity
(millions of vehicles)

Manufacturer	Passenger Cars	Light Trucks
General Motors	5.0	2.0
Ford Motor	2.0	1.6
Chrysler Motors	1.0	1.2
Total	8.0	4.8

Table 4 provides our estimates of North American NAM capacity by 1993. These estimates are based on public announcements and existing capacity, but include an extra 200,000 light trucks from Toyota. This addition to NAM capacity reflects our belief that Toyota will soon announce its often-rumored second U.S. plant, and that it will be a truck plant. Some of the Japanese manufacturers, perhaps especially Nissan and Toyota, are committed to being full-line manufacturers, and we think that indicates that they will aggressively compete in the light truck market. On the other hand, we do not expect the Lafayette, Indiana, Fuji-Isuzu plant to reach its potential 240,000 vehicles by 1993. Table 4 breaks this capacity into vehicles that will be sold through the manufacturer's own dealerships, and those that will be supplied for retailing as captives to traditional domestic manufacturers. This reflects the possibility that current differences in sourcing for these types of vehicles (for example, the Mazda-produced Ford Probe and Mazda MX-6) will continue. The captive versions of these vehicles typically have higher traditional domestic supplier content than do their Japanese nameplate counterparts.

We think that the NAM's are likely to sell about 1.7 million cars in the United States, and an additional 10% in the Canadian market. We also think they are likely to export roughly 100,000 cars to Europe and another 90,000 to 130,000 to Japan, primarily because of trade friction between Japan and both the United States and Europe. That suggests total NAM car build somewhat over 2 million vehicles, and about 99% straight-time capacity utilization. However, we forecast about 460,000 NAM truck sales and capacity for about 690,000, or overcapacity of some 50% in NAM trucks. Total overcapacity for the NAM's will be just under 9%.

Thus we see NAM overcapacity (9%) at about one-half the level of the traditional manufacturer (16%), but the patterns by type of vehicle also differ substantially. Traditional manufacturers are likely to experience proportionately greater overcapacity in cars, while NAM's are likely to face more overcapacity in light trucks. To be sure, if Toyota does not establish a truck plant, then NAM trucks, even at reduced sales levels, are likely to come closer to their reduced straight-time capacity.

[6]We projected Canadian sales at the same growth rate as U.S. sales, preserving Canada's larger import car share and lower import truck share at current levels.

Table 4
1993 Estimated
New American Manufacturer Capacity
(thousands of vehicles)

Manufacturer	Retail Passenger Car*	Captive Passenger Car**	Total Passenger Car	Retail Light Truck*	Captive Light Truck**	Total Light Truck	Total Vehicles
United States							
Diamond Star	120	120	240	0	0	0	240
Ford-Nissan	0	0	0	36	64	100	100
Fuji-Isuzu	60	0	60	60	0	60	120
Honda	510	0	510	0	0	0	510
Mazda	132	168	300	0	0	0	300
Nissan	250	0	250	150	0	150	400
NUMMI	50	100	150	100	0	100	250
Toyota	200	0	200	200	0	200	400
U.S. Total	1,322	388	1,710	546	64	610	2,320
Canada							
Honda	80	0	80	0	0	0	80
Hyundai	100	0	100	0	0	0	100
CAMMI	60	60	120	25	55	80	200
Toyota	50	0	50	0	0	0	50
Canadian Total	290	60	350	25	55	80	430
Total North American	1,612	448	2,060	571	119	690	2,750

*Vehicles marketed through the New American Manufacturers' distribution channels.
**Vehicles marketed through traditional domestic manufacturers' distribution channels.

Supplier Estimates. We asked our respondents to estimate the proportion of their 1992/1993 customers' requirements that could be met by various types of suppliers. The types of suppliers include the 1) the allied divisions of the vehicle manufacturers; 2) the traditional independent American supplier base; 3) traditional suppliers that move into product areas that are new for them; 4) New American Suppliers, or NAS's[7]; and 5) offshore or nondomestic suppliers. We asked for these estimates for two categories of manufacturers: their traditional Big Three customers and the New American Manufacturers, or NAM's. The fact that there are now two distinct types of manufacturers emphasizes the increasingly international and multinational nature of automotive manufacture.

Figure 3 displays the responses to these questions. Suppliers report that these various sources can meet 153% of their traditional customers' needs, while they can meet 190% of the NAM's' needs. That suggests that overcapacity at the supplier level may indeed be even more serious than that predicted at the manufacturer level. These levels of overcapacity indicate the probable development of even more fierce competition at the supplier level than the already heated competition of the past few years.

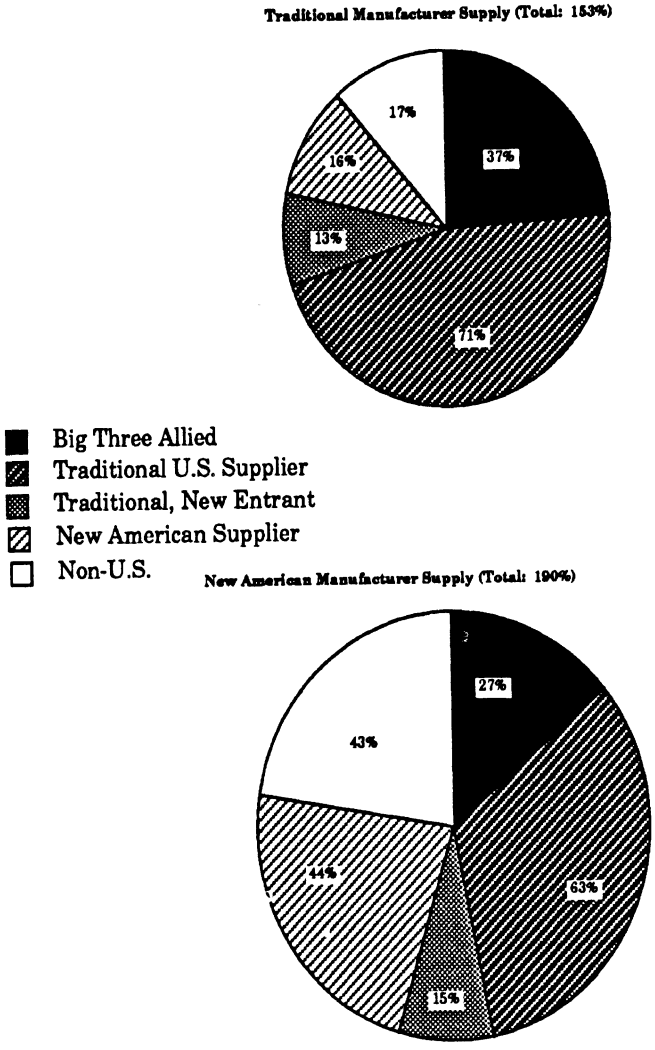

Figure 3: Available Supplier Capacity, as a Percent of 1992/1993 Customer Demand, by Source

[7]Most of these suppliers are U.S. production sites of Japanese suppliers, such as Ogihara's Howell, Michigan facility.

To be sure, we cannot determine whether or not these supplier projections are accurate. But we can ask whether they are consistent with other projections and assumptions, at least for their traditional customers. Suppliers estimate that the allied and traditional independent suppliers combined can meet 108% of their traditional customers' 1992/1993 demand. This is below the typically estimated 130% of vehicle overcapacity and our somewhat lower estimate of 116%. However, supplier overcapacity is influenced by factors in addition to vehicle demand, and they do not all predict excess capacity.

First, suppliers report that reduction in the number of suppliers is moving rapidly. If we assume that some 10% of the supply base is eliminated by 1992/1993, that leaves 90% of today's suppliers pursuing business by then. That would raise the estimate of 108% to 120% (108%/90%), and therefore within the range of our own and conventional expectations. Second, outsourcing may provide some small increase in business, an increase that will probably not be completely offset by increases in nondomestic sourcing. To be sure, the net additional supplier business from these changes in sourcing patterns will likely be small, but it will provide some additional demand for surviving suppliers, thus restraining overcapacity.[8]

Suppliers view the two types of manufacturers as having quite different patterns of potential supplier capacity. The NAS's and nondomestic suppliers are viewed as potentially providing greater capacity to the NAM's than to the domestics (44% vs. 16% and 43% vs. 17%, respectively). We assume that most offshore sourcing for the NAM's will be from Japan, reflecting current practices, while there will probably be a continued shift of the domestic's offshore sourcing to countries like Taiwan, South Korea, and Mexico, where currency values have not increased as much as they have in Japan.

How will this overcapacity affect different types of suppliers? If we assume that each type of supplier secures business proportional to its available capacity for each type of manufacturer, then Figure 4 displays the break-out of 1992/1993 manufacturer sourcing. But how likely is that business to be spread evenly across supplier bases? We cannot be certain, of course, but our estimate is that it will not be evenly allocated to all suppliers.

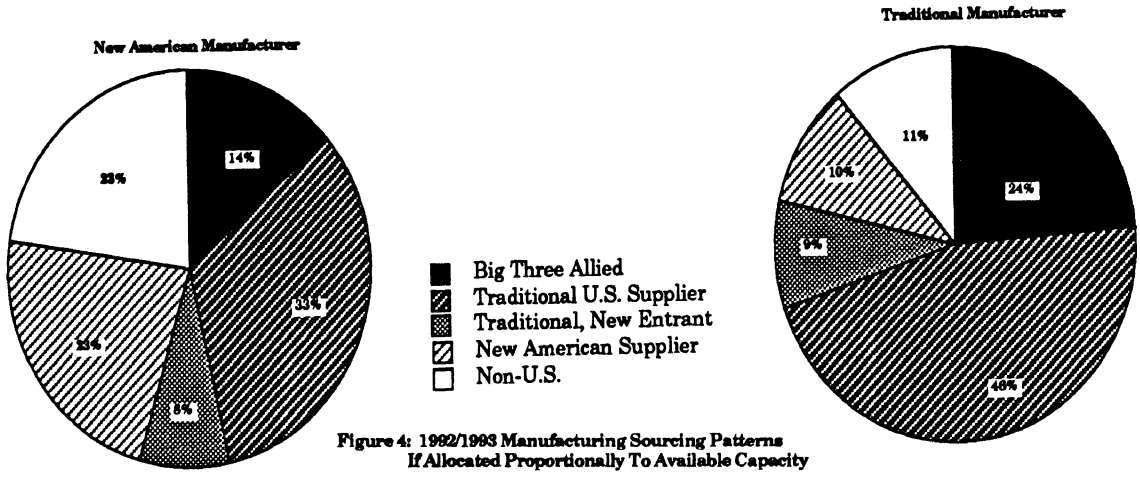

Figure 4: 1992/1993 Manufacturing Sourcing Patterns If Allocated Proportionally To Available Capacity

[8] A latter section of the paper presents supplier estimates of the rapidity of changes in these and other industry business practices.

