

EMGT 835 FIELD PROJECT:
**Management and Labor Relations Techniques of
Japanese-Owned Automotive Assembly Plants in the
United States**

By

Paul T. Pitney

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Name	Date
Committee Chair	

Name	Date
Committee Member	

Name	Date
Committee Member	

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Executive Summary

This field project involves a study of the Japanese-owned automotive assembly plants, or “transplants,” in the United States and the management and labor-relations techniques that have made them successful. The management and labor-relations aspects of the transplants are compared and contrasted to those of the American-owned, Big Three auto plants. The success of the transplants is measured and analyzed using J.D. Power data for initial quality and Harbour Report data for plant efficiency. The study identifies six major factors that have led to the success of the Japanese transplants, in terms of management and labor relations. These are 1) Non-unionization (with some exceptions). 2) Organization of workers into empowered production teams. 3) Lean production systems. 4) No-layoff policies. 5) Recruitment socialization. 6) Excellent relations with suppliers. Each factor is discussed in detail. A literature review of authoritative books on the subject of the Japanese transplants is included, as well as a brief history of the transplant phenomenon over the past 25 years. It is anticipated that this study will provide a clearer understanding of the success of Japanese management and labor-relations techniques through their application in automotive manufacturing in the United States.

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1. Introduction

Driving the streets and highways of the United States in the first decade of the 21st century is a true demonstration of the power of choice in a capitalist, free-market society. The driver notices a wide array of makes and models of cars, trucks and SUVs that are manufactured by companies with headquarters in the United States, Asia and Europe. For the drivers 30 years earlier, it was far more likely that a given vehicle on the road would have been manufactured by an American company, whether General Motors, Ford or Chrysler — collectively the “Big Three.” Today, the market share of the Big Three has sunk to 57% (Maynard 2005), so it is nearly as likely that one will pass a Toyota, Honda or Nissan as often as a Chevrolet, Ford or Dodge.

However, while the Toyota Camry in the next lane has a Japanese nameplate, it was most likely built by Americans in Georgetown, Kentucky, with a high percentage of components also built by Americans in the Midwest or South. Toyota’s Georgetown assembly plant is one of fifteen automotive assembly plants in the United States owned by a foreign-based automobile company. These assembly plants have come to be known as the “transplants.” Transplants, all but three of which are Japanese-owned, are now responsible for 25% of all the autos produced in the United States, up from 18% in 2000. Transplants employ 60,000 people in the U.S., and both employment and production numbers are rising (Maynard 2005).

Such a trend indicates that the transplants have found a formula for success. After all, they have built new assembly plants in a foreign market, and, using foreign workers, have built vehicles of high-enough quality and desirability to capture very significant market share away from native producers, which is no easy task. Of course the transplants’ ability to build very well-designed and engineered vehicles that garner excellent quality scores and media reviews has

helped immensely in their success. But while product design is the work of an engineering center, the function of an assembly plant is to build products with the highest quality possible, as efficiently as possible. Therefore, the success of an assembly plant, its management and workers is best measured by objective data indicating quality and efficiency.

A widely accepted measurement of assembly quality in the automotive industry is the J.D. Power Initial Quality Study, which is released annually in May. Auto manufacturers and their individual models each receive a score of problems per hundred. Plant efficiency is benchmarked every year by the Harbour Report, which rates each assembly plant on hours per vehicle through the entire process.

Transplants have scored very well in both J.D. Power surveys and the Harbour Report. Japanese transplants operated by Nissan, Honda and Toyota consistently beat plants operated by Ford, General Motors and Chrysler on both measurements. It is obvious that the transplants have succeeded where the traditional American manufacturers have struggled. How did the transplants do it? What factors have lead to their success?

The excellence of Japanese production systems, especially in the automotive industry, is not a new phenomenon. However, the success of Japanese automotive transplants in the United States demonstrates how a profitable business model can transcend cultural and geographic boundaries. The management and labor relations techniques used by the transplants enable their achievements in quality and efficiency, as well as their overall success.

This field-project paper will explore the Japanese transplants and address how their management and labor relations practices have created their resounding success. Comparisons will be made to equivalent practices at assembly plants operated by the traditional American

manufacturers. The author will draw upon his experiences as an engineer at three separate General Motors assembly plants between 1996 and 2005 to make comparisons.

Industry watchers have compiled significant research on the Japanese automotive transplant phenomenon since the first wave of transplants commenced in the early 1980s. The author conducted an extensive study of this research, concentrating on the last 10 years. Chapter 2 will detail a partial history of the transplants, as well as the significance of understanding their successful business models. Detailed descriptions and impressions of the books and articles used in the author's research are the subject of Chapter 3.

This study identified six main factors that have lead to the success of the transplants, from a management and labor relations standpoint. Chapter 4 of this field project paper will explore each of these factors in-depth. These are 1) Non-unionization (with some exceptions). 2) Organization of workers into empowered production teams. 3) Lean production systems. 4) No-layoff policies. 5) Recruitment socialization. 6) Excellent relations with suppliers. A seventh section provides a counterpoint to these success factors, as it addresses the controversies that have surfaced during the era of the transplants.

Chapter 5 features comparisons between the Japanese transplants and their Big Three counterparts in crucial quality metrics from the J.D. Power Initial Quality Survey and efficiency metrics from the Harbor Report. This data translates quality and efficiency improvements, which were made possible by management and labor relations techniques, into objective, numerical metrics. Tracking this data over time also shows how the American Big Three have made gains by adopting many of these techniques.

Chapter 6 offers conclusions to the study. Suggestions for additional work follow in Chapter 7.

It is hoped that this study will lead readers to a deeper understanding of why the Japanese auto assembly plants in the United States have prospered and provide lessons the traditional American auto manufacturers can apply to become more viable in today's ultra-competitive automotive market.

