

*Adm*

UMTRI-91-38

83981

A STUDY  
OF PEOPLE  
AND CHANGE  
IN THE  
AUTOMOTIVE INDUSTRY

The  
CAR COMPANY  
OF THE FUTURE



Thought  
Leadership  
Series

ERNST & YOUNG



# **THE CAR COMPANY OF THE FUTURE: FINAL REPORT**

**A Joint Research Project of Ernst & Young  
and The University of Michigan**

## **Ernst & Young**

Lee A. Sage, National Director  
Automotive Industry Services

G. Steven Burrill, National Director  
Manufacturing/High Technology Industry Services

## **The University of Michigan**

Dr. David E. Cole, Director  
Office for the Study of Automotive Transportation

Dr. Michael S. Flynn, Associate Director  
Office for the Study of Automotive Transportation

David J. Andrea  
Senior Research Associate

 **ERNST & YOUNG**





# TABLE OF CONTENTS

<b>Commentary and Prescription for Change: Accelerating Toward Tomorrow</b>	1
About this Study	1
Prescription for Progress	2
Summary of Findings	6
<b>Study Report</b>	
Chapter 1: Environmental Factors and Characteristics	11
Chapter 2: Car Company of the Future: Year 2000	23
Chapter 3: Driving into the Future: The Pace of Change	35
Chapter 4: Focus on improvement efforts and barriers to change	47
Chapter 5: Prescription For Progress—Business Process Innovation	59
Appendix A: Detail on Phases of Business Process Innovation	69
Appendix B: Study Methodology and Demographics	77
About Ernst & Young and OSAT	85
Project Advisory Committee	87



# COMMENTARY AND PRESCRIPTION FOR CHANGE: ACCELERATING TOWARD TOMORROW

**P**erhaps no other U.S. industry has been as discussed, analyzed, reported about—and criticized—as the automotive industry. Its history and trends have been documented by insiders involved in making cars, and outside observers with varying points of view. And almost everyone has an opinion about cars and enjoys discussing them.

In spite of the plethora of press stories that appear daily in national and local publications, and major books and reports by notable academic and research organizations, surprisingly little has been written about the specific actions that car companies, both assemblers and suppliers, must now take to move quickly and successfully into future positions of leadership. Most discussions center on what's wrong with companies today. Automotive executives might well feel like a driver in eight lanes of fast traffic, looking for the right road, and finding signs with contradictory directions located every half mile.

## **About This Study**

In 1991, Ernst & Young, through its National Automotive Industry Services, and the University of Michigan, through its Office for the Study of Automotive Transportation, embarked on an effort to develop information on:

- What “the car company of the future” is expected to be—the characteristics and operating success factors for car companies a decade from today
- Actions car companies (both manufacturers and suppliers) in the U.S. are taking to achieve their future-state objectives
- Efforts car companies are making to be more competitive

For this review, we define a car company as one that produces passenger cars and light trucks/vans, or the materials, parts, and components used in such vehicles.

A “car company” is one that produces passenger cars and light trucks/vans, or materials, parts, and components—an assembler or supplier.

Accordingly, the automotive industry is defined as 1) vehicle manufacturers/assemblers, and 2) independent and Big Three-allied suppliers.

Our most important goal was to understand people and change requirements of suppliers and assemblers as they build for the future. Through our research and analysis, we have created a database of information about operating practices and the future environment as seen by the industry. But we intend to provide more than just analysis and review of the industry. Two other important objectives are:

- Providing creative and practical insights on the path forward
- Supporting U.S. manufacturers and suppliers in their quest for improved operating practices that yield more competitive products

During this research project, we have drawn our conclusions—presented in this report—through analysis of information gathered from a survey of industry participants, and individual senior executive interviews. Roundtables of automotive managers also contributed their thoughts on current and future concerns and potential solutions. It is these sources, and our knowledge and experience gathered through years of working with car companies, that form the basis for our prescriptive recommendations to the industry. This final report presents additional analyses of both qualitative and quantitative findings.

### **Prescription for Progress**

What do U.S. car companies need to do to become tomorrow’s leaders? What are the operating success factor priorities for car companies? What changes are essential to become more competitive by the year 2000? Our research and analysis lead to four important “options for action” for car companies as they head toward improved competitiveness and industry leadership. A new chapter has been added detailing the fourth and most important option for action: Business Process Innovation.

### ***The First Essential Is Focus***

Our research shows that most car companies need more focus regarding virtually *every aspect* of the future—success factors, change actions, and barriers to overcome. Respondents to our survey are continually unable to differentiate what is most important—what actions and goals are most valuable when making changes. For example, of the eleven future success factors in our survey, respondents rate nine virtually equally, as “quite important.” Only product quality is singled out as extremely important. It appears that car companies are attempting to achieve too many things at once without differentiating between what they *can* do, and what they *should* do or *must* do.

Likewise, our analysis shows that *focus* on change efforts is often *scattered* and lacks coherent strategic imperatives. The majority of change practices on the survey is rated as neither extensive nor highly limited focus. Because change takes time, the ebb and flow of various popular or quick fixes to problems won’t work. The number of manageable process changes must be *few, simple, and sustained*. People need to be able to grasp and understand senior management’s vision of the road ahead. The most important priorities must be clear, manageable—and leaders must be determined.



People need to be able to grasp and understand senior management's vision of the road ahead. The most important priorities must be clear, manageable—and leaders must be determined.

Over 70 percent of the change practices in the survey are rated at a moderate to slow pace of implementation by over half the respondents.

Of all the facilitators that help create an environment for continuous, rapid change, "clear *vision* of change by top management" is at the top of the list—by quite a margin—for both assemblers and suppliers. Recognition that change will be uncomfortable, awkward, and sometimes even painful to those involved, at every level of the organization, is important. Management must have the urgency to start and persistence to stay the course.

#### ***The Second Essential Is Accelerated Pace of Implementation***

Serious attention is needed to improve the speed at which both suppliers and manufacturers implement change efforts. All areas need improvement in pace, however advanced cost management practices and supplier/manufacture relations are particularly important at this time. In our discussions, executives repeatedly referred to these key issues as critical.

Whether addressing the area of manufacturing, human resources, cost management, or supplier/manufacture relationships, survey responses on the *pace of change* of improvement efforts are tightly clustered around "neither rapidly nor slowly," with little differentiation among the specific change actions. Some change efforts are being implemented relatively rapidly, notably statistical process control and continuous quality improvement. However, it is important to note that *over 70 percent* of the change practices in the survey are rated at a *moderate to slow pace* of implementation by over half the respondents.

This is a plodding pace of change, perhaps even an uncompetitive pace of change. And it will not allow U.S. car companies to achieve industry leadership by the year 2000, if ever.

#### ***The Third Essential Is Linkage Between Actions and Objectives, Focus and Barriers***

Car companies need to establish priorities with clearly linked, supporting actions. And the evidence suggests a lack of logical relationships between (and among) various objectives, actions, and barriers. Change actions must be linked to future objectives to overcome entrenched, progress-killing barriers. Leadership must define direction, lay out priorities, and then ensure that there are clearly outlined actions which *relate* to the objectives.

One of the most critical missing linkages is the lack of new reward structures, e.g., promotion, recognition, and increased compensation, to complement new working structures. It is not prudent to expect people to embrace and sustain commitment to team structures and more fluid job boundaries when changing reward and recognition systems are given substantially lower focus. Status quo departmental and functional priorities are likely to prevail at every level if changed rewards and recognition systems do not reinforce new practices.

Also, linkage between *focus* of improvement and *barriers* needs attention. The good news is that companies which indicate solid focus on various employee-related improvement efforts, such as more communications across levels and departments, encounter fewer barriers. However, the ten most frequently encountered barriers to

**Companies which indicate solid focus on various employee-related improvement efforts, such as more communications across levels and departments, encounter fewer barriers.**

change—including business as usual, short time horizon for change, and insufficient resources—show little linkage to *any* improvement efforts. This implies that further action must be taken to overcome these major barriers.

One of our most important prescriptions relates to issues *beyond* improvement of existing change efforts. There is no doubt it is important for car companies to work consistently and diligently to focus their efforts, and improve implementation pace and effectiveness of current practices. But even if current efforts are more focused and implemented faster, it is possible that companies will *not* attain the characteristics of the successful car company of the future. And they may never become industry leaders.

Key aspects for future success on which our study respondents agree include:

- Companies will be managed more on a process basis than a purely results-oriented basis, i.e., companies will focus more on how they *do* things (the processes that drive results) rather than react to immediate and short-term financial results
- New reward structures and career paths will support jobs that have more fluid task boundaries and require more knowledge on the part of workers
- Relationships between suppliers and manufacturers must be based on long-term, joint problem solving and mutual reliance

There is consensus that to be competitive in the year 2000, car companies must improve performance in:

- Customer responsiveness through developing the capability to adjust quickly to changing demand and product preference
- Product and process design and engineering
- Product differentiation beyond the “must have” of excellent quality
- Advanced manufacturing techniques and total cost competitiveness

**This consensus view of the “car company of the future” implies a *horizontally-oriented* approach to business operations. Focus is on *processes*.**

This consensus view of the “car company of the future” implies a *horizontally-oriented* approach to business operations. Focus is on *processes* that must be accomplished to produce competitive products, rather than *vertical functions* or departments which exist today. (For car companies, external suppliers must be an integral part of the horizontal approach to improve process capabilities.) And the organization and reward structures must support and reinforce the process approach in order for it to succeed. The future car company also views competitors on a process basis as well, recognizing that outstanding process capability results in outstanding products. In short, our findings show:

- Companies recognize that improving of current quality, time, and cost factors is important

- Change to a process orientation is necessary in order for an organization to be responsive to the marketplace

**Process reengineering means redesigning the fundamental business operating process in manufacturing, product development and other areas of operation to conform to a vision of the future.**

***The Fourth, and Most Important, Essential Is a Jump from Continuous Improvement of Current Operating Characteristics to Process Innovation: Reengineering Business Processes for Quantum Improvement***

Process reengineering means designing the fundamental business operating processes in manufacturing, product development, and other task areas to conform to a vision of the future. It is really *process innovation*. Beyond just getting better and better at the way we operate today, it means establishing new methods and standards that are based on future requirements and conditions. (Chapter 5 provides a framework and recommendations for achieving quantum improvement.)

And it must be done now. Anything short of a quantum leap to get ahead of the competition will not be enough. Simply adjusting and altering the same game plan, and—in many instances with car companies in our survey—adjusting all the pieces about the same amount all at once, won't work. The war for market share and industry leadership in critical areas won't be won by continuously harassing the flanks of the competition. Companies must determine the critical battles, and attack with the sustained will to win.

No matter how effective (focused, fast, and linked) implementation of current programs becomes in car companies today, it will probably not be enough to gain industry leadership. Many industry analysts have discussed the need for more effective implementation. And we also believe more effective implementation is important. But it will not provide the total or the most profound route to U.S. car companies' competitiveness in the 21st Century.

**No matter how effective (focused, fast, and linked) implementation of current programs becomes in car companies today, it still will not be enough to gain industry leadership.**

Continuous improvement provides a *foundation* for implementing process capabilities that make quantum improvements in a company's operations. It creates the basis for understanding the fundamental processes that must be improved and develops management skills in incremental improvement. But it will not ensure creation of a future, highly competitive, horizontally oriented company focused on customer satisfaction. Without a big jump in performance—true business process innovation—car companies in the year 2000 will be an improved version of today, but not a redesigned structure built for tomorrow. And competitors will still be out in front.

Management must commit to quantum change in the few, strategic areas it believes to be of highest priority, and charge ahead at full strength. The first step involves the structured and concerted process of *visioning: identifying and characterizing a future state based on customer requirements*. Customer requirements must be stated so response to them can be tracked and measured against the ultimate achievement targets.

*Then the key processes that contribute to achieving the vision must be defined, characterized, and analyzed so linkage between actions and end goals is clear to those who must implement supporting programs.* Technology enablers must be identified to leverage new developments in systems and automation. And finally,

*organization and cultural design must be aligned to ensure that human resources are properly leveraged.* People must receive reward and recognition that is closely tied to the actions and decisions they are being asked to implement.

The car company of the future becomes a new entity, a new type of operation, driven by customer requirements and built on the reengineered foundation of its basic manufacturing, engineering, and marketing processes to become the realization of its future vision. Technology is used to leverage and integrate people systems with the overall objectives. Its measurement for success is, of course, the marketplace. It's time to begin the innovation process, commit to change, and leap forward into the year 2000.

### **Summary of Findings**

#### ***A Shared View of Challenges***

The shared view of the future competitive environment, expressed by the respondents to our survey and participants in our discussions, suggests that the future is understood and anticipated at its most fundamental levels. As automotive executives view the year 2000, they see expanding global markets, with production potential (and threat) in new regions such as Mexico, and tremendous demand in Europe, both West and East. North America will become an even more competitive arena, and Big Three share of domestic production and sales is generally expected to decline. Model lives are expected to shorten and plants must adjust to lower volumes and niche markets.

There is shared uncertainty about the potential for the "green car" as evidenced by a lack of clear agreement about the likelihood of plants for "freshening" of older cars, or plants dedicated to disassembly for recycling. European companies—Mercedes-Benz and BMW specifically—are moving ahead in this area, providing opportunities for suppliers who recognize the potential, and develop methods and process capabilities ahead of the assemblers.

Suppliers face perhaps the most significant changes over the next decade. Consolidation among suppliers is likely to continue. The supplier community recently has been under pressure from the Big Three manufacturers through rationalization and price reduction, and its impact has unfortunate consequences for the immediate (and possibly long-range) development of a "partnership" infrastructure. Outsourcing has been to some extent limited by the 1990 UAW contract, and as assemblers attempt to protect the productivity of their own work force, there will be further pressure on suppliers.

Suppliers should see some promise in the development of strong engineering skills and resources. One consistent area of emphasis is the use of outside engineering resources by the Big Three. With a projected shortage of skilled engineers in the Detroit area and the country in general, suppliers, as independent sources for strength in design and development, could take advantage of this as the basis for building better long-term, mutually advantageous relationships with their

**The car company of the future becomes a new type of operation, driven by customer requirements and built on the reengineered foundation of its business processes to become the realization of its future vision.**

**Suppliers should see some promise in the development of strong engineering skills and resources. One consistent area of emphasis is the use of outside engineering resources by the Big Three.**

customers. Also encouraging, supplier selection at the Big Three is expected to expand beyond price and reflect additional criteria.

The respondents' rating of overall competitiveness of some of the world's major producers show that GM is expected to make the greatest relative improvement. Not surprisingly, Toyota and Honda are believed to retain the top positions for overall competitiveness. Ford is also expected to improve, but its expected slower rate allows GM to equal it by the year 2000. The market position of Chrysler is not expected to change, but recent moves by Chrysler—including the introduction of "advanced design" very popular models and development of its platform product development process—may allow it to exceed expectations.

#### *Car Company of the Future Characteristics*

Respondents generally agree on the major attributes of the car company of the future, which we have defined to include automotive manufacturers and suppliers. A consensus about the operating characteristics of future car companies appears to exist. However, strong conviction on particular key factors was *not* reflected in the survey responses.

A focus on process capabilities and improved process management will characterize the future car company, and competitors will be identified by process and material capabilities as well as by their products. Survey respondents agree that the car company in 2000 will have a difficult time attracting and retaining top talent. There will be even greater emphasis on fluid task boundaries in jobs as well as greater reliance on knowledge-based jobs. Companies also expect to require changes in the reward structures and career paths that support these advanced job structures.

While most respondents agree that car companies in the future will have to adjust to more frequent model changes and shorter model lives, there is uncertainty about how supplier facilities will be configured relative to assembler plants. About half expect centralized, high-volume facilities, and about half envision contiguous, low-volume plants.

**A consensus about the operating characteristics of future car companies appears to exist.**

Despite recent difficulties in the relationships between manufacturers and suppliers, respondents agree that building lasting, longer-term relationships between suppliers and assemblers is very important to the future success of the industry. Greater integration is expected by most people, and *price and transaction* issues are not expected to remain the only important considerations.

**However, strong conviction on particular key factors was *not* reflected in the survey responses.**

There is strong shared opinion that product quality is the most important critical success factor—mandatory to succeed, but *not a differentiating* factor. Beyond the absolute must of quality, many factors are rated about equally important, ranging from total production cost to product technology to time from concept to customer. This lack of differentiation makes directing efforts difficult; companies certainly can't do everything at once, all the time. The one factor given lower priority was commercialization of R&D, where U.S. companies are generally believed to move slowly. In the past, U.S. companies were technology leaders.

In short, the future state is generally agreed upon, as are the actions needed to carry the industry forward. But survey respondents do not differentiate among the many future characteristics, and the shared future vision does not show elements of strong conviction. Companies need to establish clear priorities and focus on the most critical key success factors for the future.

***Pace and Focus of Change—and Barriers***

Domestic car companies, both assemblers and suppliers, are being overtaken by those who travel the road faster—and often better. Knowledge and actions on how to achieve new modes of operating are neither clearly defined nor quickly being adopted by car companies. Analysis in this area showed three major problems:

- Focus on many change actions all at once, without clear priorities or differentiation between what is more important and what is less important
- Lack of linkage between the key factors essential to success (the ends) and the actions being taken to achieve them (the means)
- Slow pace of change

**Everyone seems to be implementing all the popular and generally accepted change actions—at the same time—at a moderate pace.**

Respondents appear to lack strong focus in their improvement efforts. Our survey included 38 change actions. Respondents rated the pace of implementation of these actions in the areas of manufacturing, human resources, communication/structure, sourcing, and cost. There are no clear “improvement effort” consensus leaders. Perhaps because there are so many important improvements to accomplish, it may be difficult for companies to distinguish and prioritize among the valuable and not-so-valuable.

The responses for each category are tightly clustered around the “neither slow nor fast” choice. Everyone seems to be implementing all the popular and generally accepted change actions—at the same time and at a moderate pace.

Even though the *average* implementation pace is moderate to slow, some actions show more rapid adoption. Statistical process control and continuous improvement techniques are being implemented more quickly, but those related to human factors and supplier relations are not moving as quickly. Team structures and increased levels of communication and employee involvement are being adopted fairly rapidly, but the supporting reward and recognition systems are not.

Supplier/manufacturer relationship improvement actions—such as partnership relationships, selection criteria beyond price, and more functions involved in supplier selection are moving slowly. Because these (and other issues) are important to the development of a solid auto industry infrastructure, they have far-reaching implications for the industry’s overall competitiveness.

Connectivity, the *linking of actions to desired results*, is a critical aspect of making improvement. The stated targets and policies must all be consistent with action programs to ensure appropriate behaviors. But objectives and programs frequently do not show this necessary correspondence.

**Stated targets and policies must all be consistent with action programs to ensure appropriate behaviors. But objectives and programs frequently do not show the necessary correspondence.**

For example, the critical success factor of “different reward and recognition systems,” which is essential to reinforce changed behavior, is not linked to implementation of team structures, increased training, self-directed work force, or increased empowerment of the program manager. It’s not surprising that people often feel that top management does not “talk like it walks” on change and improvement.

Across 80 success factors that relate to manufacturer/supplier relationships, linkages are weak and effects scattered. Future success factors, such as effective integration between assemblers and suppliers and plant flexibility in operations, show virtually no linkage with many change actions targeted to relations and transactions between OEMs and suppliers.

Respondents rated 26 barriers on the survey from “very often” to “seldom” encountered. The two most frequently encountered barriers are business as usual (status quo) and short time horizon for change. This creates a paradox for management: it takes time for real change to occur (experts say ten years is typical for large companies), and yet if things do not change quickly, efforts are likely to be forsaken or objectives changed. These dual, serious barriers make focused improvement extremely challenging.

There is tight clustering of responses around “sometimes encountered” on most barriers. This *might* indicate that respondents experience many barriers frequently and they are all about equally serious. But it *more likely* indicates that respondents have some difficulty (again) differentiating among the barriers that are most challenging and damaging—and those that have less impact on actual achievement of improvement.

There is also limited linkage between *focus* of improvement and *barriers* that must be overcome. For example, our analysis showed that “business as usual” is seen as the largest barrier to progress, and it is *not* impacted by any of the most popular improvement efforts, such as increased communication and use of teams. Unless companies are willing to change the *motivators* (i.e., rewards) for new behaviors, the status quo will be virtually impossible to overcome.

**The two most frequently encountered barriers are business as usual (status quo) and short time horizon for change.**

There is some good news on the current emphasis on involving people and a greater amount of interaction among groups. For companies indicating a focus on employee-related improvement efforts, our linkage analysis shows the frequency of barriers encountered is *lower*.





# CHAPTER 1

## ENVIRONMENTAL FACTORS AND CHARACTERISTICS

Many characteristics of the market and competitive environment for car companies over the next decade, and into the year 2000, are trends already largely underway.

### Introduction

Car company executives certainly expect that today, as in the past, forecasting the future environment will be a challenge. However, with a practically endless number of commentators providing predictions and opinions on the future possibilities of this closely watched industry, there is little doubt that every conceivable development will be discussed at some level.

Our *Car Company of the Future* study of assemblers and suppliers covers various aspects of the future operating environment. As seen by respondents, many characteristics of the market and competitive environment for car companies over the next decade, and into the year 2000, are trends already largely under way.

This chapter focuses on how the industry sees its environment unfolding over the next ten years in two primary areas: 1) the worldwide dynamics of sales, production, and trade; and 2) supplier selection and company characteristics. In addition we questioned companies on their own competitiveness—allowing them to self-rate their performance. There is strong general agreement among both assemblers and suppliers on these broad issues. Responses to our research show few differences exist in expectations whether the respondents are segmented by product type, business sector of the auto industry, or plans/expectations for growth. Likewise, there are only scattered differences in responses at various organizational levels.