NAM Sourcing Issues. We see the NAM's seriously pursuing a high level of domestic content by 1992/1993. There are three primary motivations for this. First, there will be continued concern about the bilateral automotive trade balance. High domestic content will ease trade friction between the United States and Japan, both through its real impact on the deficit, and its symbolic value as evidence of good faith effort. Second, there are clear advantages to proximate sourcing, especially in the low inventory, pull manufacturing systems characteristic of the Japanese manufacturers. Third, we feel that the Japanese will want their U.S. production clearly viewed as "American" so that it provides a possible source of vehicles for the European market, should "Europe 1992" bring with it restrictions on import vehicles from Japan.

At the same time, CAFE standards may establish an upper limit on the domestic content levels of the NAM's. CAFE requires a particular calculation of domestic content, with vehicles at or above 75% considered "domestic" and those below 75% treated as "imports", regardless of where they are assembled. Domestic and import vehicles are separately evaluated for conformance to CAFE, and the fleets are therefore subject to separate penalties for noncompliance.

But the Japanese certainly appear to be making a concerted effort to upscale their vehicle offerings, and most of these larger and more expensive vehicles will come from Japan. This allows the Japanese industry to reduce the unit level of vehicle exports to the United States without necessarily reducing the value of those exports. The Japanese industry can then argue that they have reduced imports, and U.S. consumer choice is responsible for the continued high levels of the trade deficit. But it is entirely conceivable that these upscale imports will have trouble meeting the CAFE standards that may be in force by 1992/1993. Now, in the Spring of 1989, discussions indicate a serious possibility of CAFE miles-per-gallon standards in the low 30s by 1992/1993. To guard against this, we think the Japanese manufacturers will want to keep their NAM vehicles as "imports" for CAFE purposes, so that these more fuel efficient subcompacts (68% of projected NAM capacity) and compacts (32%) can be used to offset their less fuel efficient, upscale imports from Japan.

These contrasting pressures suggest to us that the NAM's will seriously target a level of domestic content just below 75%, to maintain their "import" CAFE status, while securing as much of an "American" image as possible. The CAFE domestic content calculation includes inherently domestic, nonsourced content of just over 37% for the typical NAM vehicle.[9] This portion of the vehicle is entirely domestic content in CAFE terms. That means the balance -- or "sourceable" content -- is just below 63% of the vehicle value. That portion of the vehicle represents supplier purchases, and it must be just under 60% domestic content for the vehicle's total calculated CAFE domestic content to be just under 75%.

For the NAM's, then, offshore suppliers are likely to secure just over 40% of the estimated 43% of NAM demand that they can fill. But that leaves the other four types of suppliers targeting a total 149% of capacity on 60% of the vehicle's sourceable content, or capacity at more than twice available demand. If the NAM's take the estimated available capacity of the NAS's (44%), as seems probable, that leaves the three types of traditional domestic suppliers with 105% of capacity to fill 16% of the originally estimated demand, or capacity that is some 650% of demand. If the NAM's equally split their domestic demand between NAS's and traditional suppliers, including all three categories, then the traditional suppliers will secure

[9]This content includes assembly, manufacturing profit, marketing expenses, and so forth.

about 30% of NAM demand, but still face serious overcapacity, with 350% (105%/30%) of required capacity. On the other hand, NAS's will also secure about 30% of NAM demand, but that represents about 68% of their available capacity. Table 5 summarizes these possibilities.

Table 5
Possible New American Manufacturer Demand, by Supplier Type

Supplier Type	Capacity Available	Most Likely	Best Case
Big Three Allied Traditional Traditional, New Product	105%	16%	30%
New American Supplier	44%	44%	30%
Non-U.S. Supplier	43%	40%	40%

We suspect that the allied suppliers of the domestic manufacturers will experience special difficulty securing work from the NAM's. The NAM's are likely to source from allied suppliers only in those cases where they in fact have unique technology, or an extreme competitive edge in quality and/or cost. A minor, or even moderate, edge will probably not suffice to win the business. We think the NAM's will view such sourcing as potentially helpful to a competitor, and will therefore resist it. The major exception to this will be in situations where the traditional manufacturer sources vehicles from the NAM. We suspect that they will be able to negotiate access for some of their allied suppliers in those circumstances.

Traditional suppliers, then, face a serious challenge. Their traditional customers are likely to provide decreased demand, and the ready replacement sources for this lost business, the NAM's, are not likely to come close to taking the suppliers' available capacity. Moreover, the NAM's' likely heavy reliance on NAS's will deprive these traditional suppliers of another important source of business: each other. These suppliers relied on other suppliers for some 20% of their 1987 sales. But NAS's are almost certain to source from offshore at a fairly high rate, perhaps as much as 50%. To be sure, traditional suppliers also source offshore, but at a rate of about 15%, based on these data. So traditional suppliers may lose an additional 41% (1.0 - [.5/.85]) of the business between suppliers generated by NAM manufacturing when that business goes to NAS's.

Traditional Manufacturer Sourcing Issues. The traditional manufacturers will undoubtedly re-source some of their demand to the NAS's. These suppliers have a number of significant competitive advantages, including their general reputation for high quality, the typically lower costs associated with a greenfield site (especially those afforded substantial public subsidies), and a younger labor force. Of course, it is unclear exactly what proportion of total traditional demand will be met by the NAS's, but most analysts assume that it will be at least the 10% proportional allocation, and probably closer to the 16% of demand they are estimated to be capable of meeting. This could change dramatically if the traditional manufacturers begin to view sourcing from the NAS's as increasing the competitiveness of competitor vehicle manufacturers.

Offshore sourcing by the domestics would be on the order of 11% (17%/153%), assuming available manufacturer business is spread proportionately across different supplier bases. But it is possible that nondomestic suppliers will receive less than a proportional share, perhaps only on the order of 5% to 7%. There are three reasons for this. First, we think that traditional suppliers will compete fiercely to retain business, and many of them will compete on a variable cost basis rather than reduce capacity. Second, we think the early 1990's will see the NAS's making access to the traditional domestic industry their number one strategic priority. Third, the strengthening of the yen has somewhat lessened the formidable competitive challenge of Japanese suppliers, and this challenge will not automatically be replaced by other offshore sources. The Japanese are no longer simultaneously the low-cost and high-quality source for many automotive goods. To be sure, the strengthened yen has not damaged their quality, and there is evidence that they are capable of restraining their costs in the face of a strong yen. But now they must frequently face competitors that can best them on a cost basis, if not a quality basis. Moreover, we think that the domestic manufacturers will likely restrain their sourcing from Japanese companies to avoid increasing their dependency on their major competitor industry. Ford, for example, has already indicated that it will limit its sourcing from Japanese suppliers to cases where they have clear technological advantages.

CAFE regulations, on the other hand, may force increased offshore sourcing for large vehicles that are made by traditional domestic manufacturers. The Big Three face the same problem that the Japanese manufacturers will: how to structure their domestic and import CAFE fleets so as to avoid penalties. For the domestics, that will probably require moving some large vehicles into the import fleet, and that can be done by lowering the level of domestic content below 75%. These larger vehicles could then be offset by more fuel efficient imports, and they would not reduce the CAFE performance of other domestic vehicles. That strategy would require lowering the typically high current levels of domestic content, often reported to be in the 90%s, down to a level of at most 60%.[10]

If the manufacturers decide to lower the domestic content of some vehicles, how they elect to do so is critical for suppliers. If they choose to source offshore major powertrain elements, such as engines or transmissions, then current independent American suppliers might still retain much of their current business. An engine sourced from Mexico, for example, is 100% import content, even if 50% of its value is composed of American exports to Mexico. If, on the other hand, the manufacturers elect to source many lower-value parts and components offshore, then suppliers may face a more broadly dispersed threat, and one more difficult to meet through increased export activity. In any case, suppliers may find that protecting their current levels of business requires substantial change in their current business practices and customer base.

If the Big Three lower the domestic content levels of larger vehicles to meet CAFE standards, then offshore supplier might well secure the 11% of available Big Three demand that reflects the proportional allocation of demand to available capacity. But how much of this offshore content consists of American exports will probably depend on the specific strategy the manufacturers pursue in attaining lowered levels of domestic content.

[10] In fact, it might be quite a bit lower than 60%. That is because these vehicles typically have a higher portion of inherently domestic content [profit and marketing expenses, for example], that must be offset by lower levels of domestic content in the sourceable portion of the vehicle.

Overcapacity in the U.S. industry, then, will make entry into the traditional domestic industry more difficult for offshore suppliers. The competition between traditional, NAS, and established offshore suppliers may effectively neutralize any cost advantage they might possess. This might preclude a typical entry strategy of quoting low prices to secure access and the opportunity to demonstrate competence. Overcapacity also suggests that domestic suppliers will be quite cautious about adding new facilities or expanding current ones. That is unfortunate news for communities that seek to acquire or expand an automotive supplier base as a component of their economic development activities.

CAFE regulations are likely to have the unintended effect of making it more difficult for the traditional U. S. supplier base of allied and independent suppliers to secure significant volumes of business at the NAM's. For the NAM's to meet the strategic needs of the Japanese manufacturers, it is likely that no more than 16% to 30% of their demand can be available to the traditional automotive supplier industry.

Capacity Constraint. Of course, general levels of overcapacity conceal product areas that may in fact experience some capacity strain. Even in an overcapacity situation, some products are likely to face constraints, sometimes because they are new or face explosive demand, sometimes because of the decisions of current suppliers to leave a product area.

We asked our respondents to identify as many as three specific product areas where current capacity may not be enough to meet 1992/1993 demand. If all 92 respondents identified three products, there would be 276 nominations. In fact, only 16 respondents identified such opportunities, and they indicated 26 product areas that might experience strained capacity. This is just under 10% of the possible nominations, and reinforces the capacity estimates discussed above. But it still suggests there are likely to be specific product areas that experience undercapacity. Products for seats (6 nominations), vehicle bodies (4 nominations), and fuel systems (3 nominations) lead this list.

Capacity Plans. We asked respondents about their current capacity and future capacity plans for ten different non-U.S. production locations and three U.S. regions: the Frostbelt, the Midsouth, and elsewhere. These companies, as displayed in Table 6, currently have at least one production location in all of these areas except Eastern Europe. The three U.S. locations total 131, or 58.5%, of the identified locations, followed by Canada at 13.4%, Western Europe at 8.0%, and Mexico at 7.6%.

We asked the likelihood that respondents' companies would add, replace, or reduce capacity in each of the thirteen locations. The scale covers 1= "near zero likelihood", through 3= "50/50", to 5= "near 100%". The three U.S. locations have the highest scale scores for adding capacity, with the Frostbelt averaging 3.3, other U.S. at 3.1, and the Midsouth at 2.9. Western Europe and Canada follow at 2.6 and 2.3, respectively. The highest score for capacity reductions are the Frostbelt (1.9), Canada (1.7), and other U.S. and Brazil (1.5).

