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COVER STORY

The Southeastern Auto Industry: Moving into the Fast Lane



In consumers' imaginations, cars are inextricably linked with visions of things to come, and automakers must stay two steps ahead of customers' cravings. Experimentation in the industry is standard operating procedure. During the past 30 years auto manufacturing has undergone a series of pervasive transformations that have affected every aspect of the industry: how cars are made, what kinds of cars are made, who makes the cars and where cars are made. One outcome of these shifts is that the Southeastern United States has become an incubator for revolutionary approaches to auto production, and the region stands to reap significant economic benefits as a result.

Change in the auto industry is reflected in the restless successions of plant openings and closings in the Midwest, the industry's traditional home. Foreign and domestic manufacturers have settled in rural Southeastern locations, bringing with them new approaches to labor and production.

Assembly plants, once maintained in dispersed locations across the country, have pulled away from the coasts and into the center of the nation. Old plant locations based on obsolete assembly systems have been abandoned, and new ones have sprung up to replace them — sometimes on the same site, sometimes across the country. The "auto corridor," which corresponds roughly with the area 200 miles on either side of I-65 and I-75, has extended steadily to the South. The whole approach to auto manufacturing has been transfigured by technology in response to changing consumer demand and new marketing strategies.

Mass production in reverse

Increased competition in the auto industry has driven car manufacturers to maximize both cost and production efficiencies. Being responsive to consumer tastes is another essential factor in maintaining a competitive edge. Technological innovations and new production systems have been critical resources for automakers as they negotiate the traffic jams of a tightening



economic environment and consolidation. Many have found that the key to success lies in precision production systems that pinpoint consumer demand and respond with a high degree of accuracy. Some analysts describe this new approach as "mass production in reverse."

Excess inventory is a serious problem in the auto industry. Unlike some other dated or unsuccessful consumer goods, outmoded vehicles that have foundered in the marketplace are not easy to dispose of. They present storage, transport and distribution headaches of major proportions. Electronic communications and highly sensitive, just-in-time production techniques allow manufacturers to be much more precise in reading and responding to consumer demand and thus avoid a build-up of obsolete products.

In the past, car manufacturers produced automobiles "on spec," so to speak. They trusted the ingenuity of designers, the wizardry of advertisers, and the retailing expertise of dealers to win consumers. Assembly plants across the nation were geared to produce identical models of a vehicle with identical parts and manufacturing processes. When a model flopped in the showroom, manufacturers suffered full-scale financial catastrophes because thousands of cars rolled off the assembly line before anyone could stop them. Now manufacturers are focusing on smaller runs of specialty models that meet customers' varied tastes and needs so that plant locations specialize in producing particular models. The term *mass customization* has been coined to describe this process, which allows auto manufacturers to produce only the number and kind of vehicles that consumers will likely buy.

Computer modeling applications in the design and testing of vehicles greatly facilitate manufacturers' ability to respond to shifts in consumer tastes. Older systems of auto design required a lead time of about five years to move a car from the conceptual stage to the manufacturing stage, according to Emil Hassan, senior vice president of Nissan in charge of North American manufacturing, purchasing, quality and logistics. Models of the car must be created and tested and trial driven. Computer modeling now allows designers to create "virtual cars" that can move from conception to fabrication in less than half the time. The appeal of a design and its safety, efficiency and marketability can all be determined before the car is produced. Computers even conduct crash tests to detect safety flaws in design so that they can be corrected before the car is ever actually produced. This speed in the design process, combined with the capacity to create smaller runs of vehicles more efficiently and economically, also allows producers more versatility in the range of models and features that can be offered to consumers.



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Under the wire

Critical to the process of mass customization is a system of production that provides for "just-in-time" delivery of auto parts to the manufacturer. In traditional approaches to auto manufacturing, workers at one plant assembled every facet of the finished vehicle from chassis to chrome stripping to seat covers. This method served well when parts were produced at distant locations and shipped to the plant. Smaller parts can be transported with less expense and require less storage space. This production mode emphasizes uniform quantities of products and a work environment in which assembly-line specialists are trained for very specific, repetitive tasks.