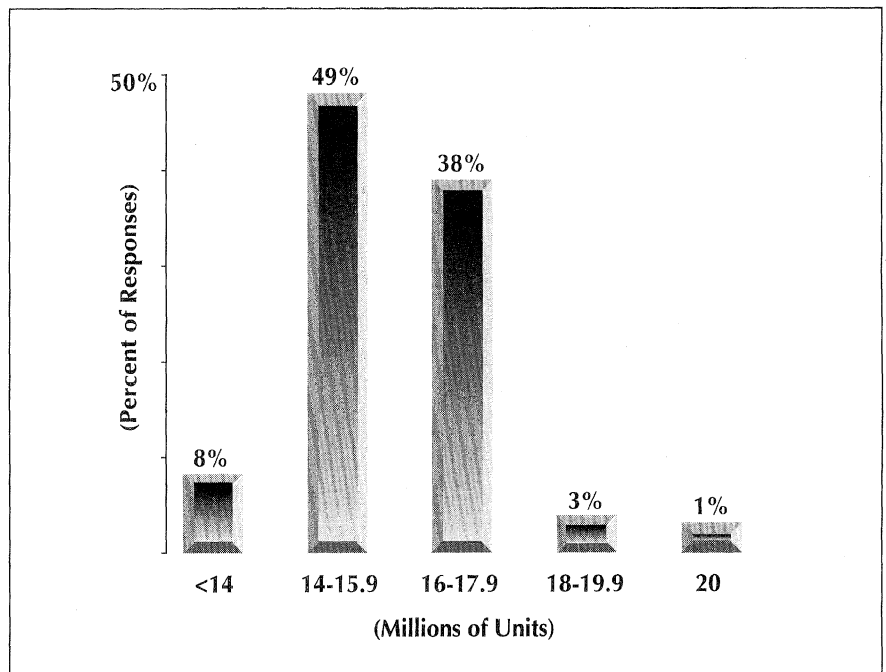
### Sales/Production

#### *U.S. Sales and Production*

There is a general expectation that the volume of light-duty unit sales in the U.S. by the year 2000 will increase from 1990 levels, but the degree of the increase is uncertain. In spite of strong industry opinion that domestic sales will lag into the mid

'90s, our survey shows healthy optimism that unit sales will rebound to the 16 million unit level by 2000 (see *Chart 1-1*). Almost half of the respondents believe sales will be in the 14 to 16 million unit range, and another 40 percent expect sales to be above 16 million, as they were in 1986. Suppliers see somewhat lower levels than do the Big Three at 15.6 and 16.2 million units, respectively. There remains however, a lingering concern about overcapacity in the industry, a feeling that was reinforced in our interviews and roundtable discussions.

*Chart 1-1: Anticipated Unit Sales in U.S. by 2000*



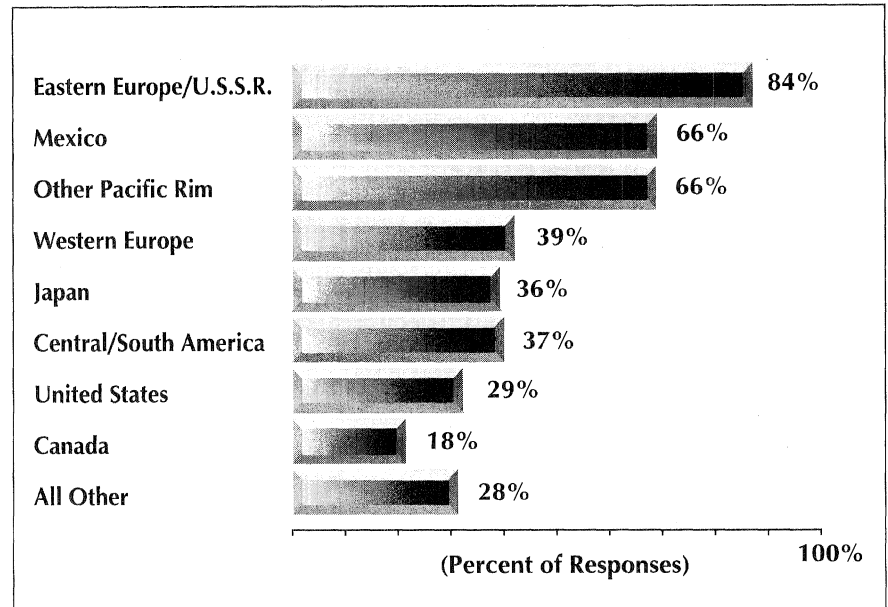
A lingering concern about overcapacity in the industry was particularly apparent in our interviews and roundtable discussions.

Respondents nearly unanimously expect that Big Three share of domestic production and sales will continue to fall somewhat through the 1990s. About 75 percent expect Big Three share will decrease by 2000. Again, suppliers are slightly more pessimistic than the Big Three on this issue.

***Increasing Automotive Trade Worldwide***

Worldwide trends in vehicle manufacturing are following the political and/or economic developments in Mexico, Europe, and the Pacific Rim. The sharpest regional increase in production is expected in Mexico, where a freer investment environment and stronger political and free-trade relations with the United States are driving assembly and light manufacturing activity into its low labor-cost northern regions.

Foreign markets are expected to expand over the next ten years, particularly in Europe, with 84 percent of respondents indicating Eastern Europe and former U.S.S.R. states will experience strong growth in share of worldwide production and sales. *Chart 1-2* also shows two-thirds of respondents expect the Pacific Rim to see increases, excluding Japan, where production and sales are expected to stay about

**Chart 1-2: Responses Expecting Increase in Region's Share of Worldwide Sales**

Foreign markets are expected to expand over the next ten years, particularly in Europe.

the same. In the U.S. and Canada, share of both production and sales are expected to decrease, or, at best, stay the same through the 1990s.

### Supplier Company Characteristics and Trends

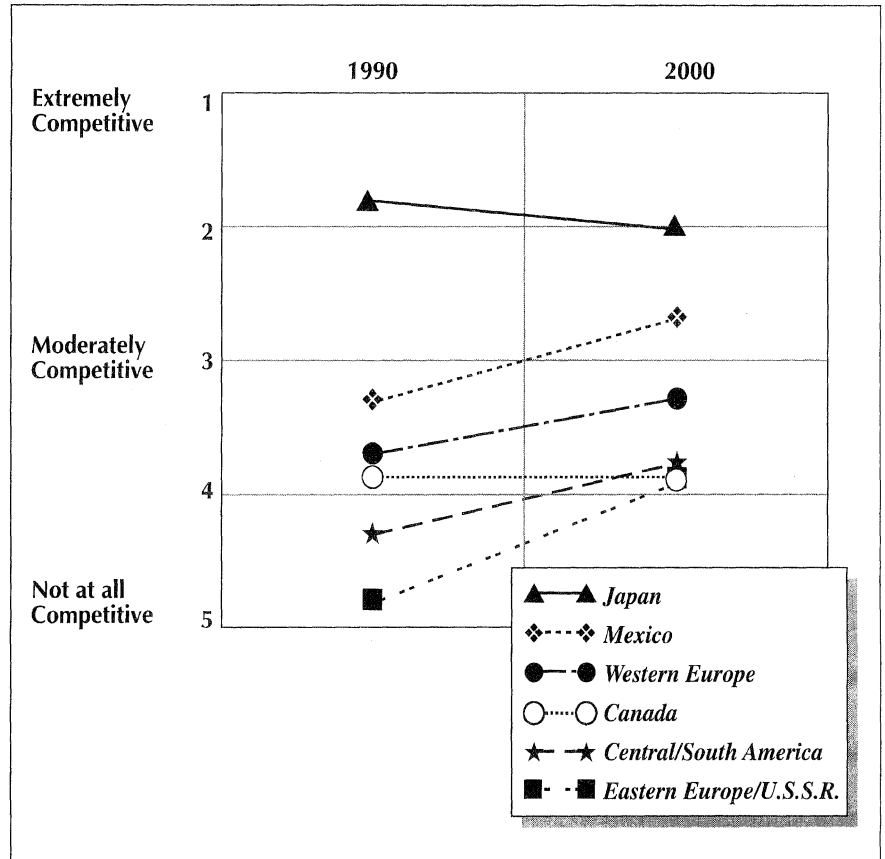
The supplier community is perhaps the most likely to look and operate differently in 2000:

- Nearly 84 percent of respondents expect the number of independent suppliers to decrease.
- About 80 percent expect the size of the typical supplier company to increase.
- Almost half (48 percent) expect to decrease the number of suppliers they themselves use.

Respondents are less clear about levels of insourcing versus outsourcing; most are undecided. The suppliers see themselves decreasing their own levels of vertical integration, and *outsourcing* more. There is indication that suppliers' purchases from imports will increase, perhaps driven by pressure on suppliers to "follow their customers" to other markets.

Only relatively few respondents (14 percent) expect that a lower percentage of their business will be accounted for by automotive product sales. Suppliers are therefore looking to opportunities outside of North America to continue their growth, with nearly 40 percent of domestic suppliers expecting to *decrease* their percent of auto sales in the U.S.

Chart 1-3: U.S. Suppliers' Changing Competitive Threat



NAMs are New American

Manufacturers, or "transplants."

**Competitive Threat to U.S. Suppliers**

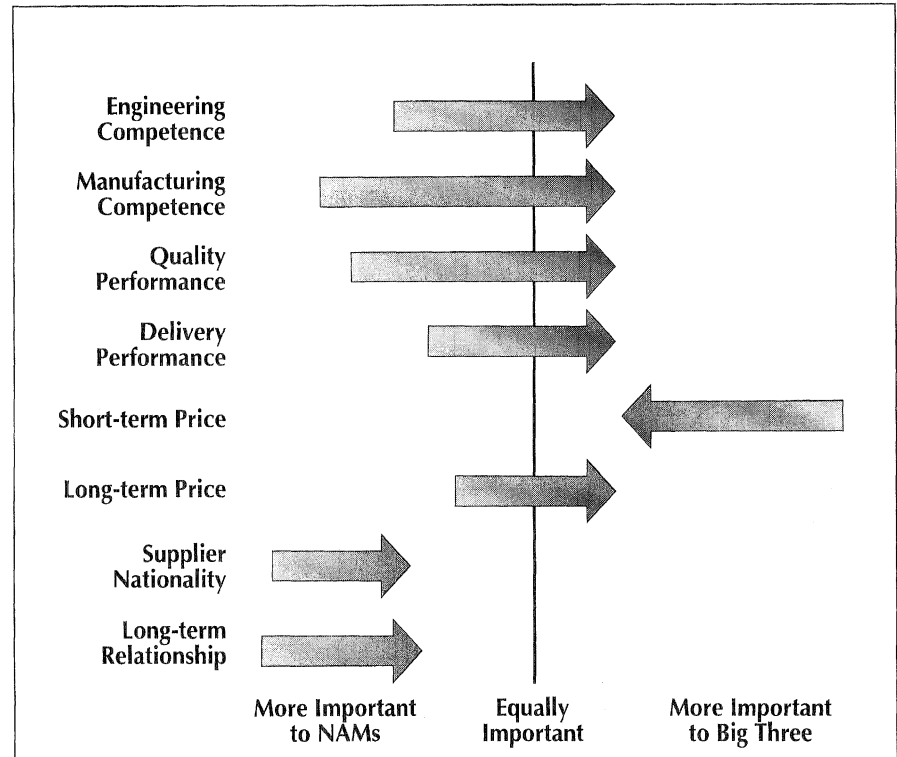
Of the United States' six major competitor regions, four—Mexico, Western Europe, Eastern Europe and former U.S.S.R. states, and Central/South America,—become increasingly competitive threats between now and 2000. *Chart 1-3* shows that, while the seriousness of Japan's threat is perceived to decline on a relative basis, it remains moderate-to-extreme, and Mexico moves sharply into the moderate range. Canada remains virtually unchanged. Over 50 percent of respondents expect U.S. suppliers' share of worldwide production to fall, while Japan's increases.

**Supplier Selection Criteria: Differences Between Big Three and New American Manufacturers (NAMs)**

*Chart 1-4* shows Big Three and NAM supplier selection criteria differing now, but over the next ten years the criteria of engineering competence, manufacturing competence, and quality—which are somewhat more important to NAMs now—will converge in importance to the types of manufacturers. In fact, these selection criteria are projected by respondents to be slightly more important to the Big Three by 2000.

Delivery performance and long-term price criteria will change the least, remaining generally equally important to both. Short-term price, which is considered by respondents to be much more important to the Big Three today, will remain more

Chart 1-4: Supplier Selection Criteria—Changes by the Year 2000



Big Three and NAM supplier selection criteria differ now, but over the next ten years the criteria of engineering competence, manufacturing competence, and quality will become equally important to both.

important to the Big Three than to the NAMs, but with a decreasing emphasis by 2000. Long-term relationships and supplier nationality are expected to remain somewhat more important to the NAMs.

#### *Product Characteristics*

Characteristics important in vehicle differentiation ranged from price to fuel economy to image to quality of service. Both assembler and supplier respondents expect quality of service, reliability, and design and styling to be the most important differentiating factors in 2000. Several other factors including price, durability, performance, safety and vehicle-customer "fit" are also rated high. For our respondents, the lowest rated factors are optional features and time to deliver vehicle.

Respondents expect quality of service, reliability, and design and styling to be the most important product differentiating factors in 2000.

#### *Brand Positioning*

Respondents were asked to rank the Big Three and several major Japanese and European automakers' competitiveness on criteria of quality, people, and overall competitiveness, for today and in the year 2000. The industry opinions about who leads, who lags, and who will improve over the 1990s are not too surprising. *Chart 1-5* is a ranking of each listed producer's overall competitiveness today and change by 2000.

Both OEMs' and suppliers' ratings reflect an expectation that GM will make the largest improvement in overall relative competitiveness, significantly enhancing its position between now and 2000. The assemblers tend to rate Honda's quality and

*Chart 1-5: Relative Overall Competitiveness Ratings*

1990		2000	
Manufacturer	Relative Rating	Manufacturer	Relative Rating
Toyota	1.5	Toyota	1.1
Honda	1.6	Honda	1.4
Nissan	2.3	Nissan	1.9
Mazda	2.5	Ford	2.0
Mercedes Benz	2.5	GM	2.0
Ford	2.6	Mazda	2.3
GM	3.0	Mercedes Benz	2.5
Chrysler	3.6	Chrysler	3.9

**Indexed Scale: 1 to 5; 1 = highest rating**

product development higher than do suppliers, and the same is true with regard to Ford’s innovation strengths. It also is clear that suppliers and assemblers expect Toyota and Honda, ranked first and second respectively, to maintain their positions. Both are rated very competitive across the board. Chrysler was lowest across categories, and like Mercedes-Benz, its overall relative competitiveness is expected to stay about the same or slightly decrease by 2000. To be sure, these ratings are somewhat time bound. Chrysler would probably receive noticeably better ratings now— in the summer of 1992— than it did in the spring of 1991, in view of the market’s acceptance of the Grand Cherokee and the industry’s pre-introduction enthusiasm for its new LH-platform cars.

**Self-Rated Competitiveness**

When surveying the industry overall, automotive companies see themselves as moderately competitive, although with some sense of urgency to improve. Survey respondents were asked to rate their company’s competitiveness on 37 issues in 1990. (See *Chart 1-6*) These were grouped into four global dimensions or categories:

- Management performance issues
- Engineering performance issues
- Manufacturing performance issues
- Marketing performance issues

For the same 37 items, respondents rated the importance of improvement for their company by the year 2000; this topic will be discussed in Chapter Three. Our analysis used a mean of the ratings along a 5-point scale ranging from 1

(extremely competitive) to 5 (not competitive). Additionally, comparisons were made throughout the analysis between the responses of suppliers and manufacturers, and between responses of top level executives (V.P. or above) and lower levels of management.

There was a convergence of mean ratings with scores clustering around “moderately competitive.” Among the four dimensions, relative competitiveness rankings were strongest in marketing issues (2.63), followed by management issues (2.83), manufacturing issues (2.85), and engineering (2.97) (where 1 = extremely competitive). It might be expected that items rated lower in competitiveness would be viewed as important to improve upon; however, this was not a consistent pattern in the data. This may reflect the strategic dilemma of whether it is wiser for a company to play to its strengths or to remedy its weaknesses. Specific findings within the four performance dimensions are described below. The dimensions were rated fairly closely, and are listed in order of decreasing competitiveness.

#### **Marketing Performance Issues**

Of the four dimensions studied, the rankings on marketing performance appeared most positive, with a composite score halfway between “moderately” and “quite” competitive (2.63). This rating was based upon three survey items: *relationships with customers, manufacturers or dealers, customer excitement with product and services*, and *responsiveness to customer preferences*. Relationships with customers, manufacturers or dealers was the issue on which respondents viewed their firm as most competitive. For all three issues comprising marketing performance, supplier ratings were slightly higher than manufacturers, while for two of the three items top management gave higher assessments.

Key OEM executives revealed in personal interviews that, in their view, they are near competitive parity with each other, but lag behind the Japanese in terms of market responsiveness.

#### **Management Performance Issues**

The management performance category included 12 issues such as *managerial productivity, effective use of human resources, total delivered unit cost, and supplier development and support*. Just as with the marketing dimension, specific aspects of management performance did not elicit widely varying competitiveness ratings: the range from highest to lowest was 0.4. Those items within this dimension that were rated as relatively more competitive (between “moderately” and “quite”) were *leadership, management of functional areas, deployment of technical resources, and deployment of capital resources*. Ratings of their own company’s competitiveness on the other eight items comprising management performance were all “moderately” competitive.

Comparing the responses to these competitiveness ratings reveals differences arose between suppliers and manufacturers. Suppliers reported higher levels of competitiveness. This was true for issues such as *management of entire system, effective use of human resources, deployment of technical resources, managerial*

**Chart 1-6 Performance Dimensions**

**Management Performance Issues**

- Management leadership
- Management of entire system
- Management of functional areas
- Effective use of human resources
- Deployment of technical resources
- Deployment of capital resources
- Managerial productivity
- Managerial labor cost
- Total delivered unit cost
- Executive make-buy decision in line with company strategic priorities
- Supplier development and support
- Personnel training

**Engineering Performance Issues**

- Customer requirements planning process
- Product development cycle time
- Product design/engineering
- Process design/engineering
- Time compression of engineering tasks to permit time for experimentation
- Effective design for manufacture
- Engineering changes
- Technical labor productivity
- Technical labor cost

**Manufacturing Performance Issues**

- Cost of quality
- Manufacturing unit cost
- First time quality capability
- Time to fill orders
- Throughput time
- Material handling
- Maintenance management
- Process control and capability
- Machine uptime
- Capacity utilization
- Production sourcing
- Production labor productivity
- Production labor cost

**Marketing Performance Issues**

- Relationships with customers, manufacturers or dealers
- Customer excitement with product and services
- Responsiveness to customer preferences



*productivity*, and *managerial labor cost*. While other industry information supports these data, also implying that suppliers are more competitive in certain practices, it is not clear that suppliers are more effectively managed overall than the manufacturers.

When top level management (V.P. or above) disagreed with other executives they rated their companies more competitively. Looking at management performance, this split occurred on three attributes: *management leadership*, *management of entire systems*, and *managerial productivity*. This is perhaps a predictable gap because these three items are the broadest in scope, and most directly the responsibility of top management. They are (in effect) rating their own performance.

### **Manufacturing Performance Issues**

Respondent competitiveness ratings of their companies were just as tightly clustered for manufacturing issues as they were on other performance dimensions. Most items received average scores of “moderately” competitive. The most competitive ranking among these 13 issues was *production labor productivity*, and the least competitive was *maintenance management*; however, these differences were slight. Again, looking at differences on seven productivity and quality-related attributes, suppliers were significantly more generous in rating their own competitiveness. Likewise, top managers gave higher ratings than their “lower counterparts” on two broad measures of manufacturing performance: *manufacturing unit cost*, and *time to fill orders*.

### **Engineering Performance Issues**

As with other areas, specific items among the nine items within engineering performance were also rated “moderately competitive” or close to it: the spread of scores was 0.7. The important issue of *product design engineering* fell between moderately and quite competitive. *Time compression of engineering tasks to permit time for experimentation* was viewed by most respondents as being less than moderately competitive in their companies. These findings are cause for concern, given the importance of these factors in the industry.

Once again ratings by suppliers were higher than those of OEMs for all but a single item in this group: the *customer requirements planning process*. Apparently suppliers view their relationship with their customer, the assembler, as both challenging and demanding, and on this issue rate themselves somewhat less competitive. Furthermore, there was a fairly wide gap between the Big Three and suppliers on product development cycle time. Suppliers see themselves as relatively more competitive in this area. They may feel they have the capability to reduce cycle times if and when asked to do so. Interestingly, cycle times are set by OEMs, so suppliers will not really be put to the test unless OEMs are willing to bring them into the development process earlier. Senior management differed from lower management, attributing higher degrees of competitiveness to *product development cycle time* and to *time compression of engineering tasks to permit time for experimentation*. The reasons underlying these gaps are unclear.

While some success stories do exist in the industry, personal interviews with executives revealed frustration that improved product development processes have not been ingrained as true systems. Companies still lack the needed discipline, focus and culture to achieve consistent improvements. Suppliers brought into the process late complained of having to incur significant amounts of overtime and reengineering to meet schedules. These pressures don't exist to such an extent when the supplier is brought in early. From the interviews we heard that this is one of the key points that makes supplying Japanese manufacturers easier than supplying domestic manufacturers; the process is well-defined and disciplined.

### **Commentary and Conclusions**

There is clear consensus among respondents as to where the industry is heading and what characteristics will change regarding the industry's structure. While some areas, such as supplier characteristics and worldwide market developments, are expected to change substantially, respondents to our survey confirmed industry "conventional wisdom" with no major surprises across the issues and dimensions we examined, from market-driven vehicle design criteria, to offshore operations and competition.

**There is clear consensus among respondents as to where the industry is heading and what characteristics will change regarding the industry's structure.**

North America will become an even more fiercely competitive arena, and a particularly critical challenge for the Big Three, whose share of sales and production must increase if they are to regain a leadership position. Unfortunately, the frequency with which Big Three market share decline is forecasted tends to make it a virtual given. Surely all industry-watchers have pondered the distressing Big Three aggregate market share dips between 1986 and 1991 with rebounding in 1992.

Two things stand out in the self assessment of competitiveness findings. The first is the overwhelming uniformity of "moderate" evaluations, both within and across the dimensions studied. The second is the pervasive gaps between the ratings of suppliers and assemblers, and between the most senior officers and those immediately below them. Suppliers might have less detailed information on competitive standing or might be less critical in their perceptions. Senior management perhaps sees broader long term progress on competitiveness, or is simply more generous in rating its own actions.