The Frostbelt (2.4), the Midsouth and Canada (1.9), other U.S. (1.6) and Western Europe (1.3) are the only regions above 1.1 on our scale for replacing capacity, even though our question asked for retrofit or greenfield replacement. Unfortunately, the data patterns suggest that respondents may have interpreted the replacement question in a number of ways, including 1) replacing in that location capacity already existing in that location; 2) replacing in that location capacity currently existing in

other locations; or 3) replacing in other locations capacity currently in that location. Therefore, until additional analysis clarifies this item, we discuss it no further.

Table 6
Supplier Production Locations

Region	Existing Locations	Expected Additions	Expected Reductions
Brazil	9 (4.0%)	5.50	1.50
Canada	30 (13.4%)	12.50	4.50
China	1 (0.0%)	3.00	0.00
Eastern Europe	0 (0.0%)	1.25	0.00
India	3 (1.3%)	1.50	0.00
Japan	8 (3.6%)	2.50	0.00
Mexico	17 (7.6%)	12.50	0.75
South Korea	5 (2.2%)	6.00	0.00
Taiwan	2 (1.0%)	2.75	0.00
Western Europe	18 (8.0%)	14.00	0.00
U.S. Frostbelt	63 (28.1%)	35.00	9.00
U.S. Midsouth	36 (16.1%)	22.25	1.75
U.S. Other	32 (14.3%)	19.25	3.00
Total	224 (99.6%)	138.00	20.50

The probabilities of adding capacity clearly exceed those for reducing it. Does this mean that the supplier industry will indeed face increased future capacity, even above today's level, and that much of the nondomestic capacity targeted on the U.S. manufacturers may be owned by North American companies? We suspect that each of these respondents assumes that the capacity they add will be compensated by the reduction of competitors' capacity, and thus there will be little or no net added capacity. But if many companies pursue this strategy, there will inevitably be additional overcapacity and the eventual premature retirement of some companies' capital investments. Worldwide automotive growth is not likely to support the additional supplier capacity coming on-stream throughout the world, and companies will have to be competitively successful to fill their capacity. That competitive success will inevitably be at the expense of other companies, with some facing idle capacity, and others forced to retire capacity.

We converted these scale scores to probabilities, then multiplied them by the number of respondents to the item, to yield an expected value for each of these capacity decisions.[11] The results for adding and reducing capacity are also displayed in Table 6. The three U.S. regions, Western Europe, Canada, and Mexico are likely to see the largest number of additional sites, while the Frostbelt, Canada, and the "other" U.S. location are likely to see the largest numerical reductions.

We subtract the expected values for capacity reduction from the expected values for additional capacity to arrive at a net expected value for each region's additional production locations, displayed in Table 7. The three U.S. regions will receive some 53% of the expected net location gains, somewhat below their share of current

[11] We treat each decision as equivalent to one plant, although that is undoubtedly an error in certain cases because some companies will be considering more than one plant for a location as they respond to this question.

Table 7
Supplier Net Capacity Additions, by Region

Region	Expected Net Gain*	Rate of Net Gain**
Brazil	4.00 (3.4%)	0.44
Canada	8.00 (6.8%)	0.27
China	3.00 (2.6%)	3.00
Eastern Europe	1.25 (1.1%)	---***
India	1.50 (1.3%)	0.50
Japan	2.50 (2.1%)	0.31
Mexico	11.75 (10.0%)	0.69
South Korea	6.00 (5.1%)	1.20
Taiwan	2.75 (2.3%)	1.38
Western Europe	14.00 (11.9%)	0.78
U.S. Frostbelt	26.00 (22.1%)	0.41
U.S. Midsouth	20.50 (17.4%)	0.57
U.S. Other	16.25 (13.8%)	0.51
Total	117.50 (99.9%)	0.52

* Table 6, Column 2 minus Table 6, column 3.
** Table 7, column 1 divided by Table 6, column 1.
*** Current base for Eastern Europe is zero, so no meaningful rate of increase can be calculated.

locations. Canada suffers the largest share loss, from just over 13% of current to just under 7% of expected net additions, followed by the Frostbelt, falling from about 28% of current to about 22% of additions. Western Europe gains about 4%, moving from 8% of current to just under 12% of expected additions, with South Korea and Mexico gaining about 3% share of additions compared to their current share.

It is not surprising that the traditional heartlands of North American automotive production, the Frostbelt and Canada, take less of a share of expected future locations than they enjoyed in the past. Nor is it surprising that these losses, for the most part, are expected to be distributed throughout these other regions rather than concentrated in just one or two. However, it is somewhat surprising to see Western Europe doing so well in expected net gains. As an established region for these supplier companies' production, one might expect it to lose share to newly emerging regions, as is the case with the U. S. regions and Canada. We suspect that this reflects North American companies' considering European locations in light of the announced plans for a European free trade area after 1992. One strategic response to this situation is to establish new European production sites, to guard against restricted access to post-1992 Europe.

Table 7 also displays the rate of net gain for each of these regions, using their existing locations as a base. The low rates for the Frostbelt and Canada reflect their large existing base, while some high rates, such as China's, reflect a small existing base. Perhaps most noteworthy here is the continued growth of the Midsouth and other U.S. locations, perhaps at the expense of the Frostbelt and Canada.

Production Site Decisions. The redistribution of production capacity in the face of industry overcapacity is a major focus of this survey, and that process will be in part driven by the fundamental factors influencing company decisions to select one from among many possible sites. Our respondents provided ratings of the importance of twelve considerations or factors in deciding where to locate a manufacturing operation. Table 8 displays these results.

Table 8
Importance of Factors
in Manufacturing Siting Decisions

Siting Factor	Rating*
Labor Force Attitudes	1.7
Loaded Direct Labor Cost	2.1
Loaded Indirect Labor Cost	2.2
Proximity to Customers	2.2
Transportation Infrastructure	2.4
Skill of Local Hourly Labor	2.5
Availability and Cost of Utilites	2.5
Loaded Salaried Labor Cost	2.6
Skill of Local Salaried Labor	2.6
Skill of Local Middle Management	2.7
Proximity to Suppliers	2.7
Land Cost	2.8

* On a scale with 1 = Major Importance, 3 = Moderate Importance, and 5 = Little Importance.

All these items were rated below 3.0, and thus on the more important side of the scale.[12] On balance, these considerations are little differentiated by these suppliers, although subsequent analysis may reveal that there are distinct clusters of factors associated with differences among these suppliers in product, size, and so forth.

However, the results do establish labor force attitude as the most important of these considerations, averaging 1.7 on our scale. Loaded cost for both direct (2.1) and indirect (2.2) labor and proximity to customers (2.2) form the next cluster, with all of the rest falling into a third cluster.

There appears to be some inconsistency in the importance these respondents assign to direct and indirect labor costs and their responses to some of the other items in the survey. They rate both hourly and salaried labor costs, as discussed below, as important, but the least important by a considerable margin, of ten performance areas that the United States must improve to stay competitive. They also rate the U.S. weighted average for production cost as competitively ahead of only Western Europe among the ten competitor regions. Yet the United States will be the location of over half of the net additions to capacity developed from these responses. It is difficult to reconcile this emphasis on labor cost as a site selection factor with a much lower emphasis on the need to improve U.S. performance in the labor cost area, in light of the still heavy, albeit somewhat declining, emphasis upon U.S. siting for capacity investments.

[12]This scale is reversed, with 1 = major importance, 3 = moderate importance, and 5 = little importance.

Summary. There is no question that the traditional North American domestic automotive industry faces a serious threat of overcapacity as it enters the early years of the 1990's. To be sure, typical estimates of vehicle overcapacity of 130% are higher than our own estimates of some 116%, and the domestic industry's overcapacity may be more concentrated in cars than in light trucks. But it is serious overcapacity in any case. Suppliers, too, face overcapacity, perhaps even beyond that experienced by their customers. There is some evidence that this will be primarily due to the increased success of the NAS's. Nondemand factors will likely cancel out, although that cancellation involves a reduction in the number of suppliers, some increased outsourcing by the manufacturers, and some increase in the manufacturers' level of nondomestic sourcing. Each of these developments pose particular threats and opportunities for individual suppliers, as evidenced by some expectation of capacity constraint in certain product areas.

These respondents are not very likely to add capacity, but if they do, it is likely to be in the United States. This is not surprising in view of their estimates of the overall capacity situation in the industry. Nevertheless, some capacity will be added, and it is likely to evidence a wider geographical distribution than current facilities, and Western Europe may significantly benefit from those changes.

Industry Trends

The North American automotive industry continues to experience major changes in its structure and practices, primarily flowing from the increased competitive challenges it has faced since the late 1970s. This section addresses some supplier views as to how those responses will develop as we move forward into the 1990's.

Changing Practices. We asked our respondents to indicate how rapidly the manufacturers are moving to implement a variety of practices. These practices form the foundation of the changes predicted for the structure of the American automotive industry, particularly for the relationship between suppliers and manufacturers. Table 9 displays these results. Continuous quality improvement (4.5 on a scale ranging from 1 = slow to 5 = rapid) is the most rapidly developing change, followed by reduction in the number of suppliers (3.8), continuous price pressure (3.7), and reliance on supplier engineering (3.6).

Table 9
Rate of Implementing Changes in Manufacturer-Supplier Practices

Factor	Rate*
Continuous Quality Improvement	4.5
Reduced Number of Suppliers	3.8
Continuous Price Reductions	3.7
Supplier Engineering Contribution	3.6
Sole Sourcing	3.5
JIT	3.4
Early Supplier Selection	3.1
Tiering	2.9
Modular Sourcing	2.5
Outsourcing	2.5
Non-U.S. Sourcing	1.9

* On a scale with 1 = Slow, 3 = Moderate, and 5 = Rapid.

There are two striking aspects to these results. First, the manufacturers' emphasis on quality improvement remains, in these supplier reports, the most rapidly developing change in standard business practices, as it has throughout the 1980's. This is important because some in the industry have been concerned that this emphasis might slacken somewhat with the relatively stronger profit performance of the domestic Big Three over the past few years. Second, reduction in the number of suppliers shows the greatest increase in estimated implementation rate and relative ranking compared to earlier surveys. Reduction in the size of the supplier base, at least in direct suppliers to the manufacturers, seems to be occurring as the manufacturers introduce new models and platforms.

So the American supplier base is shrinking, and suppliers will have to improve their quality and increase their engineering contribution to survive. This must be accomplished while facing continual pressure from their customers to reduce prices. These changes suggest an upgrading of the supply base is underway, and that, coupled with a reduction in the number of suppliers, indicates that extremely difficult and intense competition lies ahead.