2. Significance and History

A study of the Japanese auto assembly transplants in the United States and the management and labor relations practices that have made them successful is a study of state-of-the-art manufacturing management. Kenny and Florida (1993) contend that Japan is the birthplace of a new paradigm in work and production organization, much like the United States was the cradle of mass production in the early 20th century. "Innovation-mediated production" (Kenny and Florida 1993) is the integration of production knowledge among management, engineering and workers. The workers' intelligence and expertise in their areas of the assembly process is harnessed, as well as their physical labor. In contrast, under the traditional American mass-production system (often called "Fordism" after Henry Ford), only the physical labor of workers is sought.

The traditional American mass-production system dominated the automotive industry in the United States from the 1920's through the 1970's. By 1980, foreign competition in an increasingly global economy had spurred increased U.S. anxiety about the decline of traditional heavy industries such as coal, steel and autos, as well as concerns about the consumer-electronics industry. According to Perucci (1994), the domestic trade balance had been positive since 1893, meaning that the value of goods exported from the U.S. was greater than the value of goods it imported. This changed in 1978, the first year the U.S. showed a trade deficit. A similar pattern

existed across the heavy industries, including autos, as well as the electronics industry. American firms steadily lost market share to Asian and European rivals, with Japan providing the bulk of the competition.

The labor and management antagonism inherent in traditional American mass production was one of the reasons for the decline of American firms. A second reason was shortsightedness in the market, exemplified by the Big Three's slow response to shifting consumer tastes for fuel-efficient cars in the midst of the energy crises of the 1970's. The U.S. auto industry, in particular, was set up for difficulty following years of increasingly rich labor contracts in which wage increases and lavish benefits were granted without a requisite improvement in quality or productivity.

The 1980 election shed a national spotlight on the increasing trade deficit and the federal government's role in assisting the struggling American auto industry. Early that year, UAW and Big Three management launched a campaign aimed at imposing federal restrictions on imported cars and encouraging Japanese automakers to open plants in the U.S. (Perucci 1994). The Japanese response was lukewarm at first, as the companies balked at the great expense of producing cars in the U.S. President Carter supported the efforts to convince the Japanese automakers to build plants in the U.S. but was hesitant to restrict imports because that might limit Americans' access to fuel-efficient cars. Ronald Reagan, the challenger, supported the restrictions on imports. After his victory in November, the House of Representatives voted to authorize President Reagan to negotiate quotas on autos imported from Japan. Japanese firms still had the option of voluntarily reducing their imports, however, and the Voluntary Restraint Agreement (VRA) was announced in 1981. Under the VRA, the Japanese government agreed to limit the exports of its automakers (Kenny and Florida 1993). America's demand for the high-

quality, fuel-efficient Japanese cars continued to increase, however, putting pressure on Japanese firms to build assembly plants in the U.S. Seeking to avoid protectionist legislation and possible backlash from American consumers, the Japanese decided to build the transplants.

Kenny and Florida mention that Honda, with its relatively small market share in Japan, needed the U.S. exports more than its main rivals, Toyota and Nissan. For this reason, in 1980 Honda announced that it would build a plant in Marysville, Ohio, becoming the first Japanese automaker to build cars in the U.S.

The Marysville car plant wasn't Honda's first assembly plant in the U.S., though. Honda had actually established a motorcycle plant in Marysville in 1977, as a test of the transplant concept. But Volkswagen was the first foreign auto company to build vehicles in the U.S. Its assembly plant in Westmoreland, Pennsylvania, near Pittsburgh, built Rabbits and Golfs from 1978-1988. The Westmoreland plant's products suffered from poor quality, and the transplant ultimately failed, largely because of management's reluctance to allow labor to have a significant voice in the production process. Nor did Volkswagen attempt to develop a supplier network in the U.S.; instead, it continued to import its parts from Germany (Kenny and Florida 1993). Volkswagen's failure provides an example of the problems transplants can face if management does not work together with labor and the production model is more Fordist than the "Innovation-mediated" Japanese model.

The rise of the Japanese transplants continued in 1980, when Nissan announced that it would build its first U.S. assembly plant, in Smyrna, Tennessee. In early 1983, Toyota and General Motors announced New United Motor Manufacturing Inc. (NUMMI), a joint venture in which Toyota would take over the management of a closed GM assembly plant in Fremont,

California, and sell a new line of small cars. In late 1985, Toyota announced that it would build an assembly plant of its own in the United States, in Georgetown, Kentucky.

A second wave of Japanese transplants was announced in the mid-1980s (Kenny and Florida 1993). In December 1984, Mazda announced it would build a new assembly plant in Flat Rock, Michigan. In 1985, Mitsubishi announced a joint-venture assembly plant with Chrysler in Normal, Illinois. Subaru and Isuzu selected a site near Lafayette, Indiana for their joint-venture plant, announced in 1986 (Kenny and Florida 1993).

The 1990s saw German automakers BMW and Mercedes-Benz (before it became the dominant partner in the DaimlerChrysler merger) join the ranks of the transplants. Honda and Nissan opened new plants in Alabama and Mississippi, respectively. South Korea's Hyundai began production at its first transplant, in Montgomery, Alabama, in 2005. Toyota and Honda also operate transplants in Ontario, Canada.

This study's focus is on Japanese-owned auto plants in the United States, however, as they comprise the majority of the transplants. Also, the Japanese production model has proven to be a benchmark of quality and efficiency, as well as harmony between labor and management. Table 2.1 presents vital information about the existing Japanese transplants in the U.S., culled from a variety of sources, and a map showing the approximate locations of these facilities is contained in Appendix A.