Globalization is moving forward quickly. With markets opening in Europe and increased manufacturing in Mexico, Europe, South/Central America, and the Pacific Rim, new worldwide competition will intensify. NAFTA will surely have an impact on both production and sales in the U.S., Mexico and Canada. Regionalization of the global industry will have implications for companies in every part of the value chain. Suppliers and OEMs must continue implementing strategies that include developing markets worldwide. Assemblers are expected to locate where their growth markets are, and their suppliers will follow. Production and sales will be increasingly driven by markets outside of North America.

The recent announcement by BMW that it will build a facility in South Carolina is a good example of the complexity of decision making in a global industry. The company selected the new location because of low labor rates and the state's

commitment to provide extensive labor force training. The move also affirms BMW's commitment to the U.S. market. Roughly one half of the plant's output will be exported.

Suppliers face perhaps the largest and most rapid changes over the 1990s. Respondents indicate the pattern of overcapacity in the industry will continue, and the clear consensus is that there will be fewer—and larger—suppliers at every level. This consolidation is consistent with the industry's emphasis on building and maintaining stronger supplier/manufacturer relationships.

It is important to point out, however, that the industry is still wrestling with the manufacturer/supplier relationship issue. Encouragingly, despite intensified competition resulting from consolidation, shrinking business, and aggressive offshore competitors, suppliers responded to the survey that they are committed to the auto industry. Surely many see few viable strategic alternatives. However, in our interviews, some companies did report that they are strategizing about options to move away from the auto industry. Should this trend develop, it would bring into question whether there would be an adequate supplier base to support the Big Three.

The need for OEMs to involve suppliers earlier in the stages of planning and production will be critical to strengthening the supplier-manufacturer relationship. This issue was raised for discussion in many interviews, and top executives say that a team orientation will foster the long-term commitment and partnership necessary to maintain competitiveness within the industry and into the year 2000.

But, according to these top executives, strengthening this relationship will be a challenge as suppliers and OEMs almost unanimously believe that "lack of trust" is the major barrier to developing strategic partnerships. Over and over again, interviewees heavily emphasized "trust" and "partnership" in the supplier/manufacturer relationship as being the key factors for future success. In the words of one executive, "Partnership is critical." The respondents say that this is true for many reasons, including:

1. The Big Three have more power due to a shrinking supplier base and overcapacity within the industry
2. Suppliers are often used as a pricing barometer. Even though the Big Three have no intention of outsourcing to suppliers, they want engineering assistance and costing information, but are not willing to give them a contract
3. Financing is a problem for small suppliers because product development expenses are constantly incurred, while payment is made only upon part/component shipment. Therefore if they do not win a contract, their investment in product development is uncovered
4. While the supply base may be cost competitive, redundant engineering adds total cost to the system, causing vehicle prices to be out of line with customers' perceived value.

**Suppliers face perhaps the largest and most rapid changes over the 1990s. The pattern of overcapacity in the industry will continue, and the clear consensus is that there will be fewer—and larger—suppliers at every level.**

5. NAMs ask for product design suggestions and make changes according to the suppliers' recommendations—which is something the Big Three appear to be more reluctant to do. They are perceived as not wanting to relinquish control of engineering.
6. Negotiations still focus on price and not on other essentials such as quality, delivery time, flexibility, and technological competency.

As suppliers are asked to do more engineering and tooling work, the OEMs obviously become more dependent on the supplier community which must achieve world class performance for the auto assemblers to be competitive. At the same time, the OEMs must internalize a partnership philosophy and become world class customers through consistent and fair behavior, level schedules, mutual financial gain and sharing of risk. Without this internalization, the OEMs will be deserted by the world class suppliers and left with mediocre providers of products and services, minimizing or possibly eliminating the OEMs' ability to compete.

**Differences between Big Three and NAM supplier selection criteria begin to converge on a more common set. Encouragingly, these criteria are based more on relationship factors than simply short-term price.**

A shift in supplier selection criteria emerges over the 1990s, suggesting a shift in the basis of competition as differences between Big Three and NAM supplier selection criteria begin to converge on a more common set. Encouragingly, these criteria are based more on relationship factors than simply short-term price. Suppliers' own selection criteria for their vendors is driven by the models used by the assemblers, and it is evident from roundtable discussions that first-tier suppliers are pushing modified and balanced Big Three-type qualification and selection criteria down to their own supply base.

Product differentiation characteristics in 2000 are not surprising, with reliability and quality of service ranking as extremely important. The lowest rated differentiators, optional features and time to deliver vehicles, are interesting to consider. This may suggest the Big Three's traditional marketing emphasis on optional features is or should be changing. The lower emphasis on time to delivery may point to the Big Three's perceived unwillingness to drive delivery times down or reflect a continuing assumption that most customers will continue to buy from inventory.

Respondents rated the overall competitiveness of the world's major producers between now and 2000, and GM is perceived to be accelerating its rate of improvement. Not surprisingly, Toyota and Honda retain the top positions for overall competitiveness. Like GM, Ford also is expected to improve, while Mazda, Chrysler, and Mercedes-Benz remain the same or fall back by 2000.

# CHAPTER 2

## CAR COMPANY OF THE FUTURE: YEAR 2000

**Executives recognize that their companies must be as futuristic as their cars.**

### **Introduction**

As car company executives scan the horizon and prepare for the 21st Century, they recognize the difficulty of predicting what the future model will be for successful North American car companies—how companies will structure fundamental processes and management of people, what will be the nature of their relationships with suppliers, and how manufacturing plants will be configured. Executives recognize that their companies must be as futuristic as their cars if they are to survive and prosper.

Many believe that Japanese car companies provide a model for the future and have set the trend for success. And, indeed, their current manufacturing practices have served as the lessons which must be learned by companies in the United States. On the other hand, they also recognize that American companies have a history of beliefs and operating styles, an established workforce, and in-place facilities which constitute a real set of constraints. The wholesale adoption of a Japanese model is, therefore, very difficult, if not impossible—and perhaps not even desirable.

One of our primary objectives is to capture the thinking of those leading the industry on what the car company of the future will be like. Our survey includes individuals from the Big Three manufacturers; “New American Manufacturers” (NAMs), also known as transplants; domestic suppliers, both allied and independent; and foreign-affiliated suppliers. (See Chapter 5 on survey demographics for further detail.) We posed questions about what is expected of the car company in the year 2000 from several different perspectives, focusing particularly on the people-related aspects and issues:

- How the successful car company of the year 2000 will differ from the car company of today

- What the most important success factors will be for auto companies in the year 2000
- How the assembler/supplier facilities will look in the year 2000
- What the priorities for competitive improvement are on various issues

The intent was to determine the level of consensus in the industry—the commonly held vision of the future, or the set of operating characteristics toward which companies were targeting their change efforts. A consensus did emerge in our quantitative, as well as our qualitative, research: responses show a high level of agreement on the majority of key attributes for the car company in the year 2000.

Obviously, there is not a total consensus, and our questions were certainly not meant to be all encompassing, but rather include those of highest priority based on published data, discussions with industry executives, and our own extensive experience working with many different companies in the industry.

### **Company Decisions**

On issues of organizational management and structure, industry executives provided their perspective on which functional areas seem to have an especially strong influence on company decisions. Approximately half felt that the financial function has the greatest impact on decision making, while the others felt it was engineering or manufacturing. These statements were often qualified by spotlighting the customer's role in the decision-making process. Ultimately, they say, it is the customer who should have the greatest impact on company decisions.

The majority of participants indicated that one of the primary criteria governing decision making in their companies is financial impact. While quality and customer satisfaction are heavily weighed, it is usually the financial bottom line that is most heavily considered. And it is generally believed that a multifunctional team approach to decision making, where the customers' needs are of paramount concern, serves as the most effective system.

Some feel that the decision inputs and criteria used in the North American auto industry are heavily quantitative, reflecting the backgrounds of the decision makers, who are often engineers and people who specialize in finance.

We asked whether the participants see a need to broaden the information base, or the backgrounds of the decision makers. Given that the U.S. automotive industry is dramatically shifting toward multifunctional, team-oriented decision making, it comes as no surprise that virtually all but one respondent to this question agreed that this movement toward involving and empowering people with diversified, cross-functional backgrounds in the decision making process is important to the future of the industry.

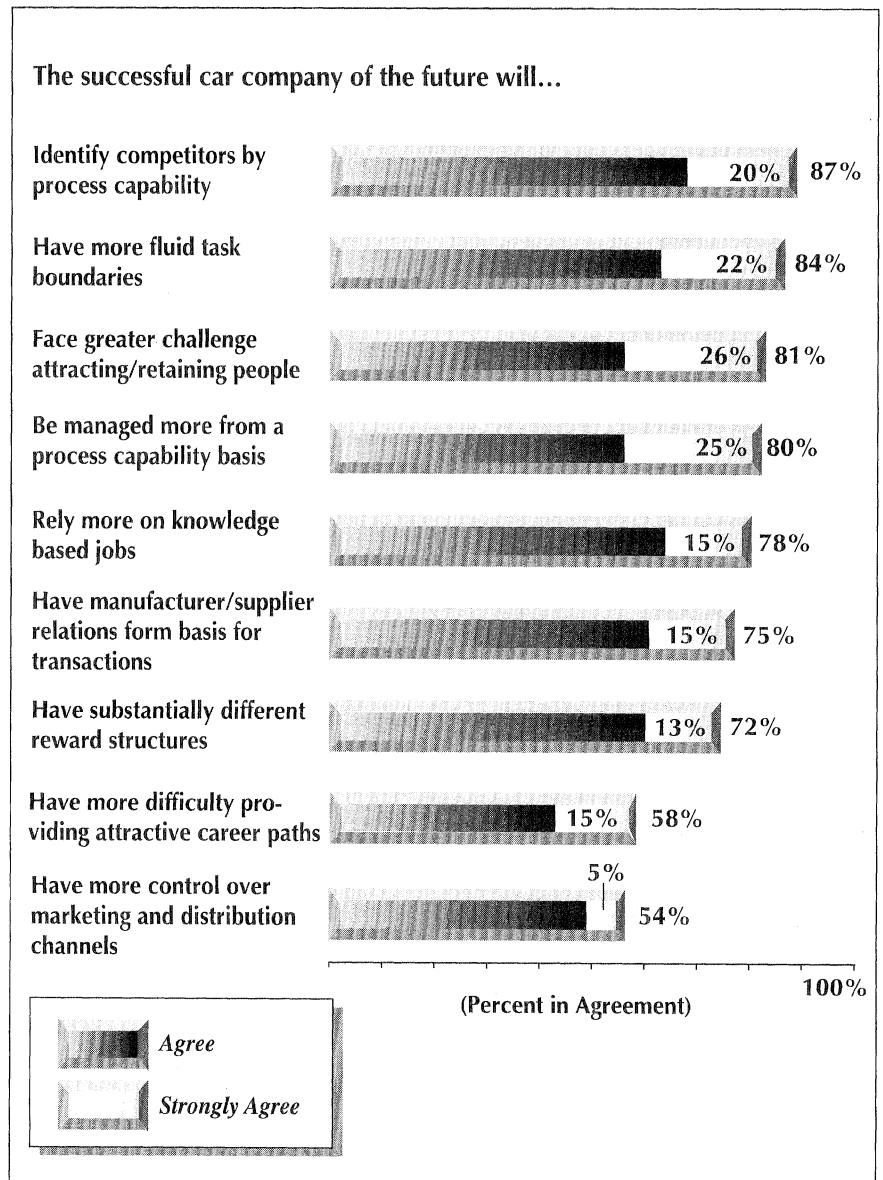
The team concept is deeply embedded in the Japanese work ethic, and to strengthen our international competitive position in the future, plans call for an increased management-by-consensus approach and the use of cross-functional teams, resulting in greater empowerment of workers. The sole respondent taking an alternative view points to the success of Japanese and European competitors, highlighting the fact that these companies are run primarily by engineers. He believes that risks and penalty for failure has placed an increased emphasis on gathering quantitative data.

**Consensus on Future Operating Factors**

Our survey reveals strong shared opinion on future success characteristics, but the responses do not reflect high differentiation among various factors. However,

*Chart 2-1: How the Car Company of the Future Will Differ from Today*

Car companies in the future must be managed more from a process capability basis than a purely results-oriented basis.



within the larger context of somewhat undifferentiated responses, we do see differences which are important to charting a map of the future terrain.

Of the fourteen future descriptions of successful companies presented, over 70 percent of respondents agree with nine of them, and over 80 percent agree with six. (*Chart 2-1* shows key items.)

**Jobs will offer more fluid task boundaries; there will be greater reliance on knowledge-based jobs.**

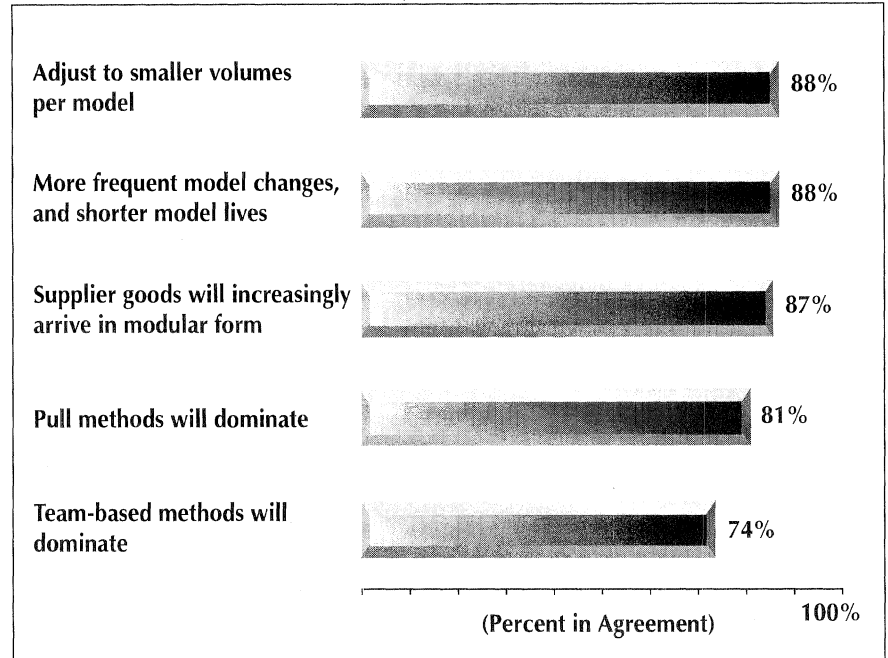
- The most “agreed upon” difference between today’s car company and that of the future is identification of competitors by their process and material capabilities as well as by their products. A full 87 percent of all respondents agree with this concept.
- Approximately 80 percent of all respondents—and almost 90 percent of assemblers—agree that car companies in the future must be *managed more from a process capability basis than a purely results-oriented basis*.
- The most “*strongly* agreed upon” future characteristic that car companies expect is a greater challenge in attracting and retaining top talent across all functional areas.
- Other human resource differences by the year 2000 agreed upon by respondents (over 80 percent) include: jobs will offer more fluid task boundaries, there will be greater reliance on knowledge-based jobs, and today’s quantitative decision criteria will be supplemented with qualitative measures.
- Seventy-five percent of all respondents agree that successful car companies will have their supplier-manufacturer relationships *form the basis for their transactions, rather than reflect those transactions*. Over 80 percent of assemblers (when taken as a separate group) believe this to be true.
- There is strong consensus by assemblers that the car company in the year 2000 will *not* have greater control than it has today over marketing and distribution channels. This was one of the lowest rated future characteristics by the assemblers: only 37 percent expect such a change.

Respondents show consensus that some people-related conditions won’t change or improve by much. There is agreement on various fronts:

- There will be difficulty in providing attractive career paths.
- Voluntary turnover is *not* expected to improve.
- Most importantly, different reward and recognition structures are given relatively less emphasis by respondents, with only 13 percent “strongly agreeing” that structures will change.



Chart 2-2: Characteristics of Facilities in 2000



More than 88 percent of all respondents believe assembly and supplier plants will have to adjust to more frequent model changes.

#### *Future Facilities Characteristics*

There is strong consensus among survey respondents about some trends and challenges facing current facilities (See chart 2-2). Facilities characteristics expected in the future include:

- More than 88 percent of all respondents believe assembly and supplier plants will have to adjust to more frequent model changes.
- Shorter model lives, and smaller volumes per model, have more than 88 percent agreement from all respondents. In OEM interviews executives indicated that it would be increasingly difficult to reach 200,000 annual model sales, which is the traditional target capacity of an assembly plant.
- Almost 90 percent agree that, increasingly, supplier production goods will enter assembly plants in modular form, with less and less subassembly work required in the assembly plant.
- Not surprisingly, the next agreed-upon future characteristic ran a close fourth with just over 80 percent agreement: pull methods (rather than push methods) will dominate production in automotive plants.
- There is strong agreement (74 percent) that team-based methods will be dominant.

It is as though manufacturers and suppliers have defined a road toward the future; it might be described as wide, ordinary, and without wild swerves or strong inclinations.

Beyond this point respondents share marked uncertainty about the specifics of facilities characteristics in the future. Industry outlook for the year 2000 gives *no clear picture* on: the amount of increased automation, conversion to two-shift, three-

**There is strong consensus by assemblers that the car company in the year 2000 will *not* have greater control than it has today over marketing and distribution channels.**

crew operations, and safety and workplace issues. Additionally, our analysis reveals that some of the newer concepts, such as plants dedicated to “freshening” or updating older models, and plants dedicated to disassembly of older vehicles for recycling, are true question marks in the minds of industry respondents.

On one of the most important questions about future facilities characteristics—the size and nature of supplier configuration relative to assembler facilities in the 21st Century—there is a split decision. About half the respondents see suppliers with more centralized, high-volume facilities, and about half the respondents see suppliers as contiguously located, with low-volume facilities.

**Success Priorities: Year 2000**

An essential step on the road to operating success and increased competitiveness by the year 2000 is deciding the most important things to do. The survey asked respondents to rank eleven “success factors” which, though not an exhaustive list of all possible options, does include many of the most important success factors which the automotive industry has discussed for more than a decade.

On future success factors, the top rated item is *product quality*. Of all respondents, over 95 percent rate quality “extremely or quite important.”

The issue of quality was a consistent and pervasive topic of discussion in personal interviews of executives. Virtually all agreed that the quality gap is shrinking and eventually would not provide a competitive advantage. But for this positive trend to continue, respondents emphasized that continuous improvement efforts in the area of quality must be ongoing. Interestingly, in response to the question of how their companies measure up competitively today, representatives of the Big Three typically felt that their company’s quality trails the Japanese, but surpasses the other two domestic manufacturers.

Our analysis of success factor priorities shows little further differentiation. Nine of the remaining ten success factors are rated as virtually *equal in importance* as areas on which to focus. Beyond the first priority of quality which is clearly demanded by consumers and competition, everyone rates everything as important. Over 80 percent of all respondents, with no differences between assemblers and suppliers, rate the success factors shown in *Chart 2-3* as virtually *equally* important.

The lowest priority success factor for the future, by a substantial margin, was commercialization of R&D. It is interesting that this is the one factor discriminated from the list because it is often identified as a general weakness of U.S. industry. However, it was rated above the mid-point of our 5-point scale.

**Importance of Improving Performance and Priorities**

As discussed in the previous chapter, survey respondents were asked for “self-competitiveness” ratings on a range of 37 issues, from marketing to production to engineering. In addition to analyzing the self-competitiveness ratings, we asked companies to rate the importance they placed on improvement for each of the 37

Chart 2-3: Success Factors in 2000

<b>EXTREMELY IMPORTANT</b>	<ul style="list-style-type: none"> <li>• Quality</li> </ul>
<b>IMPORTANT</b>	<ul style="list-style-type: none"> <li>• Total production cost</li> <li>• Product development cycle time</li> <li>• Effective utilization of human resources</li> <li>• Product technology</li> <li>• Effective utilization of technical resources</li> </ul>
<b>MODERATELY IMPORTANT</b>	<ul style="list-style-type: none"> <li>• Commercialization of R&amp;D</li> </ul>

performance issues by the year 2000. This provides a good indication of managerial priorities for the '90s across the four dimensions of management, engineering, manufacturing, and marketing. Again, each issue was rated on a scale of 1 to 5 with 1 (extremely important to improve) and 5 (not important to improve). When taking ratings as a group, each of the four dimensions was rated (on average) slightly more than "quite important," with marketing issues viewed as the most important to improve upon (1.6) and the other three approximately 1.8. However, with the ratings this close, differences are not overwhelming. Although there was some variation in item scores among the respondents, the clustering of ratings around "quite important" seems to corroborate the lack of focus revealed in reported levels of change implementation elsewhere in the survey. No particular areas were especially important when making improvements. Understanding must also be achieved regarding the requirements of differentiation and the importance of core competency in order to increase market share and expand the business.

Among the management performance issues, top executives rated *leadership* as the most important item to improve, followed by *management of entire system*, *effective use of human resources*, and *total delivered unit cost*. *Product development cycle time* was the engineering issue rated as most important to improve by 2000. Looking at manufacturing performance issues, those rated as high priority were *cost of quality*, *manufacturing unit cost*, and *process control and capability*.

Qualitative research participants' views were consistent with survey data findings, indicating that responsiveness to the market is limited by a lengthy product development process. Simultaneous engineering and early supplier involvement will be key to improving this process.

Some differences did emerge between suppliers and Big Three manufacturers with respect to their improvement priorities. On 13 of the 37 performance items the Big Three respondents attributed more importance to change than did suppliers. Those given higher importance by the assemblers were:

- Management leadership
- Management of entire system
- Effective use of human resources
- Deployment of capital resources
- Customer requirements planning process
- Product design/engineering
- Time compression for engineering tasks to permit time for experimentation
- Effective design for manufacture
- First time quality capability
- Process control and capability
- Production sourcing
- Production labor productivity
- Customer excitement with product and services

#### **Leaders Talk About Their Agenda for Change**

Interviews with senior automotive industry executives revealed that the most critical changes that must be made in their companies to improve overall competitiveness in the year 2000 focus on building higher levels of client satisfaction, both internally and externally. Some respondents were simply unable to provide a "short list" of strategic priorities. This reinforces the lack of focus revealed in the survey findings.