The most slowly developing practice is the manufacturers' move to offshore or nondomestic sourcing. From 1982 until 1986 manufacturers sought, and suppliers feared, major increases in nondomestic sourcing. Two events have seriously altered this expectation. First, the dollar weakened against the yen, mark, and other major currencies. That eliminated the cost advantage of many offshore suppliers. Second, the U.S. supplier base has significantly improved its quality level, and that undercuts the cost advantage of offshore sources, such as South Korea and Taiwan, where the currency shift has been much smaller. Our respondents report that increased non-U.S. sourcing is the most slowly developing change of the 11 practices we listed, at 1.9 on our scale, 0.6 points below the next most slowly developing trend. Non-U.S. sourcing exhibits the largest decrease in estimated rate and comparative ranking of any of these practices that were included in earlier surveys.

The independent supplier community has welcomed, while the UAW and many Midwestern communities have been apprehensive about, the manufacturers' announced intentions to outsource more work to independent suppliers. These suppliers see increased outsourcing as proceeding at somewhat less than a moderate rate of speed (2.5 on our scale). Manufacturer outsourcing has been restrained by the last UAW contract, but could accelerate after the next. This might happen if an industry downturn leads to decreased production for the manufacturers' allied suppliers. Such work might be outsourced as the industry recovers. However, on balance it seems unlikely that rapid, major changes in the allocation of work between the manufacturers and their suppliers will occur over the next five years. To be sure, there will be product-specific threats and opportunities for independent suppliers, as the manufacturers alter their specific make-buy decisions. But it is difficult to envision the substantial net increases in purchases that would accompany the significant decreases in manufacturer levels of vertical integration that analysts expected just a few years ago.

Analysts have expected two other related changes in the structure of the U.S. industry: an increase in the tiering of the supply base, and a move to more modular, or system, sourcing. Tiering involves a more unidirectional flow of goods through the levels of the supply base to the manufacturers. This is often represented as a pyramid shaped industry, with parts and components flowing upwards to the manufacturers at the apex. This structure is attractive to the manufacturers for a number of reasons, and many expected that it would come about as the

manufacturers reduced their numbers of direct suppliers, and moved to sourcing more built-up components, and even complete systems. While the reduction in suppliers appears to be moving along somewhat rapidly (3.8), neither tiering (2.9) nor modular sourcing (2.5) are developing nearly as rapidly.

However, there are reasons to believe that both tiering and modular sourcing may accelerate in the future. The manufacturers find them quite attractive, since they both reduce the manufacturers' transaction costs. Tiering is an integral part of our image of the Japanese industry, and thus has a certain appeal to the manufacturers as they attempt to adopt elements of the Japanese industry structure. Modular sourcing will, in many cases, reduce the manufacturers' own labor cost, as the suppliers take on subassembly work that is typically accomplished in the vehicle assembly plant. Both these developments may exhibit a long, slow start-up period, followed by a period of rapid acceleration. Modular sourcing, for example, may be introduced in a more clustered than smooth fashion, as the manufacturers make major moves associated with new model or platform introductions. It is possible that we will see modular sourcing follow the pattern that appears to have developed with reduction in the number of direct suppliers.

These responses also suggest that the road ahead for new, offshore entrants into the U.S. manufacturers' supply bases will be difficult. Requirements are escalating, the number of suppliers is contracting, and the interest in offshore sourcing is lower than it was in the early and mid-1980's.

Supplier Selection Criteria. We asked our respondents to rate the importance that their OEM customers place on a variety of supplier characteristics when they decide where to place their business. We asked them to indicate the importance of each characteristic for three time periods: 1977, the glory years of the old traditional industry; now, 1988; and 1990/92, a few years into the future. These responses indicate interesting changes from the past to the present, and expectations about future developments. Since they represent supplier beliefs about their customers' selection criteria, they suggest the suppliers' views of the bases of competition in the industry.

The supplier selection decision in the late 1970s was dominated by short-term price at 4.1, followed by delivery reliability at 3.3, almost one full scale point behind. Manufacturing competence and past performance, both at 3.1, were the only other factors that receive scores above 3.0, the "moderately important" point of the scale.

Quality (4.3), long-term price (4.2), and delivery (4.1) are currently more important than short-term price (3.9), and manufacturing competence (3.9) is essentially tied with it. By 1990/92, quality (4.7), delivery (4.5), long-term price (4.5), manufacturing competence (4.4), and engineering competence (4.4) are clearly expected to form the cluster of the most important selection criteria, displayed in Figure 5. Product (4.0) and process (3.9) innovation, effective management (3.9), and past performance (3.9) cluster with short-term price (3.8) behind this first set of factors, while financial resources (3.7) and location (3.3) are still expected to trail short-term price. This cluster of factors is displayed in Figure 6.

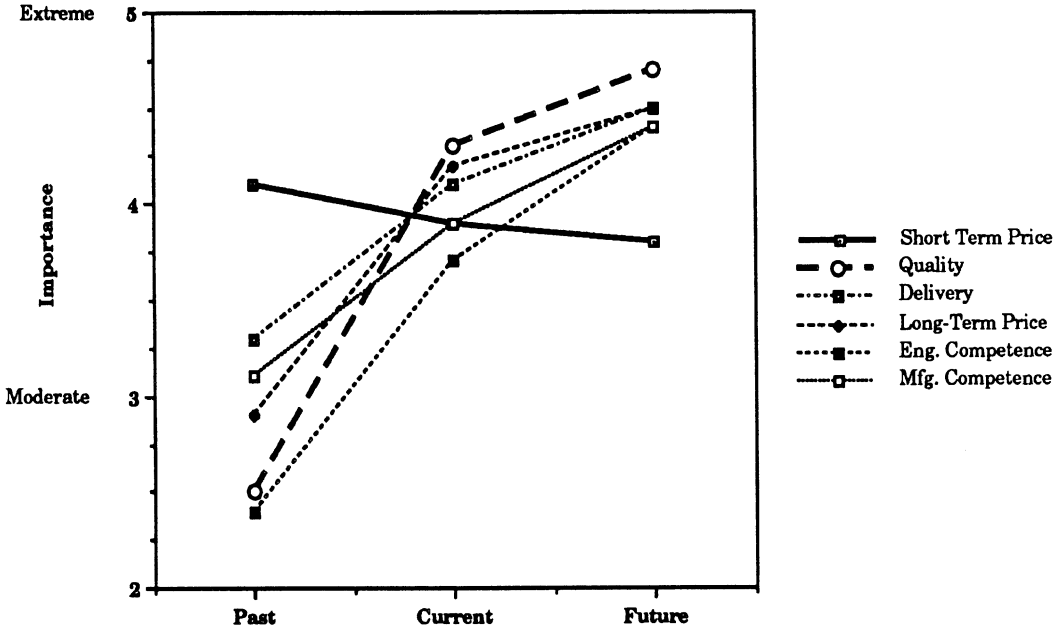

Figure 5: Supplier Selection Criteria

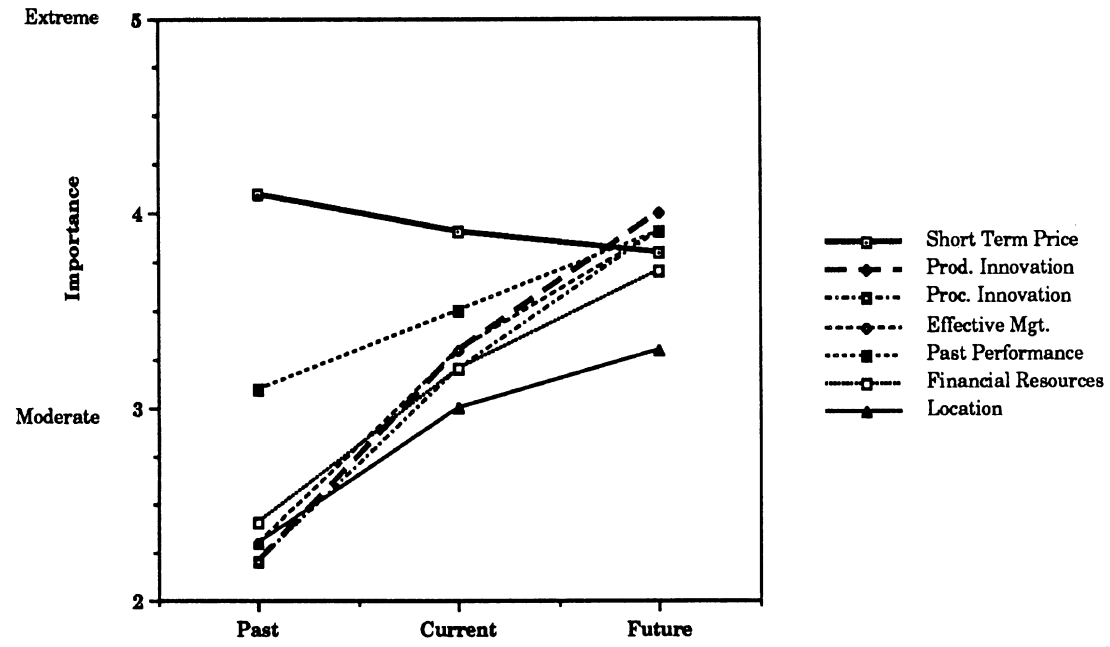

Figure 6: Supplier Selection Criteria

These suppliers, then, see rather dramatic changes in the manufacturers' selection criteria as we move from the past through the present to the mid-term future. Over time, all these criteria except short-term price increase in importance. Short-term price's absolute scale score falls from 4.1 to 3.9, and then to 3.8. To be sure, these are not major changes. But the *relative* ranking of short-term price shifts dramatically, as it falls from most important, by a significant margin, in 1977, to tied for fourth now, and to 10th in the future. Quite simply, more factors are rapidly becoming more important, and short-term price at best maintains the absolute level of importance it has held in the past.

As we look to the future, we find a new set of important selection criteria, but they are first among 12 criteria, all of which are now above 3.0 on the scale. No single factor dominates the selection decision as short-term price did in the past. The lowest ranking criteria for the future is supplier location at 3.3. In the past, only four criteria were rated above 3.0.

These data suggest that the sourcing decision has become more complex, and is likely to become even more complex in the future. More factors are important and therefore are considered in the decision, and no one strong supplier characteristic is likely to offset a series of weak ratings, as short-term price often could in the past. These data also imply that a traditional strategy for new entrants -- quoting a low price to "buy the business" and then demonstrating their competence -- is less likely to succeed now than in the past, and even less likely in the future. On the other hand, the stress on supplier proximity to facilitate Just-In-Time arrangements has by no means become an insurmountable barrier. It is a moderately important selection criteria, but it is the least important on this list.