Company	Site	Announced	Production Start	Workforce	Union
Honda	East Liberty, OH	Sep-87	Dec-89	2,650	No
	Marysville, OH	Jan-80	Nov-82	5,600	No
	Lincoln, AL	May-99	Apr-02	3,300	No
Toyota	Georgetown, KY	Dec-85	May-88	7,000	No
	Princeton, IN	Nov-95	Feb-99	4,690	No
	San Antonio, TX (under const.)	Oct-03	Late 06	2,000	No
Toyota-GM (NUMMI)	Fremont, CA	Feb-83	Dec-84	4,800	Yes
Mazda (Auto Alliance)	Flat Rock, MI	Nov-84	Sep-87	3,700	Yes
Mitsubishi	Normal, IL	Oct-85	Apr-88	3,047	Yes
Nissan	Canton, MS	Nov-00	May-03	5,000	No
	Smyrna, TN	Oct-80	Jun-83	6,300	No
Subaru-Isuzu	Lafayette, IN	Dec-86	Sep-89	2,213	No

Table 2.1: Locations and Start Dates of Japanese Transplants

Sources: The Detroit News (Clanton 2004), American Public Media Marketplace (http://marketplace.publicradio.org/shows/1995/11/30_mpp.html), Auto Field Guide (<http://www.autofieldguide.com/articles/029903.html>), The Victoria Advocate (<http://www.thevictoriaadvocate.com/business/local/story/2948464p-3416835c.html>), Toyota.com (<http://www.toyota.co.jp/en/news/03/1020.html>), Nummi.com (<http://www.nummi.com/timeline.html>), Auto Alliance.com (http://www.autoalliance.com/plant_info.html), Mitsubishi Manufacturing.com (<http://www.mitsubishimanufacturing.com/about/facility/index.asp>), Honda.com (<http://world.honda.com/news/2001/c011204.html>), Nissan News.com (<http://www.nissannews.com/corporate/manufacturing/landmarkdates.shtml>)

3. Literature Review

Books and articles used in the research of this topic are detailed here, with commentary. Books are presented first, with entries organized alphabetically by author. Articles from magazines and newspapers, found in print and online, follow and are organized similarly.

A. Books

Gavroglou, Savros P. "Labor's Power and Industrial Performance: Automobile Production Regimes in the U.S., Germany, and Japan." New York and London: Garland Publishing, Inc., 1998.

This book is a thesis completed at the City University of New York Center for Labor-Management Policy Studies. Gavroglou begins by asking why American unions were unable to stop job losses and wage reductions in the manufacturing sector in the 1980's, and also whether an industry with strong unions in a given nation can be competitive in a global economy. The book focuses on the automotive industries of the United States, Japan and Germany. Gavroglou examines the history of the labor-management relations in these three automotive industries and theorizes that the more power labor has in production and capital decision-making, the higher the quality of the cars and the more successful the industry will be.

The first automotive industry Gavroglou analyzes is that of the United States and its history of segregation between labor and management. He gives an account of the history of the United Auto Workers (UAW) union, beginning with the sit-down strikes of the 1930's. He also details the background of the legislation that led to the creation of unions and their bargaining power, the Wagner Act, and the later legislation that limited these powers, the Taft-Hartley and Landrum-Griffin Acts.

Gavroglou explains how the U.S. auto industry, from the 1930's through about 1980, was an institution of "segregated inclusion" (69). Labor's interests were included only in management's decisions about distribution of profits through the numerous union contracts of this period, which enacted redistributions such as the Annual Improvement Factor and Cost of Living Allowance. Gavroglou hypothesizes that the basis for labor's power under the regime of segregated inclusion is the right to exit, meaning to go on strike, rather than have a real voice in

corporate decision making (117). Since workers' pay and employment security are not related to their performance, they have little incentive beyond personal pride to care about the quality of their work. The rise of imported autos, especially those from Japan, coupled with the decrease in quality and productivity of the U.S. Big Three automakers, signaled the need for change in labor-management relations in the early 1980's.

Gavroglou's next chapter is on the "reluctant desegregation" of management and labor in the U.S. auto industry in the 1980's, for a new regime the author calls "jointness" (135). Although some progress was made in giving labor a real voice, both sides were hesitant to make big changes. Labor was unable to stop jobs from going overseas, and domestic capital investments were reduced. The beginnings of jointness are detailed in the Quality of Work Life programs started at GM and Ford in the 1970's. General Motors' "Southern Strategy" and Chrysler's awarding of a seat on its board of directors to the UAW president are also outlined. In addition, the UAW contracts of the 1980's and part of the 1990's are described.

Gavroglou also includes a section on the GM-Toyota joint venture, New United Motor Manufacturing (NUMMI), in Fremont, California. NUMMI is particularly interesting because it was one of GM's worst plants. Poor quality and strained management-labor relations forced its closure in 1982. It reopened in 1984 as NUMMI under Toyota's management with mostly the same workers, UAW members. Workers were organized into teams that set their own work standards and designed their own jobs. Quality levels drastically improved, proving that American UAW workers could build cars of the same caliber as the Japanese.

Saturn, another GM project, is also mentioned. Saturn was started as a clean-sheet approach to labor and management relations in which the goal was to produce a small car that

would beat the Japanese competition. The union was included in all levels of decision-making, with unprecedented job security.

Graphs showing stabilization in U.S. auto employment levels in the 1980's, as jointness is adopted, are included in the chapter. Another graph demonstrates how hourly earnings no longer rise steadily as they did before jointness but can remain the same or even drop as labor's compensation becomes more closely tied to corporate profits. Gavroglou also makes the connection between jointness and the reliability of U.S.-made autos, using ratings from *Consumer Reports*. After bottoming out in the mid 1980's, reliability ratings showed slight improvement as the industry adopted jointness.