Manufacturer and supplier executives were asked about what the top three major strategic priorities are for their companies as we approach the year 2000. An interesting distinction can be made between the responses of the two groups to this question, with auto manufacturers' responses being divided into five groups, in order of decreasing frequency of strategic priority:

- Focus on the customer: Almost every OEM respondent mentioned customer satisfaction as one of its strategic priorities for the future. Some focused on increasing the customer's value perception while others wanted to become more responsive to their customers, including the dealers.

- **Quality:** Not surprisingly, the next most frequently mentioned strategic priority was related to increasing the quality of the OEM's products and services.
- **Cost Reduction:** Improving the OEM's cost position ranked third among strategic priorities, with phrases such as lean production, price/cost competitive, and flexibility dominating these discussions.
- **Corporate culture:** These strategic priorities were aimed at improving employee attitude and behavior in addition to supplier relationships.
- **Globalization:** Last among the top strategic priorities mentioned by OEMs was the need for overseas expansion and global sourcing.

The strategic priorities of the supplier participants were very similar in nature to those of the OEMs listed above. However, it is important to note that they diverge in two key areas:

- **Growth:** A substantial number of suppliers mentioned growth as one of their top three strategic priorities. In each case, this implied diversification away from the Big Three manufacturers, and was articulated in various ways, including: expand NAM business, increase exports, expand European markets, diversify into new markets, and develop a partnership with the Japanese.
- **Full-Service Systems Strategy v. Niche Supplier:** Although somewhat evenly split, there is divergence among suppliers regarding whether to pursue a strategy of offering complete component systems to the OEMs or moving away from being a full-service provider and toward focusing on their core competencies.

Suppliers clearly articulated their survival strategies, which they acknowledged did not necessarily complement those of the Big Three. While the Big Three are seeking greater involvement by suppliers in product development and the manufacturing capacity, suppliers are exploring strategies that promote lower dependence on the Big Three. These countervailing trends could undermine the very supply base upon which the Big Three expect to depend.

### **Commentary and Conclusions**

Both assemblers and suppliers generally share a vision of the car company of the future. Most respondents see common characteristics for the year 2000, but not completely so. Lack of strong conviction on particular key factors was reflected by a wide dispersion among the responses on future factors. Respondents seem to share opinions and views of the future, but show limited discrimination among the various future success factors. Strong agreement (or disagreement) was rarely expressed, or expressed only on a limited basis. It is as though manufacturers and suppliers have defined a road toward the future that might be described as wide, gentle, and lacking sharp curves or many intersections.

**Just as an automobile engine must be properly designed, constructed and maintained to operate effectively, people must be developed, empowered, and rewarded to function at their maximum capacity.**

Top executives had varying responses when asked whether their company has clearly articulated its strategic priorities for the year 2000. In some cases, a specific plan exists, but the majority indicated that when strategic priorities did exist, it was typically supplemental to, or a product of, the five-year business plan. According to these executives, the fact that these strategic priorities are not often communicated within the organization reflects their lack of strong convictions about the future. This is not surprising in view of the competitive uncertainties they face.

These priorities are often developed at high management levels, although in a few cases, they were found to be created at the lowest level of management. Generally, information is cascaded down to the lowest levels of the company in meetings, in publications, and in videotape presentations.

A focus on process capabilities and improved process management seems to suggest the industry is acknowledging that its process capabilities will drive future competitiveness. We see this as a very important and essentially encouraging sign: focus not only on improvement of processes, but on process-based management, with a market-driven orientation rather than functional management. This is key as a means to overall performance improvement.

Greater emphasis is expected on more fluid task boundaries, as is a greater reliance on knowledge-based jobs. Less change is expected in the reward structures or career paths to support these “advanced” job structures. This suggests a paradox because linkage between changes in job expectations and reward structures should be tight. Just as an automobile engine which must be properly designed, constructed and maintained to operate effectively, people must be developed, empowered, and rewarded to function at their maximum capacity.

There appears to be little doubt about the importance of building lasting, “let’s work together on problems” relationships between suppliers and assemblers. The path to that future condition appears particularly treacherous today. A promising future certainly depends on a solid industry infrastructure. Everyone agrees it’s important, and it needs to remain a goal even when times are tough. What is needed is an accelerated pace of implementation, not a slowdown.

There is substantial uncertainty around facilities configurations, i.e., whether supplier plants will be centralized, high-volume facilities or contiguously located, low-volume plants. There is no consensus on this fundamental issue that significantly affects suppliers as they do their long-range capital and facilities planning. However, this may reflect different expectations of individual companies, depending on company size customer base, and product.

The future vision is strongly shared on the tremendous importance of quality. Many sources report on the improvements in quality by U.S. automotive companies, and it is encouraging to see that the focus on quality is expected to remain extremely high into the year 2000—and, of course, beyond. Quality will be the “ante in” to the game, but may not guarantee differentiation or success. Quality products will be required just to be considered by the customer. However, there is still a question for U.S.

companies on the pace of quality improvement. They must move faster than foreign competitors in quality improvement to capture the position of world leadership by the year 2000.

Companies appear to be unfocused in their priorities about improvement areas, and thereby dilute their progress toward becoming more competitive. When everything is important, it is impossible to maintain focus on the most critical objectives. It is, of course, impossible to do everything at once. Those who must implement can't determine what actions must take precedence. Efforts are suboptimized or thwarted because each individual, division, or department is forced to make its own decisions about what the priorities are and how to behave without regard to other units. Strategic leverage is lost, and progress toward improvement is slowed.

Strong quantitative and qualitative findings indicate that companies are continuously and consistently benchmarking their progress, internally and externally, and some more rigorously than others. As companies compare themselves with their competitors and non-competitors alike, benchmarking is conducted in many ways, including: product teardowns of industry leaders, the use of industry quality surveys, internal audits, and plant visits. While significant "product" benchmarking has been under way for many years, more process benchmarking may be required in the areas of order management, scheduling, invoicing, and measurements. These types of process benchmarking efforts should look for innovative ideas, organizational implications, and results achieved.

In conclusion, the future state is fairly defined, and the actions needed to carry the industry forward are agreed upon. Establishing priorities and bringing a few key areas into unmistakable focus is the urgent challenge. There exists a clear need to set a specific agenda, with a clear starting point.





# CHAPTER 3

## DRIVING INTO THE FUTURE: THE PACE OF CHANGE

### Introduction

Understanding future operating conditions and success factors is a solid step toward the future state. But the true test is in achieving it. The *speed* at which change is being accomplished will certainly be a major determination of tomorrow's winners and losers.

Our survey covers 38 change practices or transition efforts, identified through industry literature and discussions with notable industry sources, on which respondents rated their companies' pace of implementation. Our initial analysis centered on two essential aspects of change:

- A rating of how rapidly executives see their own companies implementing specific change actions or "improvement efforts"
- Identification of linkages between the pace of implementation on change actions and several future characteristics and success factors, discussed in the previous chapter

In addition, this chapter discusses the relationship between competitiveness (from self-ratings in the survey) and change implementation pace and focus. Charting a course for achieving success requires setting goals and a vision for the future. Senior executives in roundtable discussions felt strongly that manufacturers and suppliers alike have at the very least a five-year plan in place, but disappointingly, only a few have identified a vision for the year 2000. For those companies who have a vision, frequently it is created by those in top management positions within the organization and communicated via meetings and in publications and videotape presentations with buy-in and commitment occurring at lower levels through a trickle down effect.

Statistical process control was given the most rapid implementation rating, with continuous quality improvement ranking second.

The two manufacturing systems and technology areas, computer-integrated manufacturing (CIM) and flexible manufacturing systems, had the lowest average rate of implementation.

Because there is substantial consensus on the end state, companies that take the fastest road to get there are likely to be future winners. It's not just a question of who crosses the finish line, but who crosses it first.

### Survey Findings: A Slow Pace of Change

How quickly do people see their own company, the workers and executives around them every day, adopting and employing change actions that will make a difference? To understand the 38 areas of transition efforts more easily, we grouped them in the following categories:

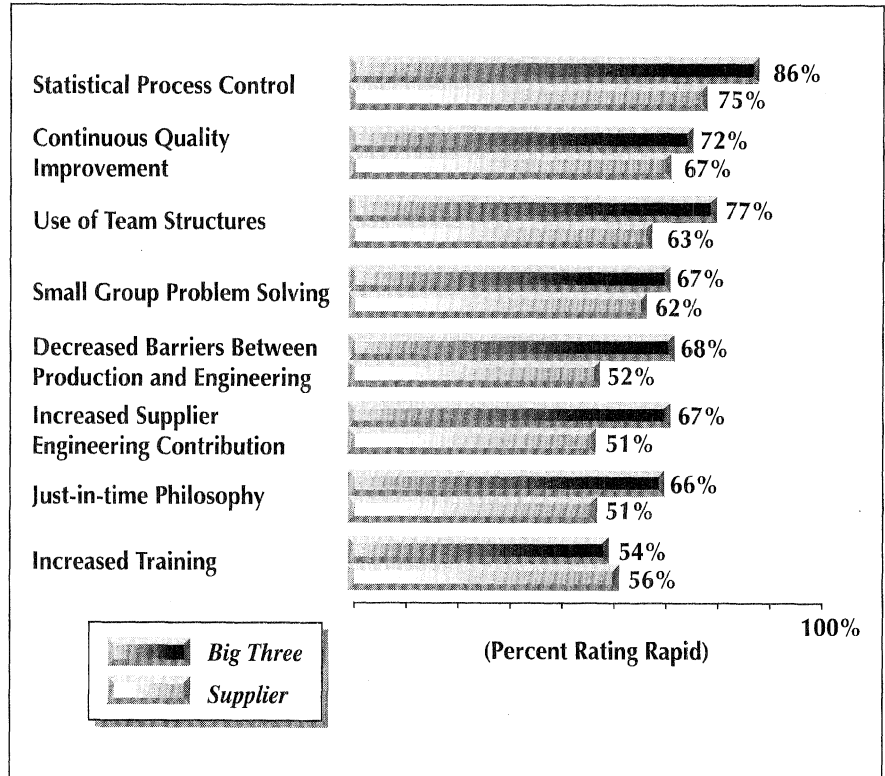
- Manufacturing: ten practices, including statistical process control, JIT, CIM, flexible manufacturing systems, and continuous quality improvement
- Human Resources: five practices, including use of team structures, increased training, and group problem-solving
- Communication/Structure: three practices, including decreased barriers between manufacturing and engineering, and increased empowerment of program managers
- Suppliers/Sourcing: sixteen practices, including early supplier selection, evergreen contracts, common industry standards, supplier engineering contribution, partner-like relations, and tiering of the supply base
- Cost: four practices, including use of process value analysis and viewing labor as a fixed versus variable cost

### Manufacturing

The overall average pace of manufacturing change action implementation is rated by respondents as "neither rapidly nor slowly." From a total standpoint, the ratings show little differentiation on the pace of change across the range of possible actions. But some differences appear in this category; in fact, there are more pronounced differences than in the other categories. The change practices (as shown in *Chart 3-1*) rated most rapid are as follows:

- A full 78 percent of all respondents rate statistical process control (SPC) implementation pace as "rapid," with 86 percent of the assemblers reporting rapid SPC implementation. (SPC was given the most rapid implementation rating of *all* 38 actions.)
- Continuous quality improvement ranks second with almost 70 percent of all respondents rating implementation pace as rapid.
- JIT ranks as third in implementation pace with approximately 55 percent of respondents reporting rapid or quite rapid adoption.
- All remaining transition efforts in manufacturing are rated by 50 percent or less of total respondents at even a "moderate" pace of implementation. These

*Chart 3-1: Most Rapid Pace of Implementation (Individual Companies, All Categories)*



The overall average pace of manufacturing change action implementation was rated by respondents as “neither rapidly nor slowly.”

include design of experiments, use of manufacturing cells, quality function deployment (QFD), increased process automation, and use of standardized components. The only exception is QFD which is rated by 63 percent of *assemblers* as moderate in implementation pace.

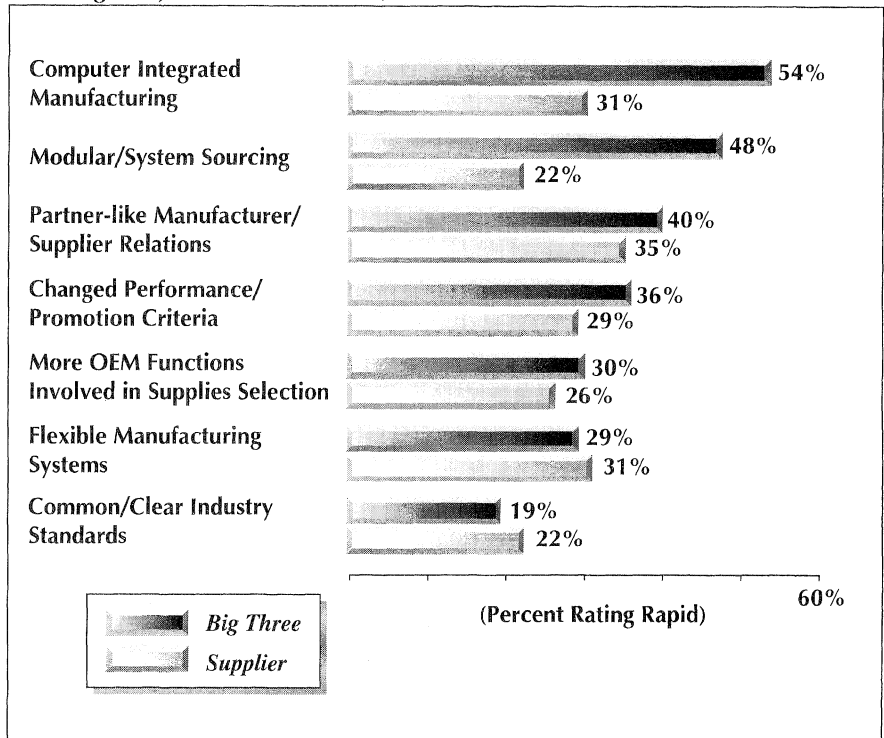
The views of top executives in our interviews were consistent with those of survey respondents. All interviewees felt that it is necessary to continuously improve in the areas of cycle time, cost, quality, and customer satisfaction. This will ultimately change how the industry currently does business in categories ranging from product development and manufacturing, to business decision making.

Top executives view the quality gains experienced by the Big Three and their supplier network as illustrating the industry’s ability to be successful when an entire company mobilizes to focus on a goal. One respondent identified adequate education and training as a key reason for success in this change effort. Team Taurus and Chrysler’s LH program were cited by both OEMs and suppliers.

When asked what standard practices and procedures must be changed to help companies more effectively respond to their customers, qualitative research participants identified the need for automation as a means to reduce response time as well as engineering and development time.

As *Chart 3-2* shows, the two manufacturing systems and technology areas, computer-integrated manufacturing (CIM) and flexible manufacturing systems, have the lowest *average* rate of implementation. Almost 70 percent of all respon-

**Chart 3-2: Least Rapid Pace of Implementation (Individual Companies, All Categories)**



Five out of eight change actions show linkage to the future success factor, "effective use of human resources."

dents see these efforts being implemented relatively slowly in their companies. However, assemblers report substantial differences versus suppliers in pace of implementation.

- CIM is one of two areas where assemblers show a substantially faster rate of implementation; the other area was QFD.
- JIT is rated at a somewhat more rapid pace of implementation by assemblers.
- Suppliers report their pace of implementation *exceeds* assemblers in two areas: use of manufacturing cells and process automation.

**Human Resources and Communication/Organization Structures**

Eight change efforts are included in these two category sets—and, again, the average rating for all respondents across all efforts is tightly clustered between “somewhat rapidly” and “neither rapidly nor slowly.” Clearly, the pace of implementation on these practices, though they are known to be important (and some have been in use for some time), is nowhere near the pace one would expect.

- The most rapidly implemented practice is “small group problem-solving activities.”

- Related efforts rated at a decidedly moderate pace include: use of team structures, increased training, and improved communications across levels and departments.
- Implementation of structural change practices are slowest of all: self-directed workforce, empowerment of program managers, and changed performance and promotion criteria reveal the slowest pace of implementation.

There are few differences between assemblers and suppliers in their rankings on the pace of implementation of factors in these two categories (human resources and communications), but assemblers on the whole report their companies' pace of implementation is slightly more rapid than suppliers.

The pace of implementation of human resources and communications efforts is directly related to an effective information exchange between senior management and employees regarding personnel policies. Top executives in personal interviews felt that, generally, existing personnel policies are communicated with an appropriate amount of contact and information exchange.

**Structural change practices—self-directed workforce, empowerment of program managers, and “changed performance and promotion criteria”— experience a slow pace of implementation.**

The qualitative research findings support the survey data in that the majority of participants believe that policy execution and dissemination needs improvement. Only in a few cases did participants feel that personnel policies were executed and communicated in a satisfactory manner, and that problems lie in channeling communications both top-down and bottom-up.

#### *Suppliers/Sourcing*

This category of transition efforts has the distinction of receiving the *slowest average overall* implementation pace ranking by the total respondent group: just below “neither rapidly nor slowly.” And this category revealed *no* average rankings of “rapidly” for *any* specific change practice.

- Of the sixteen transition efforts included in this category, twelve are ranked at or very close to “neither rapidly nor slowly.” These include such practices as selection beyond price, partner-like relations, increased insourcing, more OEM functions involved in supplier selection, and common/clear industry standards.
- The two rated slowest in implementation are: increased OEM investment in suppliers, and personnel rotation between OEM and suppliers.

Despite the overall slow pace in this category, there are differences in the implementation pace among specific actions. And some show progress at a reasonable pace.

- The top ranked action is “increased supplier engineering contribution,” with just over half of all companies, and 67 percent of assemblers, reporting a somewhat rapid pace of implementation at their companies.

- Use of engineering firms is being rapidly implemented by 57 percent of assemblers and 94 percent of suppliers.
- Over 90 percent of suppliers and over 60 percent of assemblers are implementing early supplier selection at a *somewhat* rapid pace.

### **Cost**

Despite the recurring comments in the interviews and roundtable discussions about the importance of managing or reducing costs, actual practices do not appear to be as extensive or as successful as they might be. The survey showed a “neither rapidly nor slowly” pace of implementation on *all four* change efforts: use of process value analysis to reduce costs; activity-based costing methods, viewing labor as a fixed vs. variable cost (though assemblers are adopting this notion more quickly than suppliers); and reliance on a multiproduct capability. These actions are being implemented slowly by about 70 percent of respondents. In fact, most OEMs interviewed provide corroboration of the survey findings. They believe that their companies are not competitive in terms of cost, with the primary contribution being overhead.

### **Analysis: Linking Pace of Change with Future Factors**

The following presents a few examples of the initially identified significant relationships or linkages between future goals and the speed with which companies are progressing toward them. Linkage implies companies are making the connection between pace of improvement efforts and the desired changes, such that the importance of the changes is related to how rapidly they are being implemented.

### **People Issues**

For the future success factor “effective use of human resources,” five out of eight change actions show linkage. These include:

- Changing performance criteria
- Use of team structures
- Increased empowerment of program managers
- Group problem solving and better communications between manufacturing and engineering

Surprisingly, the change actions of increased training and improved communications across hierarchical levels do *not* link with effective use of human resources.

Other success factors—promoting risk taking, more fluid jobs, more knowledge-based jobs—do not link with *any* pace of implementation actions.

Almost all qualitative research participants indicated that there must be a major cultural change within their companies, and within the industry, in general. They emphasized that a major cultural break must occur from the traditional way of doing business to a new “team-work” approach. Companies must improve their training and education programs and embrace a philosophy that focuses well beyond

technical competencies, to people skills as well. Participants cited better human resources utilization, including a reduction in layers of management and a change from a functional power structure to a horizontally structured team environment. Additionally, many felt that the measurement systems for evaluating and rewarding people must be realigned to reflect new corporate goals and teamwork approaches.

With all that remains to be done in terms of cultural transformation, there is still a feeling among interviewees that dramatic changes in corporate culture through employee involvement ranks as one of the more important developments occurring in the industry.

### ***Supplier/Manufacturer Relationships***

In this category, there is some alignment of implementation pace and success characteristics but it is somewhat scattered.

- One of the most important future success factors—supplier relationships *not* based on transactions (price)—is linked with the pace of implementing modular sourcing, sole sourcing, increasing use of engineering firms, more OEM functions involved in supplier selection, partner-like relations, and development of common standards.

There is much discussion in the industry today of partnering relationships between manufacturers and suppliers. Senior auto industry executives, when asked in roundtable discussions to list key ingredients to an effective partnership between a manufacturer and supplier, cited mutual trust as the most important factor. Additional key factors include: long-term commitment and/or contract; continuous two-way communication; reward other values beside price, (i.e., delivery, quality, and flexibility); and the use of teamwork to resolve problems.

The specific issues they gave as potential barriers to forming successful partnerships include:

- Shifting OEM emphasis on cost reduction and the methods of implementing these often destroy teamwork and trust.
- Policies are frequently undercut by a lack of guidelines for daily operation.
- Some U.S. suppliers are not equipped with extensive capabilities in engineering and development, project management, and purchasing.
- Failure to share risks and rewards.
- Suppliers do not always assure the quality of their process.

There are two general models available for supplier selection. The market selection model prescribes that the customer company routinely scan the market for price, quality, and technology opportunities, and select a supplier base that provides the best value at any particular time. The other model, the development (socialization) model, prescribes that the customer company largely commit itself to a supplier base and work with that base to develop price, quality, and technology opportunities.

According to our supplier interviews, there is full agreement that the Big Three have historically taken the market model approach, while the Japanese manufacturers and the NAMs have practiced the development approach. The development model was unanimously viewed as the better of the two approaches. Supplier executives believe that there is very little risk to using the development model approach. The risks associated with taking the market selection model approach are the loss in quality as a result of taking immediate price reductions, and the damage to the long-term viability of the suppliers.