Just-in-time delivery, on the other hand, is based on a modular paradigm of production. Parts suppliers no longer provide nuts and bolts that must be assembled at the plant but furnish fully assembled exhaust systems, axle systems, dash consoles or seats. These modules are delivered on an as-needed basis, even as a car is coming down the assembly line, so that a seat module, for example, can be ordered two hours prior to the time it will be installed. The success of this strategy depends on having a cluster of parts producers close to the manufacturer so that the modules can be delivered and installed quickly — often robotically.

A new Nissan plant in Canton, Miss., scheduled to open in 2003, will have suppliers of modules on site so that modules can be assembled simultaneously with vehicles. According to Hassan, who is a manufacturing logistics expert, this approach has extraordinary advantages: while it doesn't eliminate warehousing, it does cut down markedly on inventory and handling. Hassan also cites hidden value: quality is greatly improved because each module is tested by the parts supplier before it goes into the vehicle at the assembly plant. "We can fix problems in minutes instead of days," he notes. Module producers develop expertise in their area of specialization and are thus able to spot defects and recommend design improvements. These efficiencies in installation, handling and quality control result in major cost savings, helping to keep the price of vehicles steady or even lower if improved quality and luxury features are taken into consideration, says Hassan.

The sum of their parts

Outsourcing of module and component production is handled in different ways by different auto producers. The Big Three American automakers — Ford, General Motors and Daimler Chrysler — originally maintained so-called “captive” component manufacturers that produced parts solely for the target company. According to a 1996 Chicago Fed working paper, “The Evolving Geography of Production — Is Manufacturing Activity Moving Out of the Midwest? Evidence from the Auto Industry,” by James M. Rubenstein and Thomas Klier, “this practice insulated the components divisions from market pressures — potential independent competitors were stifled, standards of quality and efficiency were low, and cost accountability was minimal.” The Big Three producers now encourage their components suppliers to seek bids from other companies as well.

About 69 percent of the parts plants surveyed by Rubenstein and Klier were American-owned independent plants, while foreign companies owned about 17 percent of the parts manufacturers surveyed. The remaining plants were affiliated with U.S. automakers.

Not everyone is enamored with the modular approach to component manufacturing. Mike Miller, a Mercedes-Benz mechanic with Atlanta Classic Cars, says that the modular approach has made his job rebuilding and replacing parts more complicated. “We’ve gone from hand-held wrenches to hand-held computers,” he says. Cathy Ellis, the company’s owner and president, adds that her service staff have to exercise great ingenuity to keep increasingly complex electronic systems ticking.

Replacing modular parts can be expensive for consumers as well. Bryan Burkhardt, a team leader at Saturn’s service parts warehouse, stressed that even though Saturn builds with modules, repairs focus on the replacement of smaller component parts to assure economy for customers. Saturn uses a computerized stocking system that assures each dealer will have parts available for timely repairs. Rather than locating parts suppliers in tiers near dealerships, Saturn maintains a centralized facility at Springhill, Tenn. Burkhardt says that despite some additional cost in shipping, cost savings on facilities, labor, equipment and everything else easily compensate.

Strategies for supplying parts are an important consideration in determining how much economic benefit a new plant location will provide. If a new plant is large enough to draw component manufacturers as well, the new location will enjoy more significant spin-off effects. But if parts are provided from central locations, the local benefits are less. Since the Southeast has drawn foreign manufacturers that are more likely to seek parts on site, the region stands to gain considerably from new plants.

Why the Southeast?

On the surface, the Southeast’s leading role in new approaches to auto manufacturing is easily explained: because the automobile industry is relatively new in the region, innovative methods of production are more readily introduced and implemented here than in older Midwestern assembly plants geared to more traditional approaches to manufacturing.

According to Hassan, “innovations in the Southeast are a byproduct of the fact that many Southeastern plants are new sites. They have a lot more capability to apply new technologies than existing sites.”