Gavroglou then describes the history of labor-management relations in the Japanese auto industry, explaining how Japan's comparatively weak, company-based labor unions came to be. Strong, militant unions at Toyota and Nissan were eradicated in the 1950's through lengthy, violent strikes and replaced by the company unions. The lifetime-employment tradition in the Japanese auto industry was labor's compensation for its weakened state after the strikes.

Lifetime employment continues today. Gavroglou describes how the Japanese regime is more efficient because it is less wasteful of human capital. It does not lay off large numbers of workers when demand slows, as the U.S. segregationist regime once did, and rehire them when demand increases again. In Japan, Gavroglou argues, labor and management's interests are much more integrated because of the lifetime-employment conditions. He then presents balance of trade and automotive reliability data, illustrating the success of the Japanese regime of integration between management and labor interests, in comparison to the U.S. segregationist regime.

A chapter is also dedicated to the German labor-management regime, in which the powerful unions have a relationship of codetermination with management through a dedicated seat on the company's board of directors. Gavroglou makes the interesting point that a regime with strong union labor (Germany) has been successful, as well as one with weak unions (Japan). Gavroglou's concluding chapter reiterates his findings that worker participation is very important to the performance of manufacturing industries. In the end, Gavroglou successfully lays out a case that including labor in management decision making is a key factor in industrial success.

Kenny, Martin and Florida, Richard. "Beyond Mass Production: The Japanese System and its Transfer to the U.S." New York and Oxford: Oxford University Press, 1993.

Kenny and Florida's "Beyond Mass Production" is a landmark contribution to the body of knowledge regarding Japanese transplants in the United States. Gavroglou, Perruci and Sumi all cite Kenny and Florida's work many times, highlighting the importance of "Beyond Mass Production."

Kenny and Florida focus on the Japanese production system, which they deem "innovation-mediated production," and its transferability to other countries, notably the United States. Transplants in the automobile, steel, rubber, and electronics industries are highlighted in the book. The authors present the Japanese system of innovation-mediated production as no less than the next evolution of capitalism (10). Whereas the 20th century saw the birth of "Fordism," the traditional American mass-production system in which all control and decision-making is centralized in the offices of management, the 21st century will be the age of the Japanese system, in which the intellect and knowledge of workers are valued just as much as their physical labor. Successful companies will harness the knowledge of their workers and improve, or they will perish at the hands of increasing competition.

Kenny and Florida first examine the origins and development of innovation-mediated production in Japan. The origins of the no-layoff policies, resulting from the difficult strikes of 1950's and 60's, are mentioned, as are the establishment of the company unions, which include both blue- and white-collar workers. The pioneering work of Toyota's Taichi Ohno, leading to the invention of "Just-in-Time" production, is described. Management harnesses the knowledge of work teams on the shop floor to solve production problems, and the factory becomes a type of R&D laboratory, as better work flows are designed and suggestions are made for improving the products themselves.

The book next focuses on the transfer of innovation-mediated production to other countries. Automotive transplants in the United States are described as proving grounds that demonstrate the transferability of the system. The authors discuss the reasons for the location of the transplants in the upper South and lower Midwest. Other transplant-related topics include their adoption of continuous improvement (Kaizen), their relationships with unions, their opening of R&D facilities in the U.S. and the Big Three's reaction to the transplants. Some workers' accounts of their jobs in the transplants are included as well.

The next chapter describes the growing network of Japanese transplant parts suppliers that feed U.S. assembly plants. A Just-in-Time supplier complex has developed in the transplant corridor, in which an assembler has a network of suppliers within a few hours' drive. These networks are modeled after those in Japan. Unlike American supplier contracts, which frequently change to award the business to the lowest-cost producer, relations between transplants and their suppliers are forged for the long term. Recruitment, quality control and continuous improvement practices are detailed much as they are in the preceding chapter on the transplant assemblers.

Chapters on Japanese steel and high tech and consumer electronics transplants are also included. Although these industries are beyond the scope of this research, it is interesting to note that the Japanese system has not transferred as effectively in the electronics industry as it has in the steel, rubber and automotive industries.

Kenny and Florida include a chapter on the problems of the transplants, as well. They raise some interesting contradictions brought about by innovation-mediated production: the system is more labor-efficient and eliminates waste, yet workers spend more time working; the teams are supposed to work together to make the work easier, yet individual workers end up working harder; workers are allowed more individuality in designing their own tasks, yet the corporation pervades more of their lives. Kenny and Florida touch on the myth of long-term employment — very few transplants actually guarantee it — and the plight of temporary workers and the often-cited tendency of transplants to locate in areas with low minority populations. According to the authors, the single biggest obstacle to successfully transferring the Japanese system, however, is “unreconstructed American management” (287). Managers trained in the American system simply have a harder time adjusting to a regime where their workers are not so much subordinates as they are knowledgeable partners in the enterprise.

Kenny and Florida conclude that Japanese innovation-mediated production is the future of global capitalism. They see the key driver of the transformation process, from the old Fordist model to the new model, as the continuous adjustment and struggle at the production point. The authors look ahead to a world where Japan is at the forefront of technological innovation in consumer products and even of the innovation of management practice itself. “Beyond Mass Production” is an indispensable part of the knowledge base for any study of the Japanese transplants.

Liker, Jeffrey K. "The Toyota Way: 14 Management Principles from the World's Greatest Manufacturer." New York: McGraw-Hill, 2004.

This book, released in 2004, is a management non-fiction work by a University of Michigan professor who has spent 20 years studying Toyota. The author, Dr. Jeffrey Liker, directs the Japan Technology Management Program at the university. Although the Toyota Production System is a well-known benchmark in the automotive industry and in manufacturing overall, Dr. Liker probes deeper, presenting fourteen basic management principles have made Toyota, in recent years, the world's most successful car company. These principles comprise "The Toyota Way."

Liker divides the fourteen principles into four "P" categories: Philosophy, Process, People and Partners, and Problem Solving. A chapter in the book is devoted to each of the fourteen principles.