### **Transitioning Toward the Future**

When asked about transitions or changes companies must make to be competitive in the year 2000, key industry executives discussed their views in reaction to a list of challenges presented to them. Most answered for their company as well as the industry.

- From individual to team orientation, evaluation, and reward structures: According to respondents, this was ranked as one of the top transitions companies must make industrywide to not only achieve leadership status, but to survive the decade ahead. Again, respondents emphasized the need to match evaluation and reward structures to facilitate the movement toward team efforts. This relationship is lacking in our survey results.
- From reliance on formal structures and procedures to informal relationships and behavior: Responses to this transition scenario were highly consistent. The majority felt that such a change in attitude was indeed necessary; however, they consistently echoed caution since a lack of formality might possibly lead to a lack of focus. A balanced mix of formality and informality must exist to remain competitive.
- From management control to management coordination: Ranked as a high priority by all respondents, some felt that this transition must reflect more than just coordination. Management must also provide the necessary leadership and vision.
- From management of people and tasks to management of information and knowledge: Viewed as a critical transition by some respondents, some also felt that this was not “an either/or” decision. The majority believe that to some degree this transition is necessary, but not nearly as critical as some of the others that must occur.
- From relatively disconnected subunit or functional area goals to ones that are more coordinated with company goals: This transition is also ranked as one of the highest in terms of those that must take place to achieve sustained success. One respondent termed it as “essential to survival.” Overall, respondents felt that success is more attainable when all people are striving for a common goal.



- From decisions based primarily on quantitative information to decisions incorporating more “soft” or qualitative information: This transition was listed as one of the least critical that must take place to remain competitive. While respondents did not discount the value of “soft” issues, most felt that striking a comfortable balance of “hard” and “soft” issues is the key to successful decision making, and most believe that this balance has already been or is close to being achieved.
- From relatively restricted, need-to-know, to relatively broad, should-know communication patterns: Ranked high as a transition that must occur, this scenario is felt to be an essential part of the team-building experience and to focusing an entire company on a common goal.

### **Relationship of Competitiveness to Change Implementation**

As automotive companies strive to implement programs and practices that would make them successful in the year 2000, their pace of change implementation is critical. The analysis presented earlier in this chapter showed that priorities for improvement were perceived to be common across a wide range of issues. In this section we analyze the relationships between self-rated competitiveness and the pace and focus of change implementation. To assess the relationship of perceived competitiveness of respondents’ companies and their pace and focus of implementation, we divided them into three groups: high, medium, and low competitiveness. This was done by creating and testing an index of eleven items selected from each of the four categories, management, engineering, manufacturing, and marketing.

#### ***Relative Competitiveness and Rate of Implementation***

As we analyzed companies’ competitiveness relative to self-reported implementation rates, we used a five-point scale on the questionnaire which ranged from 1 (quite rapidly) to 5 (quite slowly). As the table below indicates, on several key activities there is a clear correlation between high competitiveness and a rapid pace of implementation. Those companies grouped as medium and low competitiveness reported slower paces of implementation, on average. Indeed, the pace of implementation declines from high to medium—and medium to low. The relationship was most pronounced for *continuous quality improvement techniques*, and *increased training*.

This high degree of internal consistency in the data lends credence to the self-assessments of competitiveness. As more productive management practices become standard or even a benchmark, those firms that are slow to implement it cannot hope to compete effectively.

#### ***Relative Competitiveness and Focus of Improvement Efforts***

Another relationship tested in this analysis was competitiveness and the focus of improvement efforts. Using a scale from the questionnaire where 1 is “extensive” and 5 is “no focus”, respondents rated the focus their company has placed on 20 improvement actions or initiatives. Strong effects are shown with more competitive companies reporting more focused improvement efforts.

<b>Implementation Pace Among Different Competitiveness Groupings</b>			
	High	Medium	Low
Continuous quality improvement techniques	1.6	2.3	2.6
Increased training	2.0	2.4	3.0
Improved communication levels across hierarchical companies	2.0	2.4	2.8
Use of process value analysis	2.5	2.9	3.4
Supplier engineering contribution	2.2	2.5	2.9
Personnel rotation between OEMs and suppliers	3.7	4.2	4.4
Involvement of more OEM functions in supplier selection	2.8	2.9	3.4

<b>Improvement Focus Among Different Competitiveness Groupings</b>			
	High	Medium	Low
Stable rewards	2.8	3.5	3.7
Production teams	2.3	2.8	3.0
Leadership skills	2.3	2.8	3.2
Technical skills	2.3	2.7	3.1
Career ladders for production employees	3.0	3.6	4.2
Increased amount of communication to employees	1.9	2.2	2.5
Expanded communication to reach more employees	2.0	2.3	2.6

**Barriers to Change**

Our analysis testing correlation between competitiveness and barriers to change did not yield definitive results. Companies in the “low competitiveness” group did indicate that certain barriers impeded their change efforts to a somewhat greater degree. Some of these barriers were *short time horizons*, *shifting emphasis on different change programs*, and *lack of clear vision*. Nevertheless, no significant correlations between relative competitiveness and barriers could be discovered.

**Commentary and Conclusions**

Perhaps the rapid pace of adoption of SPC, JIT, and continuous quality improvement is no surprise. They are generally understood as “the basics”—the most essential starting-point tools in the manufacturing improvement kit—and implementation of these practices has been mandated for some suppliers by the assemblers. The slow implementation of practices such as use of manufacturing cells and use of standardized components was discouraging and surprising to see.

**The rapid pace of adoption of SPC, JIT, and continuous quality improvement is no surprise—they are generally understood as “the basics.”**

The pace of change efforts in the human resources areas is moderate, and team-oriented practices are being implemented. Unfortunately, reward structures and program manager empowerment are lagging. This could have negative implications on companies' abilities to implement process management—a key aspect of the future vision.

Sourcing and supplier relations need serious attention to improve the speed with which both assemblers and suppliers implement change efforts. (Assemblers see a somewhat more rapid pace of implementation on an overall basis.) Suppliers see a faster pace of change in early supplier selection than do assemblers, but (not surprisingly) suppliers are less optimistic about the speed at which supplier selection criteria are moving beyond price as the primary driver. Because these issues are important to the development of a solid, strong automotive industry infrastructure, they are both profound and far-reaching in terms of the future competitiveness of the industry. Such meandering movement toward improved ways of working together does not bode well for the U.S. auto industry.

While self-rated competitiveness does not appear to relate to views and vision of the future, it does correlate with the pace of implementation efforts and the focus of change. Although it is possible that inflated reporting is occurring consistently among the survey respondents it would seem unlikely. Our analysis shows that companies with high relative competitiveness were demonstrably different on a number of important dimensions: their pace of implementation was faster, and their degree of focus on improvement initiatives was higher.

In spite of agreement on operating success requirements for the year 2000, the pace of change is not necessarily aligned with achieving goals or objectives. Some actions appear to be leading toward goals, particularly with regard to people issues, but patterns often seem random. Encouragingly, the pace of implementation on teams, group problem-solving, and communication does appear to connect with important future success factors.

**In spite of agreement on operating success requirements for the year 2000, the pace of change is not necessarily *aligned* with achieving goals or objectives.**

There is linkage between more lasting, relationship-oriented transactions with suppliers and actions like modular sourcing, sole sourcing, and more OEM functions involved in selection. But the connections are not present on most of the manufacturing/supplier future factors. It would be difficult to support the argument that the pace of implementation of change actions is linked in any fundamental way to the future success factors related to manufacturer/supplier relationships.

The inconsistencies in the relationship between OEMs and suppliers becomes more pronounced when top executives, in roundtable discussions, show strong divergence about whether their company needs to change its source selection criteria and business practices with its suppliers. Interestingly, the OEM respondents feel that the selection criteria are appropriate. Cost (not price), quality, and technical capability are the most frequently mentioned selection criteria. However, they do see a need to improve the business practices of dealing with the supplier network, particularly in the area of two-way information exchange. Suppliers, however, do not necessarily agree that the selection criteria are consistently applied.

The supplier respondents say that there is still too much emphasis being placed on price. Decisions are being made with an exceedingly short-term orientation, thereby ignoring their long-term implications.

In conclusion, change is indeed occurring, but movement is clearly uneven and generally at what one might call "a plodding pace." For the most part, assemblers see themselves adopting change practices more rapidly than suppliers. There is no clear explanation for this difference. It is unclear whether assemblers are, due to their size and resources, ahead of the suppliers in implementing change, or are simply more optimistic observers of their own progress.

Distinguishable linkages between actions and results are lacking. Clear paths, identifying objectives and the steps to reach them, are essential. Lack of clear paths to the future slows progress—and adds confusion for the workforce, suppliers, and external audience.

# CHAPTER 4

## FOCUS ON IMPROVEMENT EFFORTS AND BARRIERS TO CHANGE

### **Introduction**

In this chapter we look yet another level deeper into the change process, and analyze the *focus* placed on various improvement efforts, and the *barriers* car company respondents feel they most frequently encounter. We additionally analyze some linkages between improvement effort focus and frequently encountered barriers. We conclude with a brief discussion comparing “competitiveness” to success factors and change barriers.

### **Focusing on Improvement**

Twenty improvement efforts in our survey were grouped into four categories:

- Rewards
- Organization
- Human Relations
- Communications

The responses to all items, which could be rated on a five-point scale from “extensive” focus to “none,” are tightly distributed around the central rating of “moderate.” Once again, the set of responses is essentially undifferentiated, i.e., the variation in *how much* focus is placed on efforts is narrow. (This same phenomenon appeared in respondent ratings on pace of implementation of improvement efforts in Chapter 3, where the responses cluster tightly around the central response of “neither rapidly nor slowly.”) Just as pace of implementation is generally about equal and fairly slow, the focus on improvement efforts is roughly equal among various possibilities and is generally *moderate*.

In spite of the tight distribution of responses when viewed on a *total* basis, there are important differences between those efforts receiving the highest focus, and those receiving the least attention. *Chart 4-1* shows the most extensively focused on improvement efforts.

- The highest-rated response, with 69 percent of all respondents rating its focus as “extensive or quite a bit,” is increased *amount* of communication to employees.
- The second highest rated focus (66 percent) was on increased employee *involvement*, which closely relates to improved communications.
- A close third in the ranking (65 percent rating extensive/quite a bit) is focused on *expanded* communications to reach more employees.

It is clear that management places significant emphasis on communication and involvement. And the thread of strong communications and involvement continues, with the next four “quite extensive” areas of improvement focus all relating to teamwork: use of multifunctional and multilevel teams, use of multifunctional technical teams, use of production teams, and shared decision-making. However, the story is not quite complete without looking at areas rated as most limited in focus by the manufacturers and suppliers.

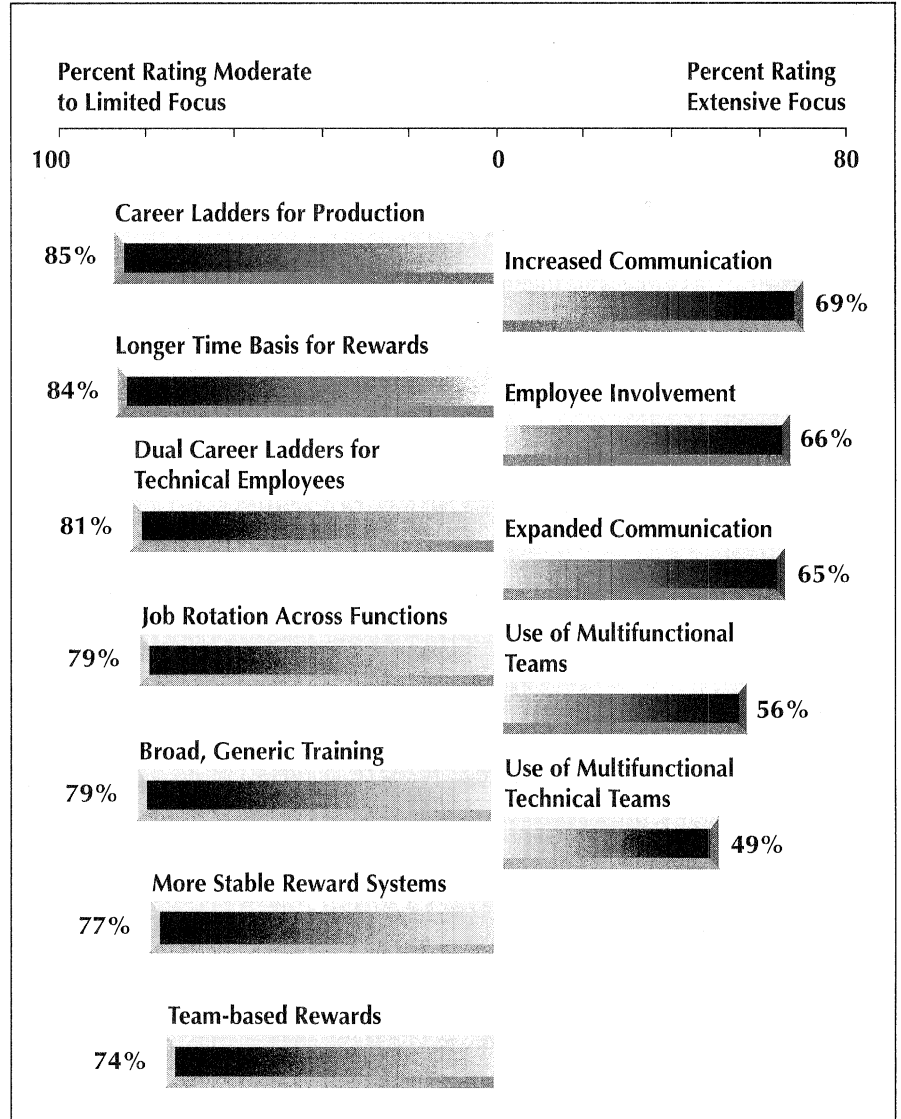
**Improvement areas that receive the most *limited* focus all relate to the areas of reward and career development.**

The six improvement areas that receive the least focus, *all* relate to the areas of reward and career development. Where as many as 60 percent to 70 percent of the respondents rated communications and teams as “quite extensive” areas of focus, only fifteen percent to 25 percent rate career and reward actions as targets of substantial focus.

- A full 85 percent rate career ladders for *production* employees as receiving moderate to limited focus.
- Eighty-one percent rate dual career ladders for technical employees as moderate to limited focus.
- Respondents give rewards relatively *low* focus: moderate to limited focus was reported by 74 percent or more respondents on longer time basis for rewards, more stable reward systems, and team-based rewards.
- Similarly, 79 percent rate both job rotation across functions and “broad, generic training” as moderate to limited focus.

The responses of the manufacturers and suppliers are not significantly different, though in most instances suppliers show a somewhat lower focus on improvement efforts. Manufacturers report substantially more extensive focus on shared decision-making. There are, however, four (out of 20) notable exceptions where suppliers report a more extensive focus. These include job-focused training, career ladders for production employees, expanding reward structures, and more stable reward systems.

Chart 4-1: Focus on Improvement Actions



In personal interviews and in roundtable discussions, top executives discussed their perspective on what major changes the automotive industry needs to make in its commitment to and development of its employees. They commented on the adequacy of current levels of training and spoke about whether lateral movement and cross-functional assignments are adequate for organizational needs and individual employee career opportunities.

The message was echoed by every participant: the automotive industry must illustrate a commitment to its people by taking steps toward making major changes in its training and development efforts. Specifically, the two areas of skills training requiring the most focus, according to respondents, are oriented to technical and interpersonal issues. Many respondents believe that if OEMs expect to improve their competitive position, all levels of the workforce need to receive increased training in the “soft” skills such as reconciling conflict, facilitation, group decision

making, and mentoring. Without such training, there is little chance of developing cooperative working relationships among managers, workers, and/or suppliers.

Senior executives interviewed are concerned about the growing shortage of qualified engineers within the automotive industry. Early retirements and a wide age gap among the industry's engineers require an increased effort in technical training to ensure long-term viability. Some believe that a shortage of over 350,000 qualified engineers will exist by the end of the decade. Moreover, 50% of the industry workforce will retire by the end of the century. As new technology is introduced into the marketplace, the need for technical training accelerates. An increase in apprenticeship programs is felt to be an excellent way in which to increase the skill level of the hourly workforce.

The key to developing cooperative working relationships among managers and workers starts with good performance review programs. Some believe that such programs provide an excellent opportunity for managers to work with their people in an effort to evaluate their desire to remain with the company as well as to establish appropriate career paths. Not only does this relationship-building exercise help to boost employee morale, but it identifies potential training needs, allowing for logical lateral transfers as well as technical career paths that are often compensated comparably to management paths. Further, it reinforces the desired behavior and establishes expectations.

Although the benefits of lateral moves and cross functional assignments are recognized by all respondents, some believe that the current pace and duration of new assignments outweigh benefits because they are too disruptive and lack a proper development period. In some cases, respondents felt that the current pace and duration of new assignments is inadequate and needs to be increased.

On the issue of job security, the message was repeated in interviews many times: OEMs tend to have a short-term focus resulting in a visible lack of commitment to its workforce. This problem has been complicated by the latest downsizing efforts made by companies in their struggle to remain competitive.

### **Barriers to Change**

Identifying and understanding those barriers which are more frequently encountered, and more serious, can help in implementing improvement efforts, setting expectations, and measuring progress.

Our survey listed 26 typically encountered barriers, and grouped them according to topical categories:

- Business Systems—barriers related to identification and measurement of change
- Strategy Implementation—barriers related to planning, timing, and communication



- Management/Leadership—barriers related to management actions
- Culture—barriers related to existing structure and behavior

When questioned on the frequency with which barriers have impeded efforts to become more competitive, again, the average responses show little variance by individual barrier. Responses are tightly clustered around the central response choice: “sometimes.” (Response choices ranged on a five-point scale from “very often” to “seldom.”)

The survey also asked respondents to rate the seriousness of barriers encountered. Our analysis showed significant and strong linkage between these ratings for frequency and seriousness. (Strong linkage between frequency and seriousness may imply they are different dimensions of the same underlying event.) In any case, analysis showed that the more frequent the barrier, the more serious the barrier. And this was true for all 26 of the barriers presented.

**Business as usual, or the effect of status quo, is rated the most frequently encountered barrier.**

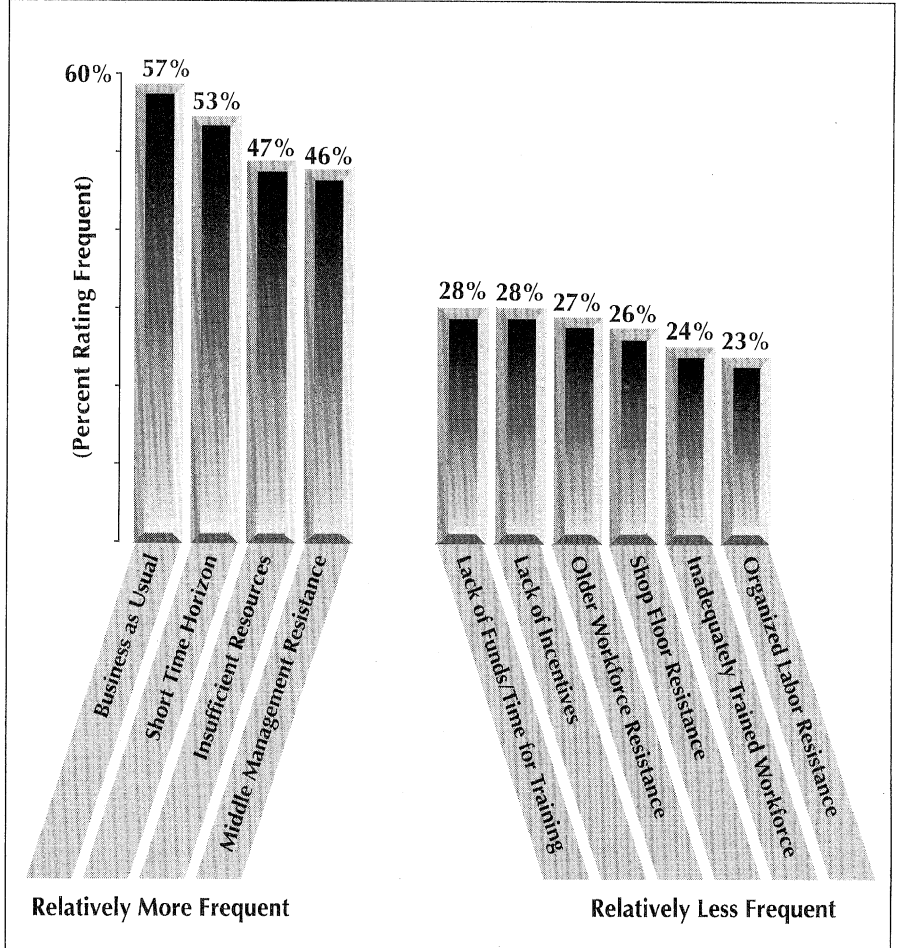
Again, in spite of the tight clustering around “sometimes encountered” for all barriers, the differences are important to highlight. The percentage responding with “very often/fairly often” responses range from a high of 57 percent on “business as usual” to a low of 23 percent on “resistance of organized labor.” It would appear that few barriers are seen as either overwhelming or nonexistent. (See *Chart 4-2*.)

- Business as usual, or the effect of status quo, is rated the most frequently encountered barrier (and the most serious), with 57 percent of respondents reporting very/fairly often encountered.
- Short time horizon for management decisions is rated second with 53 percent rating it very/fairly often encountered.
- Middle management resistance is rated by 46 percent of respondents as a very/fairly often encountered barrier.
- Insufficient resources are rated by 47 percent of respondents as frequently encountered, followed closely by the related barriers of inadequate time required for change and failure to implement a planning process for change, both of which are rated high by 40 percent of respondents.

Some barriers that receive considerable industry attention and discussion are actually among the lowest barriers:

- Organized labor resistance
- Shop floor resistance
- Older workforce resistance
- Inadequate funds and/or time for training
- Failure to provide incentives for change

Chart 4-2: Barriers Which Impede Change



It would appear that few barriers are seen as either overwhelming or nonexistent.