Three aspects of these data merit comment. First, a vision of a broadly competent supplier seems to be emerging in the manufacturers' selection criteria. This supplier delivers high quality, to schedule, at a competitive long-term price, and has strong manufacturing and engineering capabilities. The preferred supplier will be good across the board, rather than simply best on one or two criteria. The two most important selection criteria in 1977 are separated by 0.8 scale points; in 1990/1992, eight criteria are within 0.8 scale points of the most important factor, quality. These broader, more balanced selection criteria do not support a supplier strategy of narrow strength.

Second, quality has emerged as the most important criteria, although as the "first among equals" rather than as the single dominant factor. Quality shows the greatest gain, in both absolute and relative terms, from the past through the present to the future. The industry now recognizes that quality is not separable from these other selection criteria, resting on a foundation of manufacturing and engineering strength, and contributing to long-term competitive prices. But this is a profound change from the past, and one that should continue to contribute to the industry's long-term competitive strength and survival.

Third, we first asked these questions in 1982-1983, and at that time the "future" we asked about was the current time frame. Suppliers then expected quality, delivery, manufacturing competence, and engineering competence to exceed short-term price in importance by now. The reports for this survey indicate that quality and delivery have indeed surpassed short-term price, while manufacturing competence has essentially tied it, and engineering competence is close behind. That provides some confidence that these supplier expectations about the future have some value and are not simply wishful speculation. There is another noteworthy change in these

estimates over the past years, and that is that many more selection criteria are expected to become as important as short-term price than was the case in early administrations of this question. This again suggests the increasingly complex supplier selection decisions in the industry today and tomorrow compared to yesterday.

It is not appropriate to interpret these data as indicating that piece-price competition is dead in the automotive industry, or that current price quotes are competitively unimportant. If piece-price competition has receded somewhat, it is not dead, and probably never will be. The near-term price is an important part of a supplier's competitive offer, and will remain so. The critical point is that the industry now better understands its relationship to these other criteria and, especially, its failure to be a perfect, or even a good, indicator of a supplier's overall competitive strength. Consequently, while it is and will remain important, it will not dominate the supplier selection decision as it often did in the past.

Areas for Competitive Improvement. The U.S. industry today faces an increasingly complex competitive challenge, including traditional competition between companies within the industry and competition between the industry and its offshore competitors. The issue of industry competitiveness is tied to the overall competitiveness of the United States as a production location because much of the automotive industry's overall competitiveness depends on the strength of other U.S. manufacturing and material supply industries.

We asked our respondents to rate the importance of U.S. improvement in each of ten areas to its remaining a competitive production location. The breadth of the industry challenge is indicated by the relatively high importance respondents attribute to all of these performance areas, displayed in Table 10. Eight of these performance areas are rated between 4.0 and 4.5 on our scale, anchored by 5.0 as "Very Important."

Table 10
Estimated Importance of Improved
U.S. Performance on Ten Competitive Dimensions

Factor	Importance*
Process Design/Engineering	4.5
Manufacturer-Supplier Relations	4.4
Machine Uptime	4.3
Product Design/Engineering	4.3
Capital Productivity	4.2
Hourly Labor Productivity	4.2
Capital Utilization	4.1
Salaried Labor Productivity	4.0
Hourly Labor Cost	3.5
Salaried Labor Cost	3.4

* On a scale with 1 = Not Very Important, 3 = Moderately Important, and 5 = Very Important.

Only two areas -- hourly (3.5) and salaried (3.4) labor cost -- fall below 4.0 on our scale, although they still fall to the more important side of the mid-point. Two major components of labor cost are the rates for wages and benefits and labor productivity. The weakening of the dollar against the currencies of most foreign automotive competitors has currently rendered wage and benefit rates competitively less important than they were in the first half of the decade. But currencies can and do shift in relative value, and there is no assurance that wage and benefit rates will not again become competitively important. Wage and benefit rates in North America are typically higher than those of emerging vehicle and parts producers, and that represents a specific competitive disadvantage, one that has historically been compensated by superior performance in other competitively significant areas.

The other eight performance dimensions included in our survey are all related, directly or indirectly, to productivity, and all fall between 4.00 and 4.5 on our scale. Productivity is the other component of labor cost, and presents a continuing and permanent competitive challenge. Productivity, in its broadest sense, is the maximization of output in relation to input. It encompasses the efficient use of all resources, including financial capital, facilities, equipment, and transactions with both suppliers and customers, as well as the more traditionally recognized area of unit labor output at both the hourly and salaried levels of the workforce. Manufacturing quality is an important source of productivity in this broader sense. Higher productivity offsets the lower wage and benefit rates of newly emerging producers in less developed economies, and that is the realistic basis of competition with them. Productivity is also an important basis of competition with developed producers, perhaps especially Japan.

The relatively tight clustering of these eight items prohibits extensive discussion of the comparative emphasis suppliers place upon them. This clustering itself might reflect a number of different factors. It might be that the pattern of relative emphasis depends on the supplier's particular segment of the industry, or even the supplier's unique situation, and there is no clear "industry-wide" importance ranking. It might be that these areas are all quite important, and that simple fact overwhelms whatever distinctions there might be among them. Finally, it may be that productivity improvement is a "motherhood" issue, eliciting strong endorsement of any particular element or approach within its scope.

Summary. The North American automotive industry continues to face rapid and massive restructuring. These changes cover a wide range of practices and activities, many focused within a particular company, but many fundamentally addressing the relationship between these companies. They include widespread changes in the manufacturers' standard practices in sourcing, their selection criteria for suppliers, and the internal improvement efforts of supplier companies.

Views of International Competition

We asked our respondents to provide their views on ten different international competitors/production locations, and, in some instances, on three regions of the United States. The competitor list is composed of Brazil, Canada, China, Eastern Europe, India, Japan, Mexico, South Korea, Taiwan, and Western Europe. As would be expected, Japan and Canada are viewed throughout these issues as a benchmark for competition. However, the relative views on other competitors are less consistent, and that makes them both interesting and potentially useful. These views suggest how the American supplier community views these competitors and potential competitors in relation to each other now, in 1992/1993, and the year 2000.

Seriousness of Competitive Threat. We asked how serious a competitive threat each competitor industry poses in the respondent's main product area now, in 1992/1993, and in the year 2000, with 1 = not very serious and 5 = extremely serious. These data must be viewed cautiously. Competitiveness is a complex concept, and here respondents are considering it at its most abstract and general level. These responses are summary views across a range of differentiated dimensions, and represent a mixture of specific product areas.

These ten competitors currently average just about 1.9 on our scale, between not very serious and extremely serious. The average moves to about 2.3 by 1992/1993, and reaches just under 2.7 by the year 2000. The next decade, then, will see increasingly serious competitive threats from this group of countries and regions.

Figure 7 displays the evaluations for five competitors that are currently rated at 2.0 or above on our scale. Figure 8 presents evaluations for the five that currently fall below 2.0 on our scale. If we set 2.5 as the cut point for a moderately serious competitor (rounding to 3.0, the scale mid-point), U.S. suppliers now see only two serious competitors, Japan (3.2) and Canada (2.9). Mexico (2.1), South Korea and