The first category, Philosophy, includes the first principle: "Base management decisions on a long-term philosophy, even at the expense of short-term financial goals." In the chapter on Toyota's belief on long-term philosophy, Liker writes of the consistent message he has received from interviewing Toyota employees in all facets of the company. They all have a sense of purpose higher than earning a paycheck, a desire to "do the right thing for the company, its employees, the customer, and society as a whole" (72).

The second category, Process, includes a discussion of seven principles that center on the practice of eliminating waste. Toyota named many of these principles using Japanese terms, which Liker uses, as well as the English explanations, throughout the text. These seven principles, which include some of the Japanese terms, are 1) "Create continuous process flow to bring problems to the surface." 2) "Use pull systems to avoid overproduction." 3) "Level out

the workload (*heijunka*)." 4) "Stop when there is a quality problem (*jidoka*)." 5) "Standardize tasks for continuous improvement." 6) "Use visual control so no problems are hidden." 7) "Use only reliable, thoroughly tested technology." The renowned Toyota Production System is described throughout these chapters, as it utilizes all of these waste-eliminating principles.

The next category, People and Partners, embodies three principles with a common theme: respect, challenge and grow employees and partners in the enterprise. These three Toyota Way principles are 1) "Grow leaders who live the philosophy." 2) "Respect, develop and challenge your people and teams." 3) "Respect, challenge and help your suppliers." Liker dedicates chapters to each principle, with highlights including a discussion of the practice of growing leaders instead of purchasing them, the matrix organization of Toyota product development and a comparison of classic motivational theories by Herzberg, Maslow and Taylor to the Toyota Way. Another chapter is devoted to Toyota's excellent supplier relationships. Liker discusses how Toyota is hands-on in helping its suppliers improve and gives an example of how Ford attempted to implement a Toyota-like material flow system but was unsuccessful and could have benefited from more closely following the Toyota Way.

The final "P" category, Problem Solving, features four Toyota Way principles that are centered on continuous improvement and learning (*kaizen*): 1) "Become a learning organization through reflection (*hansei*) and continuous improvement (*kaizen*)." 2) "Go see for yourself to thoroughly understand the situation (*genchi genbutsu*)." 3) "Make decisions slowly by consensus, thoroughly considering all options; implement rapidly." Included is a chapter on the "Go and see" principle, which dictates that one think and speak only on personally verified data. Liker provides several interesting vignettes of high-level Toyota managers enacting this principle on the factory floor. Toyota's practice of exhaustively planning for all possibilities before

making a decision (*nemawashi*) is discussed in the following chapter. Liker introduces the *hansei* concept of deep reflection during or after a project as a thoroughly Japanese idea, one that is alien to Western culture. *Hansei* and *kaizen* are said to go hand-in-hand. Japanese managers extensively critique their subordinates during *hansei* to help them improve, but Westerners tend to view this practice as criticism.

In the final section, Liker notes how other companies, including those that are not in the automotive or even manufacturing industries, can learn from and use the Toyota Way. He discusses Six Sigma and lean production and emphasizes that unlike these concepts, the Toyota Way is not a management program or set of tools. It is instead a total philosophy that must become ingrained in a company's culture over time.

The Toyota Way is a fascinating look at the world's benchmark automotive company, with significant insight into its transplant operations in the United States. Through the book's analysis of the management philosophy of Toyota, readers will better understand the success of Toyota and other Japanese transplants.

Perucci, Robert. "Japanese Auto Transplants in the Heartland: Corporatism and Community." New York: Aldene de Gruyter, 1994.

This work, written by a fellow at the Center for Research and Behavioral Sciences at Purdue University, focuses on the Japanese automotive transplants. Special attention is paid to the transplants' impact on their neighboring American communities and the political maneuvering that took place to draw them there. A major theme of the book is "corporatism," essentially the process by which an activist state government works to enact policies that attract business and economic growth for communities within the state.

One chapter examines economic patterns in each of the six states that had attracted transplants up to the time the book was written in 1994: Ohio, Tennessee, Michigan, Illinois, Indiana and Kentucky. Perucci uses data such as the controlling political party of the governorship, house and senate of each state; international budget; per-capita taxes and income; percentage of citizens who are union members; number of auto suppliers; number of highway miles; and number of colleges and universities to determine what factors are most important to the Japanese companies selecting transplant sites. He concludes that the most important factor in site selection for the transplants is the site's proximity to an existing auto-supplier infrastructure. Another main factor is the state's ability and resources for pursuing international business. It is interesting that Perucci found no real pattern relating to the pro- or anti-union climate of the states or the generosity of the state's welfare system or cost of living. Perucci thus concludes that contrary to popular belief, the transplants have not deliberately tried to avoid states with a higher percentage of unionized labor.

Perucci also includes a chapter about the transplants' media images. He examines how the hometown newspapers of transplant cities like Lafayette, Indiana and Georgetown (near Lexington), Kentucky portray the companies. Numbers of articles on the positive aspects of growth, such as job creation and economic boosts, are compared to the numbers of articles focusing on negative factors, like increased traffic and pollution. Not surprisingly, Perucci found the newspapers were more supportive than antagonistic toward the transplants and their accompanying economic growth, since such growth should increase their readership.

The book also examines life inside the transplants. Recruitment processes at the Mazda plant in Flat Rock, Michigan and Toyota's Georgetown, Kentucky facility are discussed. Perucci writes about the phenomenon of "recruitment socialization," in which transplant recruits share

the bond of having survived the difficult, multi-stage interview process. Worker interviews are included and are revealing to read. Negative comments usually center on the pace of work in the transplants and the fact that labor-management cooperation, which is initially very good, can become strained under full production. Perucci also introduces the concept of “embeddedness,” the “PR” process for the transplants. Japanese companies know it’s important to become involved in their local American communities, so they sponsor cultural events, vocational training programs and educational programs at local schools focusing on Japanese culture.