The differences between manufacturers' and suppliers' views on barriers are not substantial. In general, all barriers are rated as *less frequent* (and serious) by suppliers.

One of the most interesting aspects of these responses on barriers is their apparent unfocused nature. No category of barriers shows higher average ratings than other categories. For example, change effort inconsistencies with current reward structures are acknowledged by respondents as barriers, but not rated more frequent than other barriers—and incentives are rated relatively low. Often the ratings appear to be counter to conventional wisdom. For example, “difficulties in measuring the costs and benefits of change” are rated more frequent than “challenges to the existing power structure and authority relationships.”

Another barrier to change that has received considerable industry attention, but ranks low in terms of concern among top executives is how the industry will raise the capital necessary to finance the many investments required to accomplish important transitions over the next decade. Qualitative research participants from the Big Three say that they would use only internally generated funds, or retained earnings, to finance new projects in an attempt to avoid over-leveraging the industry. If debt is used to finance new programs and the products do not meet their expectations, serious problems will arise.

They also indicated that there would be more limitations on capital considerations which would make their investment trade-off decisions even more difficult. An interesting note to these responses is the recent offerings of new stock by Chrysler and Ford, as well as the recent sell to/lease back arrangement that General Motors has made for its Saturn equipment. Advanced R&D consortia are being formed to address costly new technologies that companies cannot afford to invest in alone.

The differences between manufacturers' and suppliers' views on barriers are not substantial. Suppliers do rate resistance of an older workforce as more frequent than do assemblers, and failure to involve employees was also rated more frequent by suppliers. Assemblers rate difficulty in identifying and measuring the benefits of change much higher than suppliers. In general, most barriers are rated as less frequent (and serious) by suppliers.

#### **Linking Focus on Improvements with Barriers**

It is valuable to understand how barriers relate to specific focus efforts so they can be anticipated and, thereby, more easily and quickly overcome. Linkage means that the greater the focus on particular improvement efforts, the less frequently certain barriers are encountered.

Management/Leadership barriers such as lack of top management clear goals, lack of clear vision for change, and lack of resources or incentives for change link to over 70 percent of the focus efforts. These types of barriers are less frequently encountered where overall improvement focus is strong.

On the other hand, barriers related to "cultural factors" such as resistance from older, shop floor, and organized labor, and challenges to existing power structures) link to only about 30 percent of the improvement efforts. Cultural barriers are not less frequently encountered even when improvement focus is strong. There are many isolated success stories of improved competitiveness in the industry. However, these are too old (Team Taurus) or isolated (Saturn) to prove that things have changed. Such improvements have not yet been institutionalized and embedded in the broader corporate culture.

#### **Comparing Success Factors to "Competitiveness"**

To correlate survey findings with an "objective or external measure" of competitiveness, OEM ratings of suppliers were used. While these might also in some sense be subjective, they are tied to business success. Once again, our interest is in determining if competitive standing or results are correlated with change efforts or barriers encountered. Public lists of suppliers who had received quality awards from the OEMs were used; the OEMs included were Chrysler, Ford, General Motors, Honda, Mazda, Nissan, Toyota and NUMMI.

Most OEM quality awards are based on points awarded during site visits for specified items under quality, cost competitiveness, and productivity. These multidimensional measures are used to rate suppliers. Our proxy of competitiveness, the total number of quality awards received by a supplier was summed, then divided by the number of eligible vehicle customers they reported. Since vehicle company

It appears the focus on communications and involvement of employees is not complemented by a focus on structural changes such as career development and reward systems.

awards are typically tied to a particular facility, suppliers often received more awards than the number of customers they reported. This resulted in the following breakdown of suppliers:

Level of Quality	Award Ratio	% of Survey Sample
Low	None	50%
Medium	Fewer than 3	35%
High	Greater than 4	15%

Some interesting patterns emerged from this analysis. For example, when asked how the successful car company of the year 2000 would differ from today, high quality suppliers were least likely to agree that it would *be managed more for a process capability basis than a purely results oriented basis*. So, it appears that although quality awards have been criticized for focusing too much on process, these high scoring companies are quite outcome-oriented.

When analyzing the importance of differentiating factors for vehicles in the U.S. marketplace in the year 2000, some opinion differences did emerge. High quality suppliers rated *technical features* as more important than low or medium rated suppliers. *Design and styling* was seen as more important by high and medium quality companies, as compared to low quality rated companies. This priority placed on technical and design aspects may point toward the basis of differentiation in the future.

#### ***Comparing Barriers to Competitiveness***

Using the same competitiveness groupings, we looked at the relationship between competitive standing and severity of barriers encountered. We found that high-and medium-rated suppliers had reported more *failure to properly implement a 'planning for change' process*. It might be that low quality companies have not done any planning for change. Oddly, the most resistance to change by organized labor or on the shop floor was experienced by the medium-quality companies. A possible explanation might be that the medium and high-rated suppliers have both tried to innovate, with the highs achieving more success, while the low-rated suppliers are slow out of the gate.

In addition, we looked at competitive standing and seriousness of barriers encountered. The medium quality respondents stood out as being most concerned about the seriousness of two barriers:

- Difficulty of identifying and measuring cost of change
- Shop floor resistance.

#### **Commentary and Conclusions**

Respondents' companies appear to lack sharp focus in their improvement efforts. Though communications are relatively more important, there are no clear "improvement effort" consensus leaders. Perhaps it may be difficult to distinguish and prioritize among the valuable and less valuable—not because management intends

it to be so, but because there are so many important improvements to accomplish. Companies appear to find it difficult to select a *limited* number of strategic, long-term improvement efforts—and apply substantial resources to them.

There are, of course, some good things happening. A clear emphasis on employee involvement and use of teams is apparent. Sharing knowledge, joint planning, and coordination of efforts among various departments and across formal organization lines is of primary importance to car companies today. This is promising, since the importance of communication and increased interaction throughout the organization can hardly be denied. And use of “quasi-organizational” groups that come together to share information and ensure a smooth flow of work among departments is most encouraging.

However, it appears the focus on communications and involvement of employees is not complemented by a focus on structural changes such as career development and reward systems. Without focusing on rewards and career opportunities, all the talk (communications) and team structuring in the world is likely to be only superficially effective and fail to provide its full benefits.

The tight clustering around “sometimes encountered” responses to such a long list of different barriers might indicate that respondents had experienced many barriers, in approximately the same relative frequency, and that they presented about the same level of seriousness or difficulty to overcome. But it more likely indicates that respondents have some difficulty (again) differentiating among barriers that are most challenging and damaging—and those that have less impact on actual achievement of improvement.

There is a paradox which management must face, and resolve, highlighted in the analysis of barriers. The top two rated barriers are “business as usual,” i.e., the tremendous power of status quo thinking, pressure, and behavior; and short time-horizon, i.e., you don’t have much time for a given improvement effort to deliver results. Thus the paradox: it takes time to make real change happen, and yet if things don’t change quickly the effort is likely to be forsaken or the rules of the game changed. This is a serious problem when attempting to achieve focused, sustained improvement.

Companies also face numerous other dilemmas as they seek to improve their competitiveness for the year 2000. When asked which of these dilemmas present particular problems at most North American OEMs and suppliers, top executives say that the following were the ones which presented the greatest challenges:

- Job security v. supplier partnerships is an enigma that requires striking a delicate balance for which there is currently no right answer. The OEMs can provide job security for their workers by insourcing work, but that threatens supplier partnerships. Conversely, outsourcing can strengthen supplier relationships, but threatens the OEM’s workforce job security. Clearly, a difficult balance must be achieved, because job security and supplier relations are both important to the OEMs’ improvement efforts.

**Respondents have some difficulty differentiating among the barriers that are most challenging and damaging—and those that have less impact on actual achievement of improvement.**

- The issue of individual vs. team rewards presents a problem in that companies understand that they must quickly move toward developing team-oriented reward and recognition programs, but not forget that team leaders are still essential to making these programs effective. One Big Three executive conveys a concern derived from personal experience: rewards and performance systems are tough to implement for group efforts, and yet there still must exist some type of individual recognition.
- The issue of employee morale vs. downsizing for efficiency is one that will not go away, as companies find that there is no end to paring down in terms of staffing. Clearly, companies must reduce their workforces to achieve cost efficiencies, but these appear to threaten morale. The key, say these executives, is having a safety net in place. People operate more effectively when they know that programs such as worthwhile evaluations, outplacement service, and the like exist.
- Putting the issue of long term goals v. short term necessities into perspective is key. Once it is identified, the strategy for responding to the challenges facing the industry in relation to the company's vision for itself must be communicated by senior management to all levels of the company.

There is an additional problem. "Business as usual" is seen as the major barrier, yet *less* extensive focus is placed on changing reward structures, such as expanding financial and nonfinancial rewards, team-based rewards, longer time basis for rewards, and more stable reward systems. In short, the very actions most likely to motivate changed behavior are not being implemented.

Similarly, a common thread can be found in the survey data, which shows the effect of status quo thinking as the most frequently encountered barrier to change, and the interviews with industry executives who cite resistance to change as the major barrier to changing their internal structure. The cultural resistance to change in the auto industry is further entrenched, after having functioned for so many years without the need to change. Other barriers to change were mentioned by these executives and follow in no particular order:

- Lack of resources (capital availability)
- Bureaucratic and administrative barriers
- Reward and evaluation system
- Divergence of goals from competing divisions
- Lack of communication of company expectations
- Lack of training and education
- Short term profit focus

However, it is positive and encouraging to see that the current emphasis on people does work. Involving people and creating a greater amount of interaction appear to provide return for the effort. For those companies indicating a focus on employee-related improvement efforts, our linkage analysis shows the frequency of barriers encountered is *lower*.

The interdependent nature of the way a company operates requires that major changes must occur in other functional areas for one's own to achieve its major goals and changes. In interviews, top OEM management gave their impressions about this question, and made it clear that the changes that occur within their functional areas are supportive of the company's goals and strategic priorities. The OEMs identified four areas in which major change needs to occur:

- Understand and respect other functions: an often mentioned change. According to respondents, accomplishing such change requires either cross-functional job assignments, or assignments to platform and other teams that are multi-functional and multi-level.
- Improve service to internal customers: Companies must encourage internal customer satisfaction initiatives across functional boundaries.
- Process flow analysis: Managers must take a close look at current processes and perform value analysis studies, and non-value-added functions need to be eliminated for better resource utilization.
- Change reward system to promote specific behavior: Unfortunately, most reward systems are geared more toward individual performance than a team orientation. Thus, they do little to foster anything but individual functional behavior and often subvert the benefits of taking a team approach.

**It is positive and encouraging to see that the current emphasis on people does work. Involving people and creating a greater amount of interaction appear to provide return for the effort.**

Those respondents indicating a relatively *higher* degree of focus on many improvement efforts, tended to report a relatively *lower* incidence of barriers across the board. This may be due to high intercorrelation among focus on general improvement efforts and barriers. However, companies cannot assume that "doing lots of things" works, because all improvement efforts do not affect barriers *equally*, and some probably have no effect. Our analysis of the relationship between "competitiveness" (as indicated by quality award receipt) and views on success factors and barriers to change showed some interesting perspectives, but no real patterns. This would seem to support the contention that improvement efforts have not been institutionalized in most companies.





# CHAPTER 5

## PRESCRIPTION FOR PROGRESS: BUSINESS PROCESS INNOVATION

**The way the automotive industry conducts business today has been ingrained by almost a century of tradition. It is just now beginning to understand that viewing its operations from an organizational process perspective can provide tremendous competitive advantage.**

### **Introduction**

The automotive industry faces many challenges, including eroding market share, rapidly changing customer demands, competition from world-class contenders, lack of workforce job security, and business processes that are often outdated, cumbersome, and costly. Each of these challenges offers significant opportunity to improve competitiveness.

The findings of this report indicate that to achieve true industry leadership, the car company of the future must radically advance its competitive and operating situation.

### ***Why This Prescription Is Imperative for the Industry***

The U.S. automotive industry needs to be dramatically improved if it is to be assured a competitive position in the global marketplace. As reported in our survey, the modest pace of implementation and lack of focused efforts occurring in the industry today are not sufficient for ensuring competitive success. In order to accomplish this, the car company of the future must invest in enacting dramatic change and business process innovation must be central to it. Business process innovation is no simple endeavor, but it does make the difference between playing catch up and becoming an industry leader.

The way the automotive industry conducts business today has been ingrained by almost a century of tradition. It is just now beginning to understand that viewing its operations from an organizational process perspective can provide tremendous competitive advantage. Therefore, the industry faces perhaps the greatest challenge, because business process innovation requires rethinking the way an organization conducts business. It requires a rediscovery of customer expectations and new revelations about how to provide them with value-added service.

In this chapter, we discuss business process innovation and why it is vital to the survival of the automotive industry, cite examples of successful efforts within and outside of the industry and, finally, review the steps and critical success factors necessary to achieve the kind of dramatic changes possible through this approach.

### **Business Process Innovation: An Approach to Enacting Dramatic Change**

Business processes are the activities that combine to produce specific outcomes for specific customers or markets, or specific internal users, e.g., the creation of a new product or service involves research, design, manufacturing/delivery, and marketing activities. Business process innovation (BPI) is an approach to reengineering major business processes so that they are driven not by an historical functional orientation, but by the outcomes required to drive down cost, improve responsiveness, and serve customers.

Each business process innovation initiative starts with a vision of the future state which encompasses how a company would take advantage of the most innovative technologies, organizational concepts, and process designs available if it were not constrained by its existing infrastructure. Such a vision requires an understanding of customer requirements and information technology and its enablement potential. It also requires bold imagination, strong conviction, a knowledge of what has been done by others, willingness to take risks and, of course, the leadership to communicate the goals and translate them into a compelling new reality. This vision contains statements of how the company is to operate, descriptions of business performance and principles, the flexibility and integration of technology, and organizational empowerments.

Once this vision is formulated, reengineering of the targeted process begins. Reengineering involves describing the new process and technology, and redefining the organization so that the redesigned process may be executed properly. To reach this level of definition, customer requirements, both internal and external, are documented, roles and responsibilities assigned, benchmarking for innovative ideas performed, and technology enablers and trends researched and evaluated.

A prototype is created to test the feasibility of the reengineered process and environment. Additionally, a cost/benefit risk analysis and transition plan are developed to outline the activities and phasing necessary to achieve the future state.

The cost/benefit/risk analysis describes the investment required, the projected benefits, and the corresponding risks which together illustrate how well the team is able to meet aggressive objectives established by senior management. The targeted objectives are typically ambitious to drive innovative thinking and achieve an accelerated pace of improvement. Examples of ambitious objectives are:

- Reducing working capital requirements by a factor of four. For instance, if a company currently requires \$50 million in working capital to run its business (inventory, accounts receivable, etc.), a fourfold improvement would translate into freeing up over \$36 million which can be invested in bringing new products to market or upgrading manufacturing facilities.

**Reengineering involves describing the new process, and redefining the organization so that the redesigned process may be executed properly.**

- Shrinking product development lead time by a factor of five. For example, reducing a company's unspent time to market of 44 months (good by today's U.S. standards) to 9 months would result in enormous benefits in terms of increased revenue, flexibility in reacting to market and competitive needs, and reduced costs. In most cases today, it could mean the difference between survival, success or failure.
- Improving customer order to cash in time, quality, and cost by a factor of ten. For a company which currently has a true cost of \$1500 per order and an order to cash cycle time of 100 days, this would result in a new order cost of \$150 within a cycle time of 10 days. For a company that write half a million orders a year, this would mean a staggering cost reduction of \$675 million.

The decision to launch a reengineering effort and establish aggressive objectives can be rooted in several factors:

- Customers demand better service
- Fierce competition resulting in decreased margins and reduced revenue
- Deterioration of financial performance
- Bloated cost structure
- Visionary leadership

**If an organization reaches the point at which it can no longer sustain a competitive improvement rate with a current process, the process must be redesigned.**

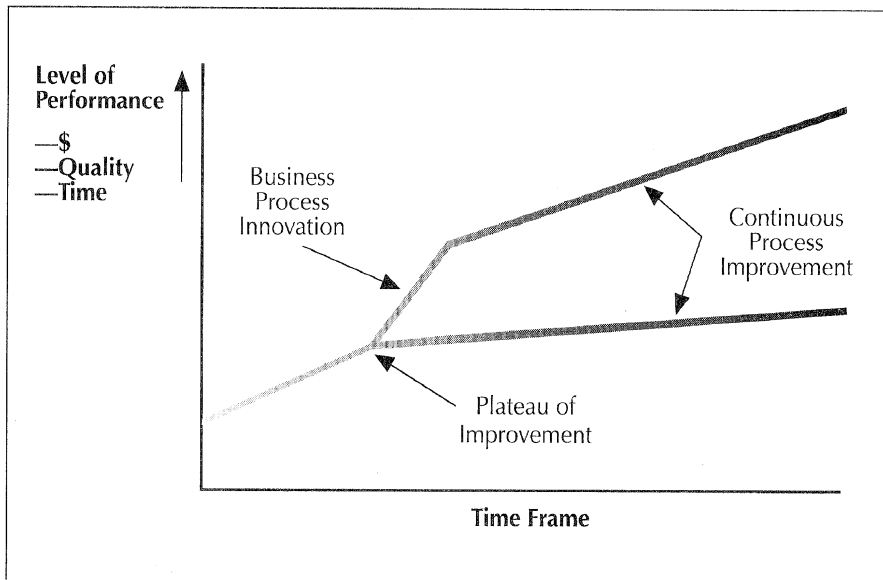
A reengineered process that achieves such objectives is the true competitive advantage.

#### **Examples of Successful BPI Efforts**

A number of companies have achieved quantum change through reengineering efforts. They have moved past improvement to innovation and beyond, obtaining incremental gains to realizing dramatic advances. Examples of such efforts include:

- A large automotive supplier institutes a concurrent engineering process that cuts the time it takes to develop a new product from 20 weeks to 20 days and increases customer acceptance threefold.
- An electrical utility redesigns its overall procurement process, collapsing the time to execute a standard purchase order from 15 days to a half day, and reducing the cost of the transaction from \$90 to \$10.
- An international equipment manufacturer reengineers all elements in its sales-to-collection processes. New processes are documented, prototyped, validated and the future state includes identification of immediate quality time, and cost improvements that help reposition the company in its marketplace.

Chart 5-1: Quantum Leap Improvements Through Business Process Innovation



Suppliers will continue to play a substantive role in the product design process. This has both positive and negative implications. They must become more involved in the design process to better position themselves for obtaining new business, to illustrate product knowledge and innovative capabilities that will, ultimately, create a better product.

These companies have taken a dramatic step forward. They have achieved quantum change in the fundamental way that they do business and, most importantly, they have redefined the way they meet the needs and requirements of their customers.

**Taking A Process View Offers Dramatic Possibilities**

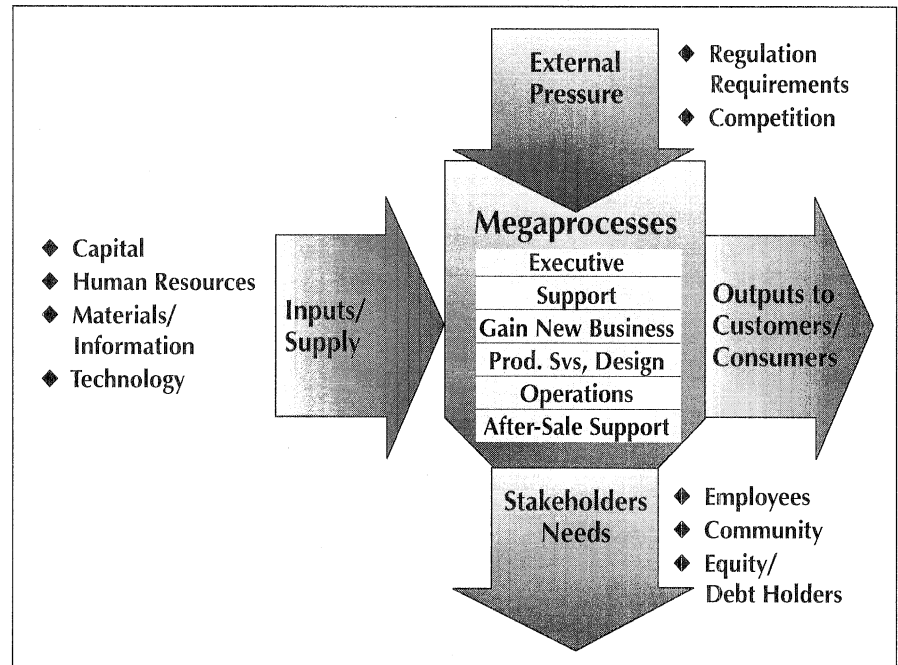
How does one move forward into business process innovation? The first priority is to thoroughly understand the processes that are inherent to the organization so that key processes for reengineering can be targeted. Most companies manage their processes vertically to accommodate the organizational structure of the business and functional units. Yet, most processes actually flow horizontally across functional departments and business groups and even out to external organizations. It is the reengineering of these processes across functional lines that will allow the car company of the future to achieve improvements of quantum magnitude.

Many of the problems the industry faces do not yield sufficient gain from tactical improvements or even continuous improvements. Continuous improvement, however, does provide the foundation for business process innovation. As illustrated in *Chart 5-1*, continuous improvement efforts can result in progress. If an organization reaches the point at which it can no longer sustain a competitive improvement rate with a current process, that process must be redesigned. This juncture, the plateau of improvement, provides the starting point for business process innovation. Continuous improvement, ultimately, will support improvement of the redesigned process as well.

Following are the overall business processes, or megaprocesses, that exist in most companies, as they appear in the automotive industry (See *Chart 5-2*).

**Executive processes** deal with decision making, the overall direction of the organization, and the strategic vision for five to ten years into the future, including strategic planning. Executive support systems, decision support systems, and cash management are integral to these processes.

Chart 5-2: Process View: Enterprise Business Process Model



Once a basic understanding of the major processes is achieved, it is time to begin targeting specific sub-processes for improvement.

When this step is undertaken, it is important to consider the scope of each process, its overall "health," strategic relevance, and the associated change management issues.