The auto corridor has been moving southward since the 1970s. Chicago Fed economist Klier and demographer Kenneth Johnson note in their 2000 article “Effect of Plant Openings on Net Migration in the Auto Corridor, 1980–97” that General Motors began the trend in the 1970s when it sought to lower procurement costs by locating component plants south of the traditional auto states — Michigan, Illinois, Indiana, Wisconsin and Ohio. Japanese-owned assembly and supplier plants also chose Southern locations, adding to the momentum. Klier and Johnson’s research indicates that between 1970 and 1997, Kentucky and Tennessee boosted their share of light vehicle production from 4 percent to 13 percent, tripling their production, while the traditional automakers moved from 43 percent to 50 percent. (Both regions gained from a trend toward greater centralization of production in the heartland and away from the coasts.) Between 1980 and 1997, seven new plants opened in the Southeast — three in Kentucky, two in Tennessee, one in South Carolina and one in Louisiana. Mercedes-Benz recently opened a plant in Alabama, a Honda plant is scheduled to open there this year, and Nissan is starting a plant in Mississippi. Ten plants opened in traditional auto-producing states between 1980 and 1997 — four in Ohio, four in Michigan, one in Illinois and one in Indiana. But Midwestern states have also experienced numerous plant closings.

A favorable labor climate is an important part of the equation that explains new growth in the Southeast’s auto industry. Not only is labor readily available, but some states provide incentives to auto manufacturers by agreeing to set up programs to train workers and pay for their instruction. Some manufacturers prefer workers who haven’t been trained in older methods of auto production because they believe workers who enter the industry with a clean slate can adapt more readily to new modes of manufacturing.

According to Hassan, who began his career in the auto industry as a Ford factory manager before rising through the ranks at Nissan, workers must be flexible and technically skilled to keep pace with innovations. He states that technological breakthroughs have helped to create a safer, healthier working environment and more high-tech positions. For example, robots now routinely handle painting and welding. Rather than breathing paint fumes or handling dangerous equipment, workers operate robots. Hassan says that a creative approach to human relations makes it possible to retrain workers and keep layoffs to a minimum. “We haven’t had a layoff in 20 years. And we owe that in part to our good workforce.”



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The green flag

While locating plants in rural areas assures a flexible workforce, expanding into such "greenfield" locations can create a labor crunch. Even though localities vying for auto producers often agree to train the workforce as an incentive, it is still sometimes difficult to find sufficient skilled labor. In the mid-1990s, sophisticated components requiring skilled labor, such as engines and brakes, were more likely to be produced centrally in the Midwest while bulky or low value-added items such as seats and tires were produced more widely in Southeastern locations.

Recent developments in engine production suggest that this trend may be shifting, however. Increasingly, foreign manufacturers are locating engine producers near their Southern assembly plants to avoid the cost of transporting engines from remote locations. Two new engine plants are slated for Alabama, and plants in Tennessee and West Virginia will be expanded.

One strategy adopted by Toyota to assure a good pool of workers was to build three plants at intervals of several hundred miles along I-64. Geographical separation allows each location to have its own labor market, but the interstate highway makes it possible to transport components quickly from one location to another.

Another significant impetus to locate auto plants in the Southeast is the proximity of good markets, says Atlanta Fed economist John Robertson, who heads the regional section of the Bank's research department. Automobile manufacturing, even more than other types of production, is most economically located near centers of demand. Moving cars across distances is more expensive than moving most other manufactured goods, so it is most cost-effective to locate industrial production near the marketplace. While this logic once induced manufacturers to locate in the center of the nation — in Illinois, Michigan and Indiana — during the past 25 years it has lured producers to the Southeast, where population and markets have been growing at rates faster than those of the nation as a whole.

Southeastern states have also courted auto manufacturers with a variety of incentives in hopes of establishing new catalysts for economic growth. The establishment of a large auto manufacturing firm can have a significant impact on both rural and metropolitan population growth. This effect is important in the Southeast, where workers welcome the option of being able to work at lucrative jobs while maintaining rural lifestyles.

The modular approach to car manufacturing promises that spin-off companies will come in the wake of new plants if production volume is high enough. Larger firms tend to have a more significant impact on local economies, increasing population not only in the county in which the firm is located but also in adjacent counties.

Whether new approaches to car manufacturing herald deeper trends destined to transform the industry or whether they prove as transitory as the big fin, automakers are exploring innovations at full throttle, and the Southeast has become an important proving ground for their experiments.

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