In his conclusion, Perucci projects two possible futures for the Japanese auto transplant industry in the United States. In the first, he cites Candace Howes and her assertion that the transplant corridor will be nothing more than an assembly industry. Advanced research and development, as well as the more advanced processes of manufacturing engines and transmissions, will remain overseas. Perucci cites a second, dissenting view from Martin Kenney and Richard Florida, in which the corridor is set to become home to a fully integrated automobile industry. Eleven years after Perucci’s writing, it appears that Kenney and Florida’s view is more accurate. Perucci’s examination of transplants and their impact on communities and workers is nonetheless an important contribution to the subject.

Sumi, Atsushi. “Japanese Industrial Transplants in the United States: Organizational Practices and Relations of Power.” New York and London: Garland Publishing, Inc., 1998.

This book is based on the dissertation of an anthropology student at the University of New Mexico. Although anthropology is traditionally seen as the study of societies and cultures, Sumi was interested in studying in an industrial setting, essentially examining the culture of companies and organizations.

Originally from Japan, Sumi researched the unique organizational culture of Japanese transplants in the United States and the relations among their Japanese and American employees. He interviewed workers and managers at transplants in the Midwest, including those at several automotive suppliers and one of the major auto assembly plants. He also conducted interviews at a number of high-tech companies in California, as well as at the American headquarters of one Japanese automaker. During an in-depth case study at a New Mexico electronics company, Suntech America, Sumi conducted interviews and studied interactions among employees over a period of four months. For the purposes of this field project, the sections on Japanese automotive transplants were of particular interest.

Sumi's study of the transfer of the Japanese management model is based on examining the eight distinguishing characteristics of large Japanese industrial companies as they are manifested in the transplants he studies. These eight characteristics are generally agreed upon by social scientists and cited in Sumi's research (4): 1) "Lifetime employment (or long tenure of employment)." 2) "Seniority-based wage and promotion systems." 3) "Elaborate welfare, bonus, and other benefits systems." 4) "Company-based labor unions." 5) "Considerable inter-job mobility within a firm and emphasis on internal promotion." 6) "Small group activities on the shop floor level." 7) "Intensive training and socialization by management." 8) "Attention to developing a corporate culture and managerial philosophy."

In the sections on Japanese automotive transplants, Sumi touches on a number of important issues. Transplants' opposition to unions is discussed, and some instances of racial and gender discrimination are mentioned, as well as the lingering phenomenon of transplants locating in mostly white, rural areas. The factors that led to the site selection of a Japanese transplant in Smyrna, Tennessee, which is assumed to be Nissan, are mentioned in one interview:

mainly cost of living and labor availability. Sumi's interviews have a personal, down-to-earth feel, giving the reader a good sense of Japanese-American relations in the transplants he examines. Japanese managers work long hours and often seem to put their companies ahead of their families.

Sumi concludes that there has not been a truly successful transfer of Japanese management practices to the transplants he has studied. Instead of creating a Japanese-American hybrid corporate culture, the Japanese and American styles co-exist with varying degrees of success. Sumi argues that several of the eight characteristics of large Japanese corporations — lifetime employment, company-based labor unions and intensive training and socialization by management — do not readily transfer to American workers. The book is well researched, with insightful commentary on Sumi's views of other works, such as that of Kenney and Florida, who argue Japanese management practices have transferred more successfully.

B. Articles

Brown, Clair and Reich, Michael. "When Does Union-Management Cooperation Work? A Look at NUMMI and GM-Van Nuys." California Management Review v13n4, p. 26-44 (Summer 1989).

This article, though dated, is useful because it provides a direct comparison and contrast between a traditional, unionized Big Three plant and one of the first transplants. In this case, the unionized plant is GM's Van Nuys, California, plant, near Los Angeles, which closed in 1992, and the GM-Toyota joint venture, New United Motor Manufacturing Company, Inc. (NUMMI) in Fremont, California, near San Francisco.

The case of NUMMI is perhaps the strongest single example of how the team concept, typical of Japanese auto factories, can improve labor-management relations and product quality.

Fremont was a former GM plant that opened in 1962 and closed in 1982. When the plant closed, it had the lowest productivity rating within GM, as well as some of its worst labor relations. The UAW president at the time, Douglas Fraser, described the Fremont UAW local as one of the country's most militant (28). General Motors and Toyota formed NUMMI, and the plant reopened in 1984. Toyota managed the plant, and GM sold the vehicle it made, a Toyota Corolla-based small car called the Chevrolet Nova. Dramatic improvements were made in quality and productivity under the new management. Labor relations also improved greatly, with the numbers of unexcused absences and grievances falling sharply.

The article details the changes made at NUMMI by Toyota management, mainly the implementation of the team-based work concept. The authors present three theories why the change worked so well. Brown and Reich first mention that, since the workers had been out of work for two years when NUMMI opened, they were simply grateful to have their jobs back. Next, when NUMMI was selecting workers to rehire, management performed extensive screening to weed out the more difficult workers. As a result, the NUMMI workforce was more cooperative than Fremont's workforce. Finally, the Japanese management philosophy, which organized workers into teams and solicited their input a great deal, served to improve quality and productivity (29).

The article then profiles the GM-Van Nuys plant, which built the Chevrolet Camaro and Pontiac Firebird. Van Nuys' implementation of the team concept is discussed in detail in Section 4-B. The final section of the article is a comparison between the NUMMI and Van Nuys experiences. The authors maintain that difference stems from the two companies' philosophies about their commitments to their workers. These philosophies are illustrated by the companies' handling of production cuts. General Motors typically lays off workers while the inventory is

reduced to lower levels, then brings labor back when production resumes. Various layoff benefits have been negotiated between GM and the UAW over the years. At NUMMI, management has a no-layoff policy. Voluntary vacations and training programs are offered instead. As a result, a greater degree of trust between labor and management exists at NUMMI.