**Support processes** relate to human resources and activities that deal with finance, including how books are closed and how the general ledger and various financial statements are generated.

**Gaining new business** involves the way in which an organization obtains new orders from customers. In the automotive business, for example, this process relates to how orders are generated from customers and how these orders are then translated into dealer orders, production plans, manufacturing requirements, and allotments and allocations. These are then converted into assembly schedules, supplier orders, receipts of material, invoices, and cash.

**Product /service design processes** include the design of new products and the process by which customer requirements are captured and understood. This includes programs such as General Motor's "Mona Lisa," for example, which breaks down competitive products, performs value analysis on those products, and then proposes possible changes to current and future product. It is, in essence, the entire stream of new product development activity—Ford's "world-class timing effort," General Motors' "four-phase process," Chrysler's platform development teams, and Nissan's heavyweight manager approach. Understanding the total approach requires taking a closer look at its key components: the teams, the individuals, the length of time involved, the steps, and the exit criteria.

Suppliers will continue to play a substantive role in the product design process which has both positive as well as negative implications. They must become more involved in the design process to better position themselves for obtaining new business, to contribute product knowledge and innovative capabilities which will, ultimately,

create a better product. However, investment in people and tooling can put a strain on supplier resources creating a vulnerability to historical OEM practices of essentially complete internal control over product development.

**Operations** address how a product is manufactured and how an organization interfaces with its suppliers. It addresses the amount of time it takes to convert a manufacturing process from producing or assembling one part to another—the changeover time. It also addresses lead time—the amount of time it takes to produce a part from inception to delivery.

**After-sale support** deals with jobbers, distributors, dealers, and warranty issues. It includes how orders are received from the after-market environment and converted into parts requirements for distribution centers or suppliers as well as how a product is ultimately shipped and billed.

Once a basic understanding of the major processes is achieved, it is time to begin targeting specific sub-processes for improvement. When this step is undertaken, it is important to consider the scope of each process, its overall “health,” strategic relevance, and the associated change management issues.

**Identifying major cost drivers, understanding customer requirements and, finally, defining and building on core competencies are all considerations an organization must make when targeting processes.**

#### **Identifying Targeted Processes**

It is critical to analyze core competencies, strategic intent and priorities, and the competitive environment in order to analyze those process which can be leveraged. This analysis provides the starting point for business process innovation. A number of additional issues must also be addressed: the customer, competition, and external marketplace.

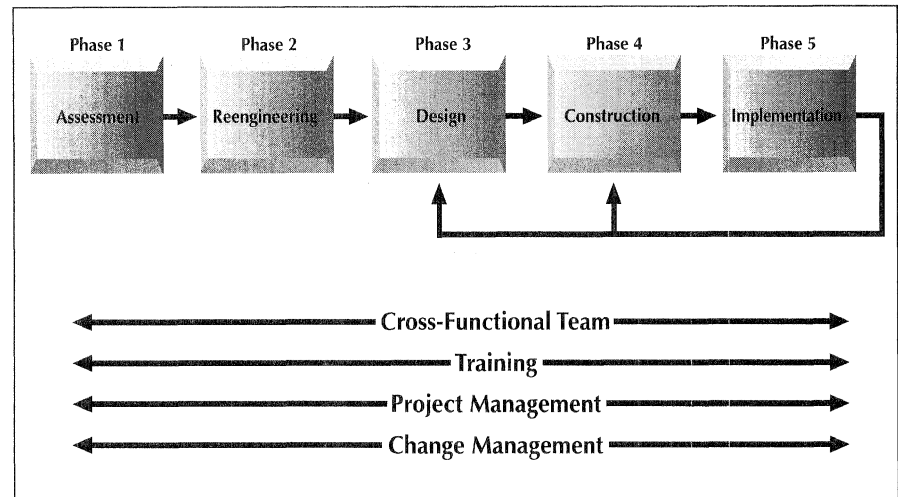
Because the automotive industry operates within a highly competitive, customer-driven marketplace that has become extremely sophisticated, the organization’s view of the external marketplace is critical to identifying customer needs. One major advantage of reengineering a business process is that a customer focus can be built into the redesigned process. Vital to this endeavor, however, and one of the key efforts that an organization must make as it targets a process, is to ensure that these quantum improvements are visible and provide value to the customer. A second area of consideration is the cost of doing business. Identifying major cost drivers, understanding customer requirements and, finally, defining and building on core competencies are all considerations an organization must make when targeting processes.

#### **The Phases of Business Process Innovation**

The following section highlights the five phases of business process innovation: assessment, reengineering, design, construction, and implementation. (See *Chart 5-3*.) The keys to a successful reengineering effort include:

- Senior leadership must have the vision and commitment.
- The buy-in strategy must be planned and initiated early.

Chart 5-3: An Approach to Process Innovation



- Cost/benefit/risk analysis must be thorough.
- Team structure and integration is crucial.
- Information management capability is important, but organizational change management is key.

### Phase 1: Assessment—Setting The Improvement/Innovation Agenda

A project team—consisting of cross-functional leaders—identifies the nature, extent, and pace of change required to meet customer, competitive, regulatory, and stakeholder requirements. All relevant options are considered, from expanding to downsizing, diversifying to retrenching, building new capabilities to outsourcing. Typically, a number of immediately actionable process improvements are identified along with process innovation targets.

### Phase 2: Reengineering

The project team creates a vision of the future state of the business processes targeted for innovation. This then is translated into a process design incorporating technology enablers, reengineered work flows, skill requirements, and performance measurement/reporting systems. New organizational designs are developed that support the reengineered processes. The future state plans and designs are tested to ensure they will actually work. Based on an evaluation of current process flows, technology, organizational structures and culture, and performance outputs, a transition plan is developed.

### Phase 3: Design

Elements are specified in detail: new policies, procedures, and work flows; data requirements; computer hardware, software, and telecommunications; organizational models; and transition requirements.

#### **Phase 4: Construction**

The new processes, technology platforms and human resources/organizational structures are developed, prototyped, tested, and refined. Implementation requirements and timetables are determined.

#### **Phase 5: Implementation**

Education and training is provided to employees, customers, and suppliers who are impacted by the process change. The new processes, systems, and performance measures are “turned on.” Planning for continuing evolution and improvement begins.

A more detailed description of each phase is presented in the appendix of this report.

#### **Lessons Learned**

Our field-tested experience has shown that the following factors are essential in any business process innovation effort:

- Senior leadership must commit the right people and their own time.
- Technology is important, but people and change management efforts are critical.
- Efforts must be driven from the top reengineering czar: consensus management style won't work.
- Stakes in the ground and guidelines are important.
- Prototype initiative is valuable for the team, operations, and customers.
- Design of process, people, and technology must be integrated and holistic with implementations phased.
- The vision of the Future State must be innovative, real and robust.

Initiation of the team and the first steps in the pre-visioning state to implementation roll-out and realization of benefits can range from three to five years. The variation in time is dependent upon:

- Size of the company.
- Product line variations.
- Magnitude and complexity of the targeted process.
- Consumer intensity of customer and competitive pressures.
- Resources that can be applied.
- Degree of sustaining commitment from the leadership.



**Conclusion**

Never before has the industry had to innovate as rapidly and thoroughly as present day circumstances demand. In the past, growth and prosperity occurred despite adverse conditions and by merely maintaining the status quo. Never before have automotive manufacturers or suppliers needed to be architects of a grand new plan requiring multi-departmental, multi-functional cooperation driven by customer needs and expectations. Today, industry leaders need to be visionaries and master builders. The internal organizational factors are critical: to actually reconstruct reward and recognition systems, and to establish new measurement methods that encourage desired behavior. Our survey results suggest that many of these changes are slowly taking place. However, the automotive industry must prepare for radical change. According to one industry executive, "The pain of change has become less than the pain of staying the same."



# APPENDIX A:

## DETAIL ON PHASES OF BUSINESS PROCESS INNOVATION

Another area where cycle time is critical is in new product development. While much progress has been made in this area—the average design-to-delivery cycle has been reduced from 50-60 months to 44-48 months—we can still do much better.

### Phase 1: Assessment

Once a process has been targeted for reengineering, a current-state assessment of the process is conducted.

#### *Current State Process Assessment and Documentation*

Targeting a major process for reengineering using input from its customers enables a company to better understand its external and internal environments. The company then performs the current-state assessment of how the mega-process is to be executed. This involves developing a detailed work flow diagram and by identifying the resources associated with the process, including inputs, outputs, and transformation activities. Additionally, it includes defining the value-added and non-value-added activities, quality defects, and cycle time requirements associated with that process. This is done in order to:

- Ensure an accurate understanding of the current environment.
- Provide a base line to perform a cost-benefit risk analysis
- Establish priorities
- Identify investment opportunities

Characterizing the current-state assessment by producing a work-flow diagram of the process allows a company to review the associated cost, head count, and resources involved in executing this process. In addition, the quality, the defects, and the rework associated with this process must be assessed.

One area where cycle time improvements could lead to significant savings is customer order to vehicle delivery which ranges from 35-80 days with more than

**The information collected in this study suggests that the car company of the future must move beyond merely benchmarking outputs to benchmarking process design. This type of benchmarking is effective for capturing innovative ideas and lessons learned, and for demonstrating process feasibility.**

half of that time consumed by the manipulation of paper. This is caused by the planning and allocation process, systems that are not integrated, and measurements that do not emphasize cycle time in the value chain. By attacking customer order to delivery time, customers are served faster, manufacturing inventory shrinks, overhead costs are reduced, and dealer floor plan inventory is decreased. If six million cars are being sold each year, a 50% reduction in customer order to delivery time (60 days down to 30 days) results in a savings of 1.5 million cars in inventory. At an average cost per vehicle of \$15,000, this will result in a savings of \$1.125 billion.

Another area where cycle time is critical is in new product development. While much progress has been made in this area—the average design-to-delivery cycle has been reduced from 50-60 months to 44-48 months—we can still do much better. Many foreign competitors, primarily from the Pacific Rim, fall within a 36-month production time frame. With product life cycles shrinking, examining the process from a time-related perspective is critical. An increasing shortage of qualified engineers, and the need to reduce overhead costs requires that issues regarding product life cycle be addressed. Maximizing operations efficiencies calls for the successful car company of the future to determine very specifically the time frame in which each incremental activity is performed.

Within this phase, companies must identify where value-added activity exists. Short-term opportunities for focused improvements typically emerge at this stage. These improvements can be implemented immediately, but it is also important that they remain consistent with the focus and direction of the reengineering effort and do not detract from management's ultimate objective.

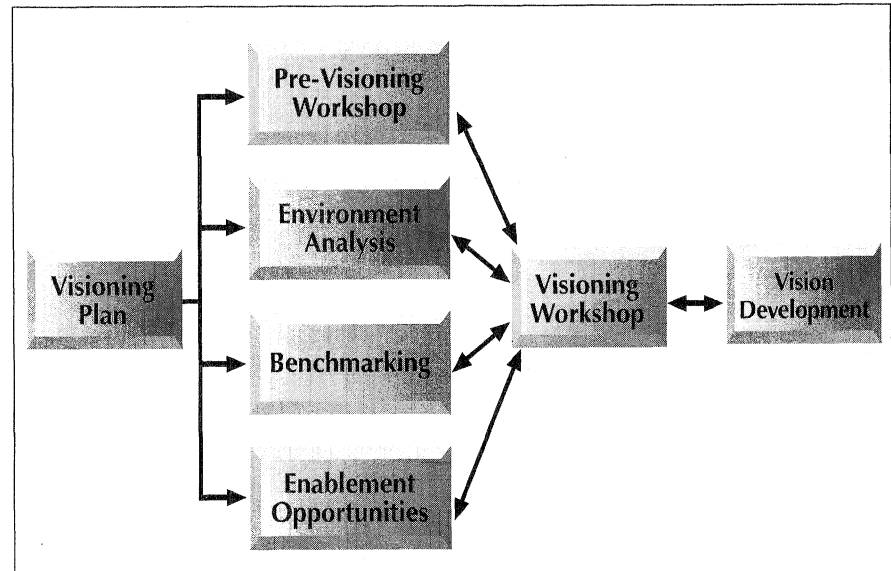
***Pre-Visioning***

Pre-visioning refers to a series of group sessions in which the results of different analyses are presented to prepare the organization for future-state visioning, perhaps the most crucial activity in any reengineering effort. Benchmarking for best practices and investigation of powerful, new information technologies are perhaps the most important of these. Each of these activities form a "tool box" which can be accessed by the team during the visioning process, ultimately defining the new process (See *Chart 5-4*). Pre-visioning workshops, performed simultaneously with other activities, are designed to introduce and facilitate an awareness of these new tools. This exercise serves as the key enabler in designing a new process that is unhampered by preexisting limitations and provides for a valuable forum in which to discuss future possibilities.

***Benchmarking***

Interviews with key automotive executives indicate that the industry is currently benchmarking product features and functions as well as quality and productivity performance. The information collected in this study suggests that the car company of the future must move beyond merely benchmarking outputs to benchmarking process design. This type of benchmarking is effective for capturing innovative ideas and lessons learned, and for demonstrating process feasibility. These best practices, in conjunction with technology enablement, will ensure a future vision of

Chart 5-4: Future Visioning—Key Activities



By understanding what is technologically available, a company can create a future state vision of what it wants to become and assemble the appropriate pieces to put those changes into effect.

“best possible.” Ideally, benchmarking should occur after the process has been targeted and after customer needs and requirements have been identified. Benchmarking should not be restricted to the automotive industry but encompass the universe of best practices—to go “beyond the best.”

#### *Enablement Opportunities*

The objective of this activity is to create a technology “tool box” with which the team can move into the visioning activity carrying with them a thorough understanding of the technology available and projected to be available in the near term (two years). This activity includes investigating new and emerging technologies such as notebook computers, decentralized systems, security communication, new applications, or knowledge-based software that might be used for capturing market information, vehicle diagnostics, or supplier-manufacturer communication. New technologies must be tracked as to how they may be used in the future vision of a process. It also requires the analysis of how information is captured and how linkages between systems can be achieved.

When a particular technology is not yet accessible, but may become commercially available in the near term, a company may have to confront the fact that it may be unable to reengineer with full functionality and, therefore, choose against this approach. In other cases, it may be too costly to wait, and alternative avenues may have to be explored.

It is imperative to review the entire range of technology available—including that from the small software houses to the Apples, DEC's, the HP's, the IBM's and that which is scheduled for development and distribution in the future. By understanding what is technologically available, a company can create a future state vision of what it wants to become and assemble the appropriate pieces to put those changes into effect.

In addition to technology enablement, organization change management interventions must also be examined. As companies move through major change and reengineering, the human resources issues, specifically communications, performance appraisal methods, education and training, and mentoring are critical factors in implementing change. As in most, if not all major change initiatives, managing the people issues is the key to a successful reengineering effort.

*Visioning of the Future State*

The objective of developing a vision statement is to describe the company's future plans for conducting business, including how it will focus on product and service offerings, operating principles, and cultural issues. As the road map that serves as a guide into the future, a vision statement contains clear definitions of key internal operating metrics. Typically, the statement should encompass desired state descriptions for people, process, and technology. The process, to be most effective, must be a structured process that enhances creativity with a focus on the business process.

**As in traditional product development, a key activity during any reengineering effort is prototype testing. In this case, however, it applies to the newly designed process rather than a product.**

**Phase 2: Reengineering**

*Designing the New Process*

In the reengineering phase, the process must be described, the organization and culture developed, and the technology enablers defined. Specifically, a multi-functional team will spend three to five days defining the new process. Inputs, activities, outputs, dependencies, and measures are discussed in detail. For example, if the process is customer order to delivery, the team would identify how orders are to be received, the associated activities necessary, outputs derived from the activity, dependencies (e.g., pricing, allocations), and appropriate measures for monitoring purposes.

After this first week, two types of testing occur. The team engages in a process by which highly specific questions are raised for the purpose of challenging the fundamental process. The answers to these questions are tested against the process. The second form of testing involves reviewing the vision and conceptual description of the process with others to obtain feedback and additional suggestions on the process redesign. This could involve dealers, customers, plant personnel, human resource representatives, UAW leadership, and information systems people.

Following this testing, the team reassembles, incorporates the feedback, and carries the process description to the next level of detail. The iterations and testing continue for approximately 4-6 weeks until enough detail and comfort exists with which to determine the performance attributes, division of work, organizational characteristics, and the required technology and associated applications. This then becomes the input to the prototype.

Change management and human resource issues become critical at this stage. As the team further defines the changed process, discussion is necessary about how the affected groups need to be organized and empowered, including training and development issues.

**Performance appraisal and management activities must be designed to correspond to this new environment and encourage desired behavior. At the same time, new measurements are designed that are in concert with the vision and balance of both individual and team performance.**

### ***Prototype Testing***

As in traditional product development, a key activity during any reengineering effort is prototype testing. In this case, however, it applies to the newly designed process rather than a product. Prototype and test activities determine whether the objectives and metrics developed in the vision statement have been met. This is accomplished through simulation and prototyping. Essentially, a mocked-up process is constructed. Refinement is ongoing and occurs in an iterative fashion. The prototype drives customer requirements for the detailed design and the next stage of systems development activity. The prototype then becomes an integral part of establishing requirements in the design phase as the organization begins to apply the necessary technology components.

### ***Cost/Benefit Risk Analysis***

The cost/benefit risk analysis is performed concurrently with the development of a transition plan. The ideal process has been designed, but now it becomes necessary to look at every conceivable divergence. Examining extremely detailed relationships in the process architecture is characteristic of this phase.

### ***The Transition Plan***

The objectives of the transition plan are to review and verify costs and benefits; identify and address key risks; and map out the specific activities and roles involved in the design and implementation phases. These activities and roles include those related to the design of the system, its construction, its roll-out, and the change management issues associated with these phases, which are many. Change management implications of this activity include, for example, developing education and training programs to support the new process; determining what the reporting hierarchy will be, and what measurements must be put in place to monitor the process over time. While conceptually, the re-engineered process may be elegant and inviting, final decisions about its survival are based on risk, cost, and return on investment.

### **Phase 3: Design**

Critical steps in the design phase are the following:

- Process design
- Process/technology prototyping
- Detailed systems design
- Change management planning
- Transition planning

Following the reengineering phase, and obtaining leadership approval of the cost/benefit/risk analysis and the transition plan, more detailed process definition is required to operationalize the environment. The process must also drive and be linked to the information technology design. A systems analysis team will work

closely with the process definition team to design the applications and ensure its successful integration.

Once the technology effort is underway, a significant amount of additional work is necessary in the area of change management. Planning, development, and execution of effective communications occurs to inform people of the nature of the reengineering initiative, who is driving the effort, the timetable, how they will be affected, and the projected benefits. The design and development of new training programs is critical to building the skill level necessary to function with the new process, technology, and environment.

Performance appraisal and management activities must be designed to correspond to this new environment and encourage desired behavior. At the same time, new measurements are designed that are in concert with the vision and balance of both individual and team performance. Finally, reward, recognition, and compensation systems are designed.

#### **Phase 4: Construction**

The construction phase involves the actual building of procedures and systems necessary for rolling out and implementing the reengineered process and environment. The systems and supporting architecture will vary in accordance with the complexity of the modified process.

The implementation roll-out plan must be constructed. Extensive work is required in phasing the activity, controlling the cost and minimizing the risk. The pace of implementation, a major issue to be dealt with, is influenced by the competitive environment, customer requirements, financial and human resources risk, and leadership commitment.

#### **Phase 5: Implementation**

The implementation process is complex, but not unlike the initiation of any major system, new facility or product launch. The implementation effort will build on the lessons learned in the pilot activity and can be implemented with either a "big bang" approach or incrementally.

The "big bang" approach could involve the implementation of a new product development approach where the activity is focused, can be managed without impacting the organization, and where a program or platform can be isolated and addressed. The implementation would involve providing education and training on the overall organizational design as well as how to use the new process and technology. The training in the new process, assignment of roles and responsibilities, and technology and measurement systems are executed and the technology installed. The Chrysler L/H program would be an example of this implementation approach.

Another implementation approach might be employed if, for example, the reengineered process concerns customer order to cash. In this situation, the implementation may occur by car line, by plant, or by geographical delineation. For instance, an Oldsmobile '88 order-through-cash pilot implementation plan



would embrace all Oldsmobile products and plants manufacturing the product employing a phased approach by zone and/or region. In this situation, the training requirements would be more extensive involving people at various levels. In addition, the implementation of technology will also be phased over time, especially if the necessary applications are not immediately available.

In the customer order to cash process, dealer systems, order management, production planning, assembly and component scheduling, invoicing and cash collections would be analyzed. Clearly, this is a major undertaking involving significant risk.

Visioning and reengineering must address and redefine the entire megaprocess. However, implementation can be phased while remaining consistent with the desired state. If installing the new technology for the Oldsmobile line is too complex and risky, then the implementation of the new dealer system, order management, production planning, and assembly scheduling can be installed with the remaining systems being masked. These masked systems would then be eliminated and implemented at a later time.

**To achieve quantum improvement, organizational leadership must demonstrate vision, commitment to change, and a willingness to take risks. The pace of implementation must be aggressive, but must exemplify the ability to balance the resource requirements, and must manage and minimize risk.**

In the implementation of the new process and technology, many applications are linked and many processes are interdependent and parallel. For example, it is very difficult to achieve dramatic improvement in delivery by changing the order management system but not addressing configuration management and assembly/component scheduling. It is virtually impossible to commit to the delivery of a vehicle with its inherent pricing arrangements if the process and technology are not integrated.

It is not recommended that implementation occur functionally. Installation of the process by organization and technology, and then by sales, engineering, and purchasing, for example, is not effective because the process and technology are seamless and, therefore, cannot be segregated or implemented by function. Implementing the reengineered process incrementally by product and/or by region while effectively managing risk is the preferred approach and will yield the greatest benefits.

Finally, the level of investment and risk cannot be ignored. Clearly, the pace of implementation is heavily influenced by cash flow and profitability. However, this must be balanced with customer requirements, competitive pressure, and the return on investment. The risk, while on the surface may appear to decrease over time, actually increases. The longer the implementation, the more traumatic for the people, the more changes in technology are needed, and the greater the potential dilution of leadership energy and commitment.