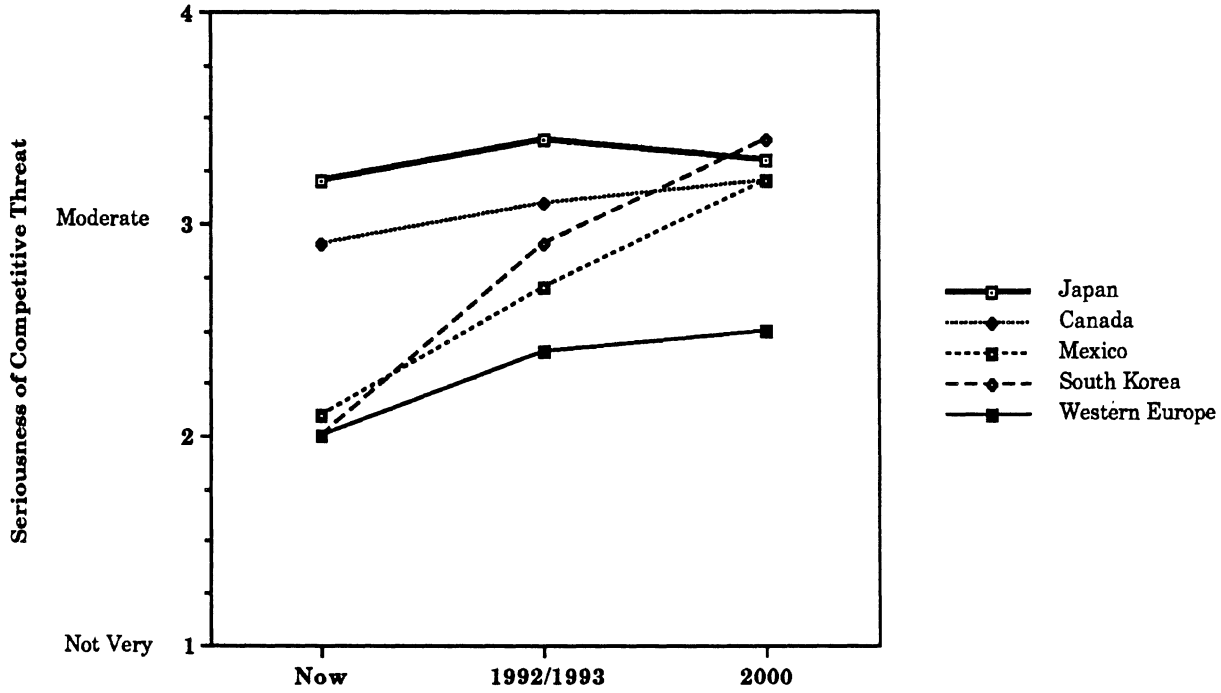

Figure 7: Competitive Threat to U.S. Suppliers, Over Time: Five Competitors

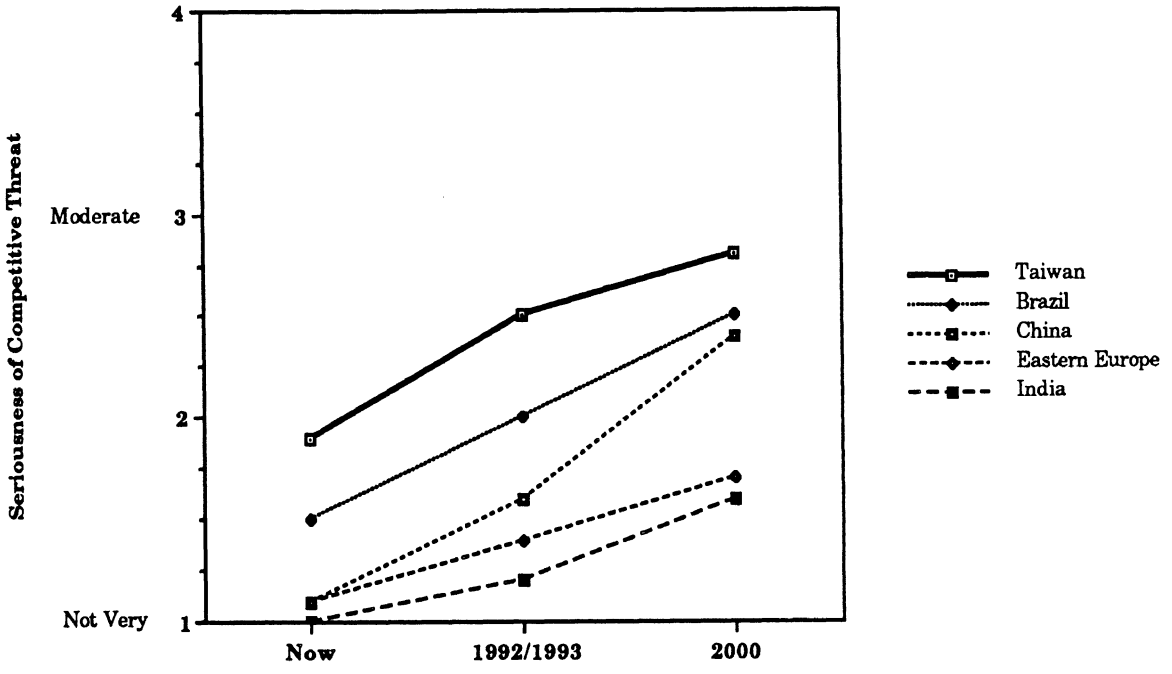

Figure 8: Competitive Threat to U.S. Suppliers, Over Time: Five Additional Competitors

Western Europe (2.0), and Taiwan (1.9) form the next competitive tier. The very general nature of these ratings is probably reflected in the grouping of Western Europe with these newer, but perhaps more aggressive, competitors. Western Europe is probably viewed as a less serious threat than Japan and Canada because of its perceived lack of activity, rather than because of a markedly lower capability. Suppliers see Brazil (1.5), China and Eastern Europe (1.1), and India (1.0) as currently not very serious competitive threats.

In 1992/1993, Japan and Canada marginally increase their competitive threat, moving to 3.1 and 3.4 respectively. South Korea (2.9), Mexico (2.7), and Taiwan (2.5) reach a moderately serious level, while China (2.4), Brazil (2.5) and Western Europe (2.5) reach it in 2000. By 2000, South Korea (3.4) pulls just ahead of Japan (3.3) and Canada (3.2), while Mexico reaches 3.2 on our scale. Competition is increasing, and the number of credible international competitors is likely to grow over the next decade or so.

China presents an interesting case in point. China scores 1.1 for the current period, tied with Eastern Europe and marginally ahead of India. China, at 1.6, is expected to pull ahead of Eastern Europe by 1992/1993, and to pull essentially even with Western Europe and Brazil by 2000, at nearly 2.5 on our scale. China, of all these competitors, shows the largest percentage increases from now to 1992/1993 (0.5 points, 45%) and from 1992/1993 to 2000 (0.8, 50%). These suppliers, then, view China as a competitor that is likely to show rapid development, perhaps somewhat more rapid during the 1992/1993 to 2000 period. They clearly believe that China will leave the less serious competitor group and establish itself as a moderately serious competitor by 2000.[13]

[13]We suspect that these views would be markedly different today, in June of 1989, because of the recent turmoil in China.

Competitive Dimensions. We asked respondents to rate each producing region on five dimensions: quality, cost, technology, material resources, and market potential. For this set of ratings we included three U.S. regions (the Frostbelt, the Midsouth, and other), so there are 13 locations under consideration. These ratings, presented in Table 11, provide more detailed evaluations that may form the bases for the summary ratings of competitive threat discussed above. In fact, if we take an unweighted average of each of the ten non-U. S. region's scores across these five dimensions, we find virtually the same rank ordering that we observe on the summary measure. The major exception, Western Europe, is just behind Canada on the sum of these five dimensions, while it falls at least 0.5 scale points behind Canada for each of the three time periods of the summary measure. That is consistent with the suspicion that its lower ranking on the summary measure does not reflect its capability, but rather its strategic decisions about where to compete.

Table 11
Competitive Ratings* on Performance Demensions

Region	Product Quality	Production Cost	Technical Capability	Material Supply	Market Potential	Average Rating
Brazil	2.5	3.9	2.3	2.7	2.7	2.8
Canada	4.0	3.4	3.7	3.8	3.7	3.7
China	1.8	4.0	1.8	2.2	2.9	2.5
Eastern Europe	2.0	3.1	2.2	2.3	2.3	2.4
India	1.5	3.5	1.6	1.8	2.1	2.1
Japan	4.8	3.6	4.7	3.6	3.5	4.0
Mexico	2.8	4.3	2.3	2.9	2.9	3.0
South Korea	3.4	4.2	3.0	3.1	2.9	3.3
Taiwan	3.0	4.1	2.7	2.8	2.7	3.1
Western Europe	3.9	2.7	4.2	3.6	3.6	3.6
U.S. Frostbelt	3.8	2.8	4.3	4.1	4.0	3.8
U.S. Midsouth	3.8	3.5	3.8	3.8	4.0	3.8
Other	3.6	3.0	3.8	3.6	3.9	3.6

*On a scale with 1 = Extremely Non-competitive 3 = Average Competitiveness, and 5 = Extremely Competitive.

The U.S. locations differ quite substantially from these ten competitors when we compare their averages on these five performance dimensions. While the U.S. locations incur a substantial disadvantage in production cost (3.1 vs. 3.7), they possess clear advantages on the other four dimensions, exceeding this group of competitors by a substantial margin on each: 3.7 vs. 2.7 on quality, 4.0 vs. 2.9 on technical capability, 3.8 vs. 2.9 on material supply, and 4.0 vs. 2.9 on market potential.

But these regions compete individually, not as a group, so comparisons of individual locations are more important for business decisions. U.S. locations are rated fairly competitively on the summary measure of these dimensions in comparison with individual competitor regions as well. The Frostbelt and the Midsouth average 3.8, behind Japan at 4.0, but ahead of Canada at 3.7, while other U.S. locations tie with Western Europe at 3.6.

However, a company's product, the bases of competition appropriate to its industry segment, and the basis of competition it selects influence both the relative importance of these performance dimensions and the company's relevant competitors. Japan is the clear quality leader, followed by Canada, Western Europe, the Frostbelt, and the Midsouth.[14] India, China, and Eastern Europe fall at 2.0 or lower on quality. Mexico, South Korea, Taiwan, and China are the production cost leaders, all scoring at or above 4.0, while Western Europe and the Frostbelt fall below 3.0 on this dimension. Japan is the clear leader in technical capability, followed by the Frostbelt and Western Europe. India, China, Brazil, and Mexico all fall below 2.5 on this dimension. In terms of material supply, the Frostbelt, Canada, and the Midsouth are the leaders, and India, China, and Eastern Europe the farthest behind. The U.S. locations, Canada, Western Europe, and Japan lead in market potential, while India and Eastern Europe trail substantially.

If we think of these competitors as comprising two groups, developed and developing, it is clear that the developed competitors typically score lowest on the production cost dimension. For the developing competitors, production cost is typically the highest rated performance dimension. Thus the balance of competitive strengths and weaknesses differ for these two types of competitors, and that suggests that the balance of competitive strength between them depends on the exact markets and products under consideration.

The average of the three U.S. regions, weighted by their proportion of current locations, puts the United States second to Japan on the summary measure of these five performance dimensions, and essentially tied with Canada. However, the pattern of performance differs across the three U.S. locations. Thus the Midsouth has a production cost advantage over the Frostbelt, but lags the Frostbelt in both technical capability and material supply, although these regions essentially are the same on the summary performance measure. The "other U.S." location is behind both the Frostbelt and the Midsouth on the summary measure. But it does seem that the Frostbelt and the Midsouth offer relatively balanced and strong competitive performance across these dimensions. While the Midsouth cannot compete with many of the competitor regions on cost, it compensates for this weakness with considerably stronger performance than those regions on other dimensions. The Frostbelt may be even weaker than the Midsouth in its competitive cost position, but it is comparatively even stronger than the Midsouth on technical capacity and material supply.

What are the implications of these results for the competitiveness of the United States as a source of automotive parts and components? The United States, with a weighted average of 3.00 on production cost, is ahead of only Western Europe on this critical performance measure, and may be noncompetitive in parts and components where this is the only basis of competition, few as they may number. For more typical products, where competition is multidimensional, it is quite competitive. For products where cost is relatively more important, the Midsouth is quite a strong competitor in terms of these five performance dimensions, second only to Japan. For products where technical capacity and/or material supply are more critical dimensions, the Frostbelt is extremely competitive, also second only to Japan.

[14] In view of the increasing importance of quality as a supplier selection criterion, the U.S. performance, especially in comparison to Canada and Western Europe, is disappointing.

Potential International Activity

We included two items in our survey that tap the respondents' views and opinions about possible international activity. These views cover their ratings of the ten competitor regions as potential arenas for different kinds of business opportunities and their opinions as to the attractiveness of these regions for production site locations.

Business Opportunities. Our respondents indicated their views of each of the international competitors as potential business opportunities. We inquired about five such opportunities: as a vehicle customer, parts customer, vehicle source, parts source, and as a potential production site. These results are displayed in Table 12.

Table 12
Potential Business Opportunities*
in Ten Competitor Regions

Region	Vehicle Customer	Parts Customer	Vehicle Source	Parts Source	Production Site	Average Rating
Brazil	3.4	3.3	2.8	2.7	2.9	3.1
Canada	2.4	2.3	2.4	2.3	2.2	2.3
China	3.4	3.4	3.2	2.8	3.0	3.2
Eastern Europe	3.6	3.4	3.4	3.2	3.4	3.4
India	3.8	3.8	3.7	3.5	3.7	3.7
Japan	2.9	2.8	2.2	2.2	2.8	2.6
Mexico	3.0	2.8	2.4	2.3	2.1	2.5
South Korea	3.2	3.1	2.4	2.4	2.5	2.7
Taiwan	3.4	3.2	2.9	2.6	2.8	3.0
Western Europe	3.0	2.9	2.5	2.6	2.7	2.7

* On a scale with 1 = Extremely High Potential, 3 = Average Potential, and 5 = Extremely Low Potential.

North American suppliers see these ten regions as more attractive opportunities as sources, rather than as customers, for vehicles and parts. They rate the opportunities for vehicle sourcing at 2.8 across all these regions, compared to a rating of 3.2 for developing these regions as vehicle customers.[15] The difference is even greater in the parts area, where their potential as a source is rated at 2.7 and their potential as a customer at 3.4. Their potential as a production site averages 2.8, about the same as their potential as a vehicle source.

Canada is the leader in terms of the summed average across these five business opportunities, followed by Mexico and Japan. India and Eastern Europe are viewed as having the lowest potential at the time these responses were collected. China is closer to Brazil than to India and Eastern Europe, but recent events might mean that suppliers would today rate it closer to India and Eastern Europe.

[15]The scale for this item has 1 = extremely high potential, 3 = average potential, and 5 = extremely low potential.

Japan is seen as having the best potential as a source for either vehicles or parts, with Canada and Mexico tied for a close second. Canada has a wide lead over Japan as a potential customer for vehicles, and Canada has the same lead over Japan and Mexico as a potential parts customer. Mexico and Canada have the best potential as production sites. However, Table 7, above, indicates that Mexico appears likely to benefit more than Canada from the allocation of additional production, in both absolute and relative gain.

The rank ordering of these competitor regions are fairly consistent across these different business opportunities. That might mean that the "business opportunity climate" is nearly the same for these different opportunities, or it might mean that our respondents did not distinguish the different opportunities in responding to the question. We suspect that the former is the case, because the summary ratings for the items do differ, and the stage of automotive development and receptivity to foreign trade and investment are two major business factors that probably do affect these different opportunities in similar fashions.

The number of ties between these regions in the ratings of potential for particular business opportunities is fairly high. For example, four countries tie for sixth (at 3.4) in potential for becoming vehicle customers. We suspect that this reflects some uncertainty as to future developments, and that is probably appropriate. Actual decisions to pursue these possible business opportunities will probably reflect specific developments and targets of opportunity in the future.

These suppliers report that the ten regions have more business potential as *sources* than as customers for automotive goods. As noted earlier in this report, these suppliers import a higher proportion of their purchases than the proportion of sales they export. This is typical of the industry, and, of course, contributes to the large U.S. automotive trade deficit. These results suggest that this pattern is likely to continue, as the industry sees more opportunities for sourcing than for sales abroad. This unbalanced participation in international trade flows is a potential strategic weakness in the domestic industry, and may serve to perpetuate the U. S. role as the world's market, but only a limited producer for the rest of the world market. For traditional suppliers, it may inhibit the development of alternative markets as their share of the domestic market continues to erode in the face of international competition in both vehicles and parts.

Production Site Attractiveness. Respondents rated the competitor locations as attractive production sites on five dimensions, essentially providing material that might clarify their rating of each region's business potential as a production site, discussed above. The dimensions are policy stability, market potential, economic growth, labor attitude, and infrastructure. These ratings are presented in Table 13.[16]

The summary ratings across regions for each of these dimensions cluster tightly around 3.0, the neutral attractiveness point of the scale. Economic growth, at 2.9, and labor attitude, at 2.8, are slightly to the attractive side, while the other three cluster at about 3.1. Each region's overall ranking is quite close to its ranking on the separate dimensions, so the discussion focuses on those dimensions where a region's ranking is markedly different from its ratings on the other dimensions.

[16]The scale for this item is also reversed, having 1 = extremely attractive, 3 = neutral attractiveness, and 5 = extremely unattractive.

Table 13
Attractiveness* of Ten Competitor Regions as Production Locations

Region	Policy Stability	Market Access	Economic Growth	Labor Attitude	Infra-structure	Average Rating
Brazil	3.8	3.5	3.3	3.1	3.6	3.4
Canada	1.9	1.9	2.4	3.0	2.4	2.3
China	3.7	3.5	2.7	2.6	3.7	3.2
Eastern Europe	3.8	3.8	3.7	3.5	3.8	3.7
India	4.0	3.9	3.7	3.5	4.0	3.8
Japan	2.0	3.3	2.5	2.0	2.3	2.4
Mexico	3.2	2.7	3.0	2.7	3.2	3.0
South Korea	3.1	3.1	2.6	2.5	2.9	2.8
Taiwan	2.8	3.1	2.7	2.4	2.9	2.8
Western Europe	2.3	2.6	2.6	3.1	2.4	2.6

* On a scale with 1 = Extremely Attractive, 3 = Neutral Attractiveness, and 5 = Extremely Unattractive.

Canada ranks first overall (2.3) and on three of the five dimensions, and ranks second on the fourth. But Canada ranks sixth on labor attitude, with a rating of 3.0. Western Europe, third overall, also ranks low on the labor attitude dimension, right behind Canada at 3.1. Japan ranks second overall, but scores a low 3.3 for sixth place in market access. Mexico, at sixth overall, manages a third on the market access dimension. China ranks seventh overall, but ranks fourth on labor attitude and fifth on economic growth.

The rank ordering of these regions on the summary averages across these five dimensions matches fairly well with the specific ratings assigned each region's potential as a production site location, presented in Table 12. The two exceptions are Western Europe and Mexico. Western Europe is rated third on these aggregated dimensions, but sixth on the direct assessment of its potential business opportunity as a production site. Mexico, on the other hand, is rated first as a potential site location, but sixth on its aggregated scores on these dimensions. Of course, attractiveness as a business opportunity is neither simply determined, nor by these dimensions alone. In the case of Western Europe, we suspect that a well established competitor industry increases the potential risks of establishing production sites there; in the case of Mexico, a combination of its proximity to the United States and Mexico's domestic content regulations probably make it a higher potential business opportunity than its performance on these dimensions alone predicts.

It is unclear whether siting decisions are made by comparing potential sites on their "averages" across dimensions such as these, or by a "veto" model -- where performance below a certain level on any one dimension cannot be offset by high performance on others. For this reason, as well as the lack of completeness in the list of dimensions ranked by our respondents, we cannot interpret these ratings as comparative likelihoods that these respondents will establish production sites in these regions.

Summary

The automotive industry is changing rapidly, both in its internal bases of competition and in the growing threat of international competition. The bases of competitive success in the automotive supplier industry are becoming far more multidimensional, and no one criterion dominates supplier selection as short-term price did in the past. Suppliers will have to be broadly competent to compete successfully for manufacturer business in the future, and few will find a strategy of narrow strength sufficient. At the same time, there is rapid, if uneven, change in the patterned exchanges between the manufacturers and their suppliers, led by an emphasis on continuous quality improvement. Respondents suggest that there is a decreased emphasis on non-U.S. sourcing, compared to the recent past.

The North American industry is likely to face moderately serious overcapacity in the next five years or so, with the traditional manufacturers facing more in passenger cars than light duty trucks, and the NAM's facing more in light trucks than in passenger cars. Traditional suppliers face overcapacity due to the declining demand of their traditional customers, and the additional capacity targeted upon that demand by offshore, NAS, and traditional suppliers seeking new business. Traditional suppliers are likely to face stiff competition from NAS and offshore suppliers for NAM business, and their opportunities will probably be somewhat restricted by heightened concern about possible increases in the CAFE standards. These concerns may curtail business currently available to them for some larger Big Three cars, and at the same time restrict their opportunities at the NAM's.

The United States is competitively strong, but somewhat behind Japan in overall strength. Japan has an edge in production cost, technical capability, and quality. The ratings of the ten competitor regions indicate that while only Japan and Canada currently pose moderately serious competitive threats, six more industries are likely to present such challenges by the year 2000. Respondents indicate that the U.S. industry must pursue numerous broad efforts to improve its competitive situation.

Many of these competitor regions are attractive on a number of competitive dimensions, but the United States is likely to receive the majority of capacity investment these companies make in the next few years. However, this represents a somewhat lower share of these investments than in the past. Within the United States, the Midsouth has a production cost advantage over the Frostbelt, but the Frostbelt has advantages in technical capacity and material supply.

Appendix I

Survey Document

THE UNIVERSITY OF MICHIGAN
OFFICE FOR THE STUDY OF AUTOMOTIVE TRANSPORTATION

&

THE INDUSTRIAL TECHNOLOGY INSTITUTE

AUTOMOTIVE SUPPLIER STUDY

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AUTOMOTIVE SUPPLIER QUESTIONNAIRE

This questionnaire is designed to elicit the views of automotive suppliers: companies that produce or market raw materials, parts or components that are ultimately incorporated as original equipment in passenger cars or light trucks. The questionnaire seeks your views on a wide variety of competitive issues facing the industry today, and concentrates on the automotive portion of your business activities.

Some of our questions may not apply to your company. If that is the case, please mark the question "NA" (for Not Applicable), and move to the next question. If you are unable or unwilling to answer a particular question, please leave it blank and go on to the next question. If you produce multiple products, please answer with the main product you identify in question 1 as the product of reference; if you have no products in question 1, please use the main product in question 2 as the referent.

If your company is not an automotive supplier by the above definition--that is, you neither produce nor market raw materials, parts or components that are ultimately incorporated as original equipment in passenger cars or light trucks--please check the appropriate box below, fill in the company name, etc., and return the questionnaire unanswered.

____ We have never been an automotive supplier by this definition.

____ We were, but are no longer an automotive supplier by this definition. Our principal automotive product was ____ (Please enter from code sheet on page 7).

Corporate Name: _____

Mailing Address: _____

_____

City: _____ State: _____ Zip: _____

Name of Respondent: _____

Title: _____ Phone: _____ - _____

Section I: Product

1. Please enter the code (from the list on page 7) of the three main products (by fiscal 1987 sales) your company supplies the *vehicle manufacturers* for installation on-board new vehicles (i.e., as original equipment). 1.____; 2.____; 3.____

2. Please enter the code (from the list on page 7) of the three main products (by fiscal 1987 sales) your company supplies other *automotive suppliers* for eventual installation on-board new vehicles (i.e., as original equipment). 1.____; 2.____; 3.____

3. Please consider what will be the likely demand for your main product by the traditional domestic manufacturers (Chrysler, Ford, and GM) in 1992/1993. What percent of that total 1992/3 demand *could* be met by each of the following sources (Note that the total can be greater than 100%):

Allied/Captive Suppliers of traditional OEMs ..... _____%
Traditional U.S. Suppliers ..... _____%
Traditional U.S. Suppliers not currently in this product area ..... _____%
Transplant or New American Suppliers ..... _____%
Non-U.S. Suppliers ..... _____%
TOTAL (Note: can be more than 100%) ..... _____%

4. Please consider what will be the likely demand for your main product by the New American manufacturers (Marysville Honda, Flat Rock Mazda, etc) in 1992/1993. What percent of that total 1992/3 demand *could* be met by each of the following sources (Note that the total can be greater than 100%):

Allied/Captive Suppliers of traditional OEMs ..... _____%
Traditional U.S. Suppliers ..... _____%
Traditional U.S.Suppliers not currently in this product area ..... _____%
Transplant or New American Suppliers ..... _____%
Non-U.S. Suppliers ..... _____%
TOTAL (Note: can be more than 100%) ..... _____%

5. Please enter from the code sheet on page 7 any product areas where you feel current traditional U.S. supplier capacity will not be sufficient to meet the 1992/3 demand of the traditional manufacturers:

1.____; 2.____; 3.____

6. There is much comment about changing customer-supplier relations in the industry. Please indicate the rate that the following practices are being implemented in your main product area. Please enter numbers from 1 to 5, (where 1 is Slow, 3 is Moderate, and 5 is Rapid).

Just-In-Time ..... _____
Modular or system sourcing ..... _____
Continuous price reductions ..... _____
Continuous Quality Improvement ..... _____
Tiering of the supply base ..... _____
Reduction in the number of suppliers ..... _____
Increased outsourcing ..... _____
Increased non-U.S. sourcing ..... _____
Increased supplier engineering contribution ..... _____
Early supplier selection ..... _____
Exclusive sourcing ("sole supplier") ..... _____

Section II. Competitive Issues

7. In your view, how important is it that the United States *improve* in each performance area to remain a competitive production location in today's global industry? Please enter numbers from 1 to 5, (where 1 is Not Very Important, 3 is Moderately Important, and 5 is Very Important).

Capital Productivity....._____
Salaried Labor Productivity....._____
Hourly Labor Productivity....._____
Hourly Labor Cost....._____
Salaried Labor Cost....._____
Machine Uptime....._____
Capaciity Utilization....._____
Product Design/engineering....._____
Process Design/engineering....._____
Manufacturer-supplier relationships....._____

8. In your main product area, how serious is the competitive threat to U.S. suppliers from each of the listed areas -- currently, in 1992/3 and in 2000? Please enter numbers from 1 to 5 (where 1 is Not Very Serious, 3 is Moderately Serious, and 5 is Extremely Serious) to indicate your view.

	NOW	1992/3	2000
Brazil			
Canada			
China			
Eastern Europe			
India			
Japan			
Mexico			
South Korea			
Taiwan			
Western Europe			

9. For each listed producing area, please indicate your view of its overall potential for developing each of the listed business opportunities. Please enter numbers from 1 to 5 (where 1 is Extremely High Potential, 3 is Average Potential, and 5 is Extremely Low Potential) to indicate your estimates.

	Vehicle Customer	Parts Customer	Vehicle Source	Parts Source	Production Site
Brazil					
Canada					
China					
Eastern Europe					
India					
Japan					
Mexico					
South Korea					
Taiwan					
Western Europe					

10. For each listed producing area, please indicate your view of its competitive strength or weakness on the listed dimensions. Please enter numbers from 1 to 5 (where 1 is Extremely Noncompetitive, 3 is Average Competitiveness, and 5 is Extremely Competitive) to indicate your estimates.

	Product Quality	Production Cost	Technical Capacity	Material Supply	Market Potential
Brazil					
Canada					
China					
Eastern Europe					
India					
Japan					
Mexico					
South Korea					
Taiwan					
Western Europe					
Frostbelt (MI, OH,IN,IL, ETC.)					
Mid-South (MO, KY,TN,NC, ETC)					
Other U.S.					

11. For each listed producing area, please indicate your view of its attractiveness as a potential production location on the listed dimensions. Please enter numbers from 1 to 5 (where 1 is Extremely Attractive, 3 is Neutral Attractiveness, and 5 is Extremely Unattractive) to indicate your estimates.

	Policy Stability	Market Access	Economic Growth	Labor Attitude	Infra-structure
Brazil					
Canada					
China					
Eastern Europe					
India					
Japan					
Mexico					
South Korea					
Taiwan					
Western Europe					

Section III: Competitive Selection Issues

12. Please rate the importance you feel your manufacturer customers (GM, Ford, Chrysler, etc.) attach to each of the following characteristics of a supplier when they decide where to place their business for your main product or product family. We are interested in your perception of how important the manufacturers considered each characteristic to be in the past (roughly 1975-1978), currently (1988), and what you think will likely be the case over the next few years (roughly 1990-92). Please enter numbers which correspond to your rating of the importance for each supplier characteristic over the three time periods, where 1 is Not Important, 3 is Moderately Important, and 5 is Extremely Important.

Characteristics of Suppliers	c.1977	1988	1990-92
a. Engineering Competence			
b. Manufacturing Competence			
c. Product Innovation			
d. Process Innovation			
e. Quality Performance			
f. Delivery Performance			
g. Short-term Price Quotation			
h. Long-term Price Quotation			
i. Financial Resources			
j. Location			
k. Effective Management			
l. Supplier's Past Performance			
k. Other (please describe):			
_____			

13. Please indicate your existing production sites and view of the likelihood that your company might add, replace (retrofit or greenfield), or reduce current production capacity in each region/area. Please indicate by a "check" areas where you have production facilities and enter a number from 1 to 5, where 1 is near zero likelihood, 3 is 50/50, and 5 is near 100%.

	EXISTING	ADD	REPLACE	REDUCE
Brazil				
Canada				
China				
Eastern Europe				
India				
Japan				
Mexico				
South Korea				
Taiwan				
Western Europe				
Frostbelt (MI,OH.IN,IL, ETC.)				
Mid-South (MO,KY,TN,NC, ETC)				
Other U.S.				

14. Please indicate your view of the relative importance of the following considerations when deciding where to locate a manufacturing operation. Please enter a number from 1 to 5, where 1 is Major Importance, 3 is Moderate Importance, and 5 is Little Importance.

Skill of local hourly labor ..... _____
Skill of local salaried labor ..... _____
Skill of local middle management _____
Loaded salaried labor cost ..... _____
Loaded direct labor cost ..... _____
Loaded indirect labor cost ..... _____
Loaded salaried labor cost ..... _____

Labor force attitudes ..... _____
Land cost ..... _____
Availability and cost of utilities ..... _____
Adequacy of transportation infrastructure ..... _____
Proximity to suppliers ..... _____
Proximity to customers ..... _____

Section IV: Background Data

15. Roughly how many employees did your company typically have during fiscal 1987? _____

16. Approximately what were your total company sales for fiscal 1987? $_____

17. Did your fiscal 1987 sales increase or decrease from fiscal 1986?
_____Increase _____Decrease

18. Roughly what percent of these total 1987 sales were

a. direct to vehicle manufacturers? _____ %

b. to other automotive suppliers for incorporation into products ultimately sold to the manufacturers? _____%

19. Roughly what percent of these total automotive sales (question 18) were export from the United States? _____%

20. Roughly what percent of you purchases of raw materials, parts, and components for use in your major automotive product or product family was sourced from outside the United States?_____%

21. Of the total number of production operations that your company operates outside of the United States, how many of these operations are:

a. Divisions ..... _____
b. Subsidiaries ..... _____
c. Joint Ventures ..... _____
d. Equity Holdings ..... _____

Thank you very much for the time and effort you took in answering this questionnaire.

System/Component Coding

ENGINE - A0
- Balance shafts - A1
- Camshafts - A2
- Connecting rods - A3
- Crankshaft - A4
- Cylinder block - A5
- Cylinder head and cover - A6
- Exhaust manifold - A7
- Flywheel - A8
- Intake manifold - A9
- Oil pump/lubrication - A10
- Piston rings - A11
- Piston - A12
- Valve train components - A13
- Water pump - A14
- Other - A15

BODY STRUCTURE/BUMPERS/GLASS - C0
- Bumper assemblies - C1
- Cowl, dash, sill, pillar stampings - C2
- Frame - C3
- Glass (fixed and movable) - C4
- Misc. small stampings (brackets, etc.) - C5
- Underbody, hood, roof, deck, fender, quarter panel stamping - C6
- Weather stripping, seals - C7
- Other - C8

STEERING AND SUSPENSION - E0
- Front wheel drive sus. assemblies - E1
- Front wheel knuckle - E2
- Power steering pump - E3
- Shock absorbers - E4
- Springs - E5
- Stabilizer/torsion bars - E6
- Steering column - E7
- Steering gear box - E8
- Steering wheel and horn pad - E9
- Struts - E10
- Suspension control arms - E11
- Other - E12

ENGINE ELECTRICAL - G0
- Alternator - G1
- Coil - G2
- Cruise Control - G3
- Distributor - G4
- Engine wiring harness - G5
- Ignition module and assc. controls - G6
- Spark plug - G7
- Starter motor - G8
- Other - G9

BRAKES, WHEELS, AND TIRES - I0
- Brake disc - I1
- Brake tubes and hoses - I2
- Caliper assembly - I3
- Drums - I4
- Master cylinder - I5
- Shoes, linings, and pads - I6
- Tires - I7
- Wheels - I8
- Other - I9

CHASSIS ELECTRICAL - K0
- Audio - K1
- Battery - K2
- Electrical instrument controls - K3
- Fuses, switches, etc. - K4
- Lamps - K5
- Main body wire harness - K6
- Small electric motors - K7
- Other - K8

TRANSMISSION/TRANSAXLE - B0
- Clutch assembly - B1
- CV joints - B2
- Differential assemblies - B3
- Drive shaft - B4
- Gear sets - B5
- Torque converter - B6
- Transmission case - B7
- Other - B8

SEATS, INTERIOR/EXTERIOR TRIM - D0
- Exterior finish trim/ornamentation - D1
- Grille panel - D2
- Headliner/carpeting/trim panels - D3
- Inst. panel/console assembly - D4
- Interior finish soft trim - D5
- Interior/exterior mirrors - D6
- Occupant safety/restraint systems - D7
- Rough hardware (hinges, etc.) - D8
- Seat covers - D9
- Seat frames and mechanics - D10
- Other - D11

FUEL DELIVERY SYSTEMS - F0
- Carburetor - F1
- Electronic fuel injector units - F2
- Fuel injectors - F3
- Fuel lines - F4
- Fuel pump - F5
- Fuel tank and filler tube - F6
- Turbochargers - F7
- Other - F8

EXHAUST AND EMISSIONS - H0
- Catalytic converter - H1
- Exhaust pipes - H2
- Muffler - H3
- Other - H4

HEATING, VENTING, AIR CONDITIONING- J0
- Compressor - J1
- Condenser - J2
- Heater core - J3
- Radiator fan - J4
- Radiator - J5
- Other - J6

OTHER COMPONENTS - L0
- Bearings - L1
- Belts - L2
- Fasteners, clamps, bolts, etc. - L3
- Gaskets, adhesives, chemicals - L4
- Paint, plastic, vinyl - L5
- Filter assemblies - L6
- Steel - L7
- Wiper/washer systems - L8
- Other - L9