This article, though somewhat dated, is invaluable for its direct comparison between a plant run by one of the American Big Three automakers and a plant run by what is now generally regarded as the world's best auto company, Toyota. Though both plants are represented by the UAW, the different outcomes after the companies enacted the team concept are a striking example of the contrast between Japanese and American management philosophies in the automobile business.

Clanton, Brett. "UAW Fails Again in Contented South: Union Opposition at Ky. Plant Leaves Effort All But Dead." The Detroit News. May 18, 2004.

Clanton details the failure of the UAW to organize Toyota's Georgetown, Kentucky, assembly plant. The article was written shortly after the UAW pulled out of Georgetown, after two decades of failure to organize the plant's 7,000-plus workers. The feelings of the majority of Georgetown workers toward UAW organization are summed up in a quote by Toyota employee Milt Sizemore: "Our company has issues and problems like any other place, but I don't feel like the UAW is going to do any better for us."

Clanton also explores the pro-union side of the story. A quickening work pace and outsourcing are cited as the main reasons for UAW representation. While employment at Georgetown has declined from its peak of 8,000, the reductions have come from attrition and retirements.

The article contains a table listing the non-union auto plants in the U.S., along with their locations and numbers of employees. A graph at the end of the article shows how UAW membership has declined, from its peak in 1979 to the present. The UAW is in critical need of new membership, and Clanton does a commendable job of presenting both sides of the recent union debate at Toyota-Georgetown.

Maynard, Micheline. "Foreign Automakers, Settled in South, Set Industry's Pace." The New York Times. June 22, 2005.

Maynard gives an overview of the automotive transplants settling in the Deep South, focusing on a Toyota engine plant and Mercedes assembly plant, both in Alabama. Workers at each facility are quoted. Important, up-to-date statistics are given for the percentage of U.S. auto production coming from transplants, total employment at transplants and average wages of transplant workers versus those of the traditional American automakers. Maynard provides data from a study by the Center for Automotive Research that estimates the total number of jobs Toyota has created in the U.S., including those at suppliers and dealerships. A brief description on the training process at the Toyota engine plant in Huntsville, Alabama is provided as well.

Miller, James P. and Popely, Rick. "Auto Industry's Center Goes South: Sunbelt's Gain is Midwest's Pain." Chicago Tribune. January 26, 2005.

This article spotlights the migration of jobs from the traditional center of the automotive industry in the upper Midwest "Rust Belt" — Michigan, Indiana, and Ohio, as well as Illinois and Wisconsin — to the Deep South. Basic information about the location of the transplants is given, as well as industry sales statistics from 1999 to 2004. During this period, total vehicle sales remained stable, but as Detroit-based automakers lost market share, the Midwest lost automotive jobs. The article also mentions that with each auto assembly job that migrates south,

five or six supplier jobs follow. The article ends on a somewhat positive note for Michigan — it continues to be the center for automotive design and development in the U.S.

Pil, Frits K. and MacDuffie, John Paul. "What Makes Transplants Thrive: Managing the Transfer of 'Best Practice' at Japanese Auto Plants in North America." Journal of World Business v34n4, p. 372-391 (Winter 1999).

Pil and MacDuffie's paper from the "Journal of World Business" is a superb overview of the success factors of transplants. The authors see the automotive industry as a prime example of how best practices in business and manufacturing can be exported from one society to others throughout the world. Pil and MacDuffie actually compare the factors among three groups of auto plants: plants in Japan, Big Three plants in the U.S. and Japanese transplants in the U.S.

First, the article examines the human-resources policies and work practices of the Japanese companies. The "three pillars" of the employment system in large Japanese companies are lifetime employment; enterprise, or company, unionism; and wages based on seniority. Other aspects of Japanese work organization are described as well, such as work teams, worker participation in problem-solving, few job classifications, extensive training and few class distinctions between labor and management (374). Sections are dedicated to each characteristic, with comparisons made among the Japanese transplants, Japanese plants and American plants.

The article also examines the three groups' use of technology instead of human capital. The authors compare the proliferation of robotics and other forms of automation in body shops, paint shops and general assembly and find that Japanese plants and transplants generally have more automation than Big Three plants.

The authors also compare supplier relations. Japanese auto producers and their transplants in the U.S. foster cooperative relationships with their suppliers, while Big Three

producers tend to pit their suppliers against one another to compete on cost. Japanese plants and transplants also have significantly fewer suppliers than the Big Three and do not inspect incoming parts (384).

Finally, Pil and MacDuffie compare the performance of the three types of plants in productivity, quality and ability to handle product variety. Labor hours per vehicle are measured to give an indication of productivity. The measurements are broken down by body shop, paint shop, general assembly and indirect, salaried and part-time labor. Quality is measured by the J.D. Power and Associates Initial Quality Survey in plant-controllable categories such as body gaps and fits, paint quality and water leaks. In both quality and productivity, Big Three plants lag behind Japanese plants and the transplants. The section on product variety makes the case that Japanese plants follow a different product strategy than Big Three plants, in which more models in different body styles come from a single plant and are sent to an extensive number of export markets. Transplants make fewer models for fewer markets, and although they have very good quality and productivity scores, the reduced product variety means they generally have less-demanding performance goals than their counterparts in Japan (387).

The article concludes with some interesting observations about the characteristics the transplants have adopted from Japanese plants and those they've borrowed from the local, American environment. The wage structures of the transplants are more similar to those in Big Three plants. Team responsibilities in the transplants are less extensive than they are in Japanese plants. Japanese plants tend to be more automated than the transplants; however, certain areas, like the body shop, tend to be very similar. Transplants have developed supplier networks in the U.S. like those their parent companies have in Japan and are increasingly using U.S. suppliers rather than importing parts from Japan. Pil and MacDuffie conclude that the transplants have,

for the most part, succeeded in adapting many Japanese practices in the U.S. and in reducing challenges presented by the new environment.

4. Management and Labor-Relations Techniques of the Transplants

This chapter discusses the six management and labor-relations techniques that have enabled the Japanese transplants to be successful, with a seventh section on controversies involving the transplants.

A. Transplants and Unions

Of the 12 Japanese-owned auto assembly plants in the United States, only three are unionized. The UAW represents workers at Mazda-Flat Rock, Mitsubishi-Normal and NUMMI. The unionization of these three transplants is evident from the circumstances under which they were built. All three had some connection to a unionized Big Three automaker. Mazda chose to add onto a vacant Ford casting plant outside Detroit to build its facility (Perucci 1994). In southeast Michigan, the cradle of the UAW and a very strong union environment, it is expected that workers at a new auto plant would gain representation. New United Motor Manufacturing was originally a General Motors plant that closed in 1982. The Fremont, California plant reopened in 1984 under Toyota management, the vast majority of its workforce consisting of laid-off GM employees. United Auto Workers Local 2144 continued to represent NUMMI workers. Mitsubishi's plant in Normal, Illinois started as a joint venture between Chrysler and Mitsubishi, known as Diamond-Star, until Chrysler sold its stake in 1991.

The remaining nine transplants have steadily resisted unionization. As of 2004, approximately one in seven auto assembly jobs in the U.S. were non-union (Butters 2003).

Location is one reason most of the transplants have remained union-free. Toyota and Nissan have located their transplants in the upper south, in Kentucky and Tennessee. The newest Japanese transplants were built even farther south, with Honda locating in Lincoln, Alabama and Nissan in Canton, Mississippi. Away from their strongholds in the Great Lakes and Northeast, unions have a more difficult time convincing the local populace that they are a necessary part of employees' working lives.

The United Autoworkers union, conversely, is desperate for new members. Membership in the UAW has declined from a peak of 1.53 million in 1969 to 624,585 in late 2003 (Szczesny 2004). The UAW has tried to organize the transplants for almost as long as they have been in operation, with little success.

The UAW attempted to organize the Honda transplants in Ohio twice in the 1980's but lost the vote both times. The Teamsters tried in 1999 and lost as well (Pakulski 2003). Most recently, the UAW ran an organizing drive from 2001 through early 2003 but failed to collect enough signatures. Only 30% of workers are required to sign election cards in order to authorize a vote, according to U.S. labor laws. However, the UAW prefers to get 60% of a workforce to sign in order to improve its chances of winning the vote to represent workers, and it failed to do so (Pakulski 2003).

Toyota's sprawling Georgetown, Kentucky complex has also resisted unionization ever since production began in 1988. In April 2004, the UAW closed its recruiting office in Georgetown indefinitely (Clanton, 2004). Only 37% of the plant's workers signed union registration cards during a recruiting drive that ran from November 2003 to April 2004 (Clanton, 2004). Toyota workers admit their company has problems, like any other, but they don't see the union as the solution.

The UAW has targeted the Nissan plant in Smyrna, Tennessee four times — in 1989, 1997, 2000 and 2001. The vote failed each time. In fact, in 1989, Nissan workers voted 70% against union representation (Szczesny 2001). Nissan management has been quite active in campaigning against the union. In-plant video monitors air anti-union messages, and fliers opposing the union have been distributed (Laws and Tang, 1999). Management has effectively refuted each of the union's claims, realizing that workers rarely vote for unions but rather against management policies (Laws and Tang, 1999).

The main obstacle unions face in organizing the transplants is that the transplants already offer excellent wages and benefits, and they realize the UAW has not been able to prevent the loss of union jobs at Big Three automakers. The unions simply do not have the incentive to organize that their forebears in the 1930's felt. For example, Toyota workers are paid \$24 per hour, slightly less than comparable unionized workers at Big Three plants. However, when wages and benefits are added, workers at Georgetown have the second-highest compensation package of any group of autoworkers in the United States, trailing only workers at the Mercedes plant in Alabama (Clanton, 2004). Toyota employees also enjoy the convenience of 24-hour childcare, an onsite pharmacy and big-name entertainment at an annual perfect-attendance banquet (Clanton, 2004).

Pro-union factions do exist within the transplants, however. Such groups cite protection from outsourcing and layoffs and a faster work pace as their main reasons for supporting the union. Toyota workers look to a nearby parts-distribution center, Transfreight, as a possible trendsetter for outsourcing. Transfreight workers earn only \$10 per hour, compared to the \$24-per-hour wage enjoyed by their neighbors at Toyota (Clanton, 2004). Employment at Toyota-Georgetown has fallen to 7,100 from its peak of 8,000 (Clanton, 2004). Yet the Japanese

transplants do not appear as interested in outsourcing as their Big Three counterparts. Honda, for example, prefers to “insource,” bringing work in-house where it can better monitor quality (Newman, 2004). Therefore, the UAW continues to struggle to convince workers that they really need union representation. As one Honda worker explained, “Honda has so much stuff in place for improving things, you really don’t need a union” (Newman 2004).

As stated before, three transplants are unionized. Mazda’s Flat Rock, Michigan plant, just south of Detroit, is one of these unionized transplants. The fact that Ford owned 25% of Mazda at the time may have led to this unionization. Mazda workers initially voted 89% in favor of the UAW (Kenney and Florida, 1993).

Mazda-Flat Rock is regarded as having the most tenuous relations between labor and management of all the Japanese transplants. However, the UAW has shown flexibility in adapting to work rules preferred by Japanese management. Mazda insists that workers at