To achieve quantum improvement, organizational leadership must demonstrate vision, commitment to change, and a willingness to take risks. The pace of implementation must be aggressive, but must exemplify the ability to balance the resource requirements, and must manage and minimize risk.



# APPENDIX B:

## STUDY METHODOLOGY AND DEMOGRAPHICS

**We believe our findings represent the opinions and thinking of the industry's leaders, and show the successes as well as the challenges facing automotive companies.**

*The Car Company of the Future* report presents an analysis of the environment and operating characteristics of car companies—U.S. manufacturers and suppliers—as they see themselves and the industry by the year 2000. We present findings from our survey and interviews, and draw conclusions about the pace and paths of change which are being traveled by car companies to reach their “decade away” destination.

We believe our findings represent the opinions and thinking of the industry's leaders, and show the successes as well as the challenges facing automotive companies. This report documents a shared view of the future across a range of issues. In addition, we have tried to present new insights, perspectives, and prescriptions for increased future competitiveness, focusing particularly on the very important issues that relate to people and manufacturer/supplier relationships.

Our *Car Company of the Future* survey questionnaire and interview/roundtable focuses on the views of senior management. The survey was mailed to approximately 800 executives representing a selected, well-informed sample of leading companies (and individuals) in both the assembler and supplier communities. It includes individuals from all major departments and functions in car companies: production, engineering, marketing, general management, and others. It represents manufacturers and suppliers for major categories of automotive products. We received approximately 240 responses—about a 30 percent response rate, with a representative distribution across the population.

### **Data Collection**

Our research objectives were 1) to determine if there existed a shared view of the automotive business environment and operating characteristics in the future—the year 2000—and 2) to identify the change actions and initiatives which need to be taken to reach the desired future state. To that end, the data gathering and phased research process were defined and undertaken in the following manner.

**Our philosophy and methodology was to include those elements of change that appeared to be of the highest priority.**

**Interviews were conducted with senior executives at the top levels of management whose insights on the industry and its future were most helpful.**

*Survey Questionnaire:* Quantitative data were collected in the spring of 1991 using a comprehensive questionnaire to examine various dimensions of the "Car Company of the Future," including the industry outlook, competitive issues and trends, industry change and transition efforts (pace of implementation, focus on change efforts), enablers of change, and barriers to change. It also elicited views on how the typical car company will look and operate in 2000, as well as what specific change actions are being taken now, and those that are still needed to reach a successful future state.

In developing our survey, we did not attempt to create a complete inventory of all change actions, enablers, and barriers which car companies may have faced, or will face over the coming decade. Our philosophy and methodology was to include those elements of change which appeared to be of the highest priority—those which have been previously presented by industry participants and experts in written or verbal form, in publications on automotive companies, and from our own experience. Though perhaps not absolutely all encompassing, the elements in our survey are certainly those generally held to be significant.

Our preliminary analyses of these data were guided by two sets of questions. First, we asked how our respondents' views and actions might differ depending on their role in the industry, i.e., whether they are a supplier or OEM manufacturer. Second, we asked what might be the relationships among their views, expectations, and actions. To answer these questions, we relied on established statistical techniques commonly applied to survey responses.

Where our interest was in establishing whether differences exist in the reports and views across groups, we used analysis of variance techniques. For example, we often compared manufacturers and suppliers with different major products to examine whether the difference was related to differences in expectations about the future. Where our interest was in establishing whether certain reports and views are associated with expectations or actions, we performed correlational analyses. Thus, we often explored how expectations about the future are related to reported activities today.

*Interviews and Roundtable Discussions:* Thirty-three interviews were conducted with senior executives from the industry in the spring/summer of 1991. These individuals are industry leaders at the top levels of executive management whose insights on the industry and its future were most helpful. Many of the executives interviewed hold the positions of chairman, chief executive, and executive vice president. Of the 33 interviewees, 42% were CEOs or president of a company or operating group, 36% were vice presidents, 12% were directors, and 10% held middle management titles.

In an effort to achieve representativeness across the industry, the size of company was considered in addition to executive ranking. Top corporate and divisional personnel of each of the Big Three and two NAMs were selected to represent the vehicle manufacturers. Besides the major OEMs, participants were sought in the top fifty suppliers as determined by automotive revenues reported in annual reports or

10K forms. Some medium and smaller suppliers were selected based upon industry reputation. The supply base interviews focused on the corporate presidents and included seven large, three medium-sized, two small, and two engineering service suppliers. The UAW also participated in a personal interview.

Additionally, groups of executives participated in focused roundtable discussions conducted in two formats: 1) executives from one company representing the same function; and 2) executives from one company representing different functions. The objective of the roundtable discussions was to observe the interplay among the group members, and to do a qualitative "reality test" of whether improvement efforts are truly cross-functional.

Both the interviews and roundtable discussions covered a range of topics and issues affecting individual companies and the industry as a whole. These include strategic priorities for 2000, internal transitions/changes to 2000, employee development, sources for financing, and a particular focus on manufacturer/supplier relationships. In addition, changing company-specific standard practices and procedures; employee development; and managing adverse consequences of change were addressed in the context of customer responsiveness. Due to the fact that the roundtables were conducted shortly after some major OEM announcements were made about supplier relations, these participants may have overstated the importance of such policies.

Interviews lasted approximately 90 minutes and the roundtable discussions took two to three hours. Care was taken to ask general questions of all participants and specific questions across companies, functions, and organizational level. This material was then organized by topic and used to support and amplify the survey findings.

*Secondary Data Research:* Secondary data and information was obtained through a literature and media search addressing current topics related to our inquiry.

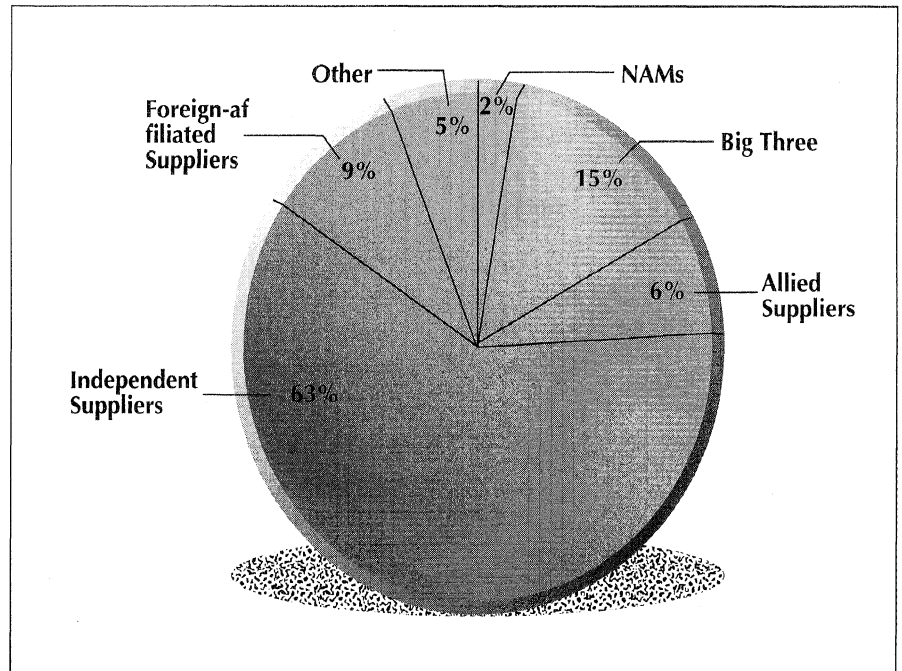
### **The Industry Defined**

For the purposes of this survey, the *automotive industry* is broadly defined as those companies which assemble, manufacture or supply the worldwide market for passenger cars. More specifically, it is defined as follows:

- An *automotive company* is defined as one that produces light-duty motor vehicles, or raw materials, parts and components that are ultimately incorporated as original equipment in such vehicles.
- *Vehicle manufacturers* include the traditional Big Three (Chrysler, Ford, GM) and the New American Manufacturers (NAMs) which are the North American facilities of Japanese and Korean car makers.
- *Suppliers* are defined as parts or components makers for passenger cars and light trucks/vans. This segment is composed of independent suppliers, Big Three allied or "captive" supplier divisions, and recently established or acquired affiliates of traditional foreign suppliers.

**The *automotive industry* is broadly defined as those companies which assemble, manufacture, or supply the worldwide market for passenger cars.**

*Chart 6-1: Survey Respondents by Company Type*



Over 75 percent of our survey respondents are at the chief executive/president, executive vice president, vice president, director and general manager levels.

**Respondent Company Demographics**

The survey questionnaire was answered by a total of 242 individuals representing each segment of the industry as defined above. *Chart 6-1* shows approximately 80 percent of the total respondents are independent supplier and Big Three executives. Over 50 responses were obtained from the Big Three vehicle operations and allied or “captive” supplier divisions, and about 150 independent supplier executives responded.

Looking at respondent companies by product area in *Chart 6-2* shows about half the respondents focus their primary products in the areas of powertrains, stamping, and materials, and the balance have primary products that span all vehicle subsystems ranging from seats and trim to heating, venting, and air conditioning.

**Manufacturer/Supplier Pairs**

Supplier companies typically have multiple vehicle manufacturing customers, and in our survey, over 1300 manufacturer/supplier pairs are represented. Nearly 70 percent of these pairs are with Big Three or Big Three-affiliated entities, and the balance are with the NAMs (*Chart 6-3*).

- Suppliers also typically supply multiple products: 72 percent supply OEMs more than one product.
- Seventy-four percent supply at least one product to other suppliers.

Chart 6-2: Survey Respondents by Product Area

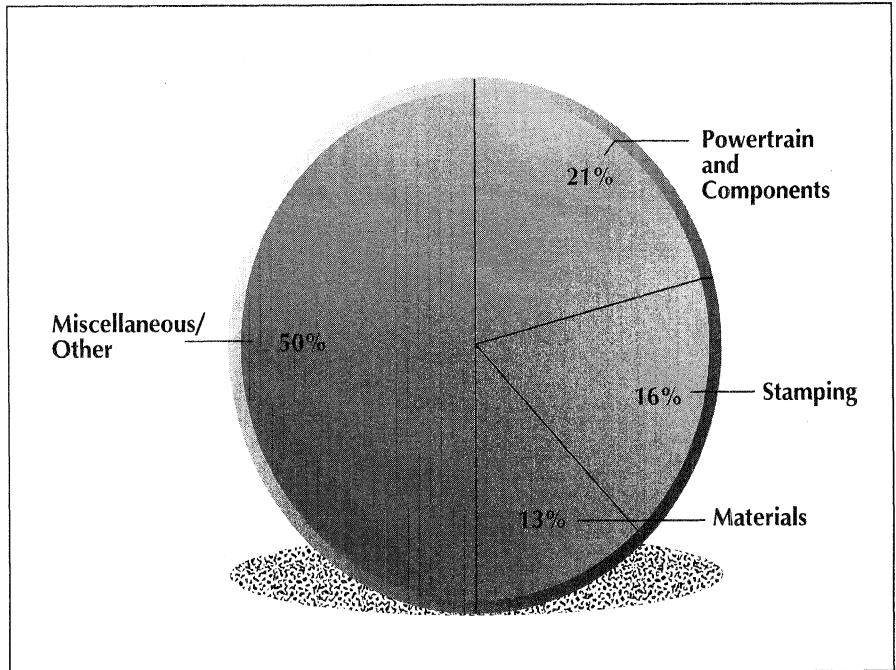
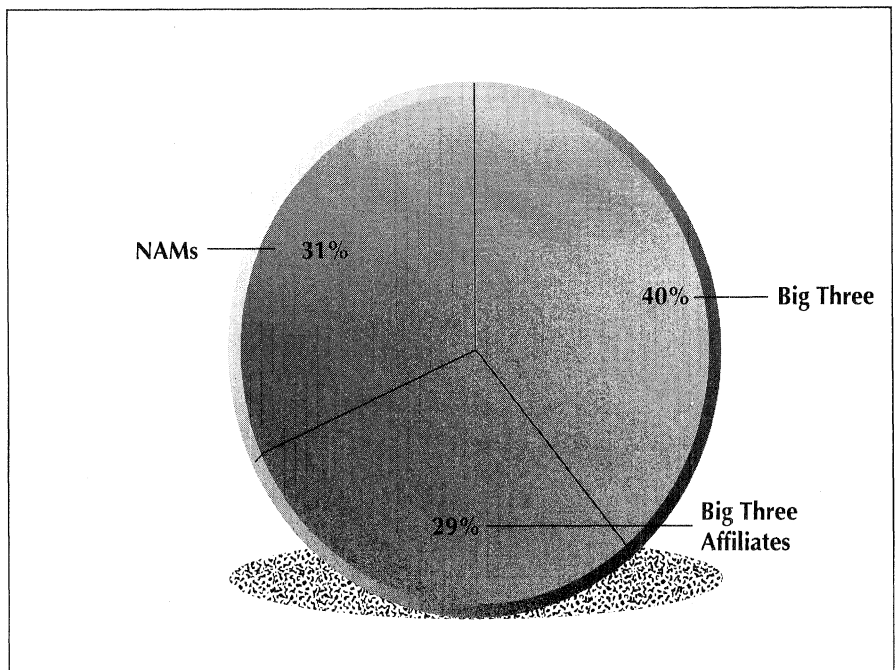


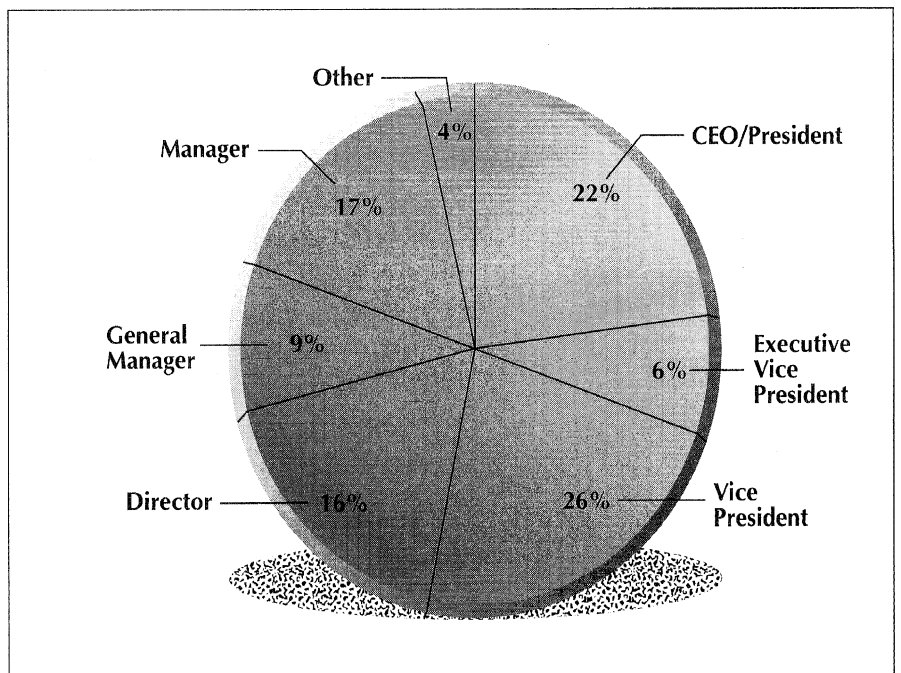
Chart 6-3: Makeup of Manufacturer/Supplier Pairs



**Profile of Survey Respondents: Senior Management**

Our key objective with the questionnaire was to elicit views of those closely involved in managing and directing the organization as a whole, to gain an accurate understanding of what drives management decision making and shapes the industry today. Our survey gives a broad functional perspective. As *Chart 6-4* shows, over 75 percent of our survey respondents are at the chief executive/president, executive vice president, vice president, director and general manager levels. The remaining 22 percent are managers and other titles.

*Chart 6-4: Survey Respondents by Organizational Level*



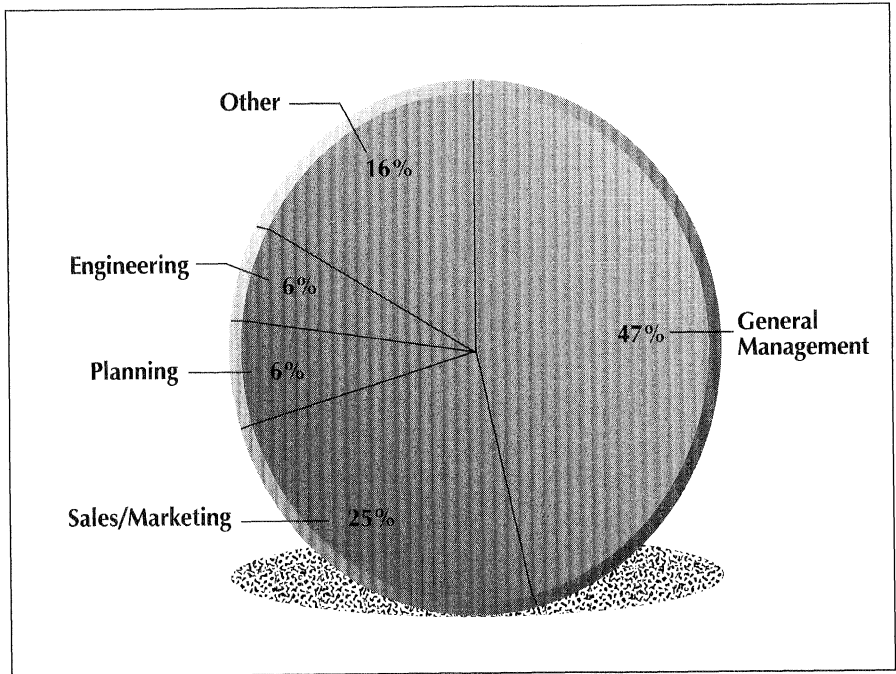
In *Chart 6-5*, the profile of survey respondents by function shows nearly half of the respondents are in general management functions, a reflection of the large percentage of high-ranking executive respondents. Another 25 percent are sales/marketing executives, and the balance represent planning, engineering, plant management and the “other” category which includes finance, manufacturing, quality, purchasing, human resources, and other staff.

We believe this survey has resulted in a broad, substantial database to support our analyses. It has been our objective to draw reports and information from these data that go beyond a “taking of the industry’s temperature,” and provide truly fresh perspectives and new insights on even some of the oldest, most troublesome challenges.

The project is designed to help bring into focus what is truly critical now, to provide a practical (yet sophisticated) view of future options and actions, and to begin building a statistically solid foundation for understanding and creating forward-looking, action agendas and goals to guide automotive companies into the year 2000.



Chart 6-5: Survey Respondents by Function





**Ernst & Young**

As the leading integrated professional services firm in the United States, Ernst & Young has distinguished itself through commitment to providing clients with the highest level of quality service. In the United States, Ernst & Young employs 23,000 people in over 100 cities; the worldwide organization of Ernst & Young has over 64,000 people in more than 600 offices in 100 countries.

Ernst & Young has extensive experience and world class capabilities in the areas of information systems and technology, and business performance improvement, in addition to worldwide accounting, audit, and tax resources. Our service philosophy of enterprise-wide improvement is based on the effective integration of people, processes and technology throughout an organization. We support many automotive companies, particularly in the areas of cost management, total quality management, time-based management, and employee involvement, in their efforts to achieve performance improvement.

**The Office for the Study of Automotive Transportation**

The Office for the Study of Automotive Transportation (OSAT), a division of the University of Michigan's Transportation Research Institute, is the only U.S. university-based research office which solely focuses on the future of the international automotive industry. Through research, publications, conferences, media relations, and information collection, OSAT provides unbiased economic, business, and technical research findings; facilitates communication; creates problem-solving methods; and serves as an industry exponent to promote an efficient automotive industry.

OSAT is self-supporting through grants from affiliated organizations, sales of its research reports and information, conference fees, and research funded by a variety of agencies, corporations, and foundations.

***Survey Development/Research Team******Ernst & Young***

Lee A. Sage  
Terrence R. Ozan  
Kathleen S. Reichert  
William R. Tanner  
Jeffrey F. Hale  
Lari Hodkin  
Robin Sadowski

***The University of Michigan***

David E. Cole  
Michael S. Flynn  
David J. Andrea  
Brett C. Smith  
Sean P. McAlinden  
Jack C. Cragen



The following individuals served as members of the *Car Company of the Future* Advisory Committee. This committee was convened to advise on the study in general, and provide comments on the study findings. The contribution of this committee has been extremely valuable. We acknowledge their contribution to the *Car Company of the Future* project, while recognizing their possible reservations about some of our findings and analyses.

**Hulki Aldikacti**

Saturn Corporation

**Ed Buker**

Assistant Vice President and East Liberty Auto Plant Manager  
Honda of America Manufacturing, Inc.

**Thomas W. Chisholm**

Vice President, Automotive Marketing  
Eaton Corporation

**Ronald L. Fornshell**

Publisher and Managing Editor  
GLOBAL Automotive Information Services

**G. Glenn Gardner**

General Manager  
New Platform Engineering Division  
Chrysler Motors Corporation

**Murray B. Jones**

Program Manager, General Manager  
GE Automotive

**Bob King**

Director, Region 1A  
UAW

**Hank Lenox**

Chief Engineer, Engine Product & Manufacturing Division  
Ford Motor Company.

**Terry K. Lindquist**

Vice President, Marketing and Advanced Technology  
Borg-Warner Automotive, Inc.

**Ralph L. Miller**

President,  
CDI Transportation Group

**Thomas S. Moore**

General Manager, Liberty and Technical Affairs  
Chrysler Motors Corporation

**John J. Mueller**

Vice President, Automotive Engineered Systems Division  
3M Company

**Fred Musone**

President, Chassis Products Operation  
Federal-Mogul

**Thomas Page**

Executive Vice President (Retired)  
Ford Motor Company.

**David R. Rea**

Vice President, Technology  
Dupont Automotive Products

**J. Martin Rowell**

Director, Advanced Program  
Allied-Signal, Inc.  
Bendix Automotive Systems Group

**Robert H. Schaefer**

Director, Systems Engineering  
CPC Group  
General Motors Corporation

**George L. Schneider**

Vice President and General Manager,  
TRW Engine and Aftermarket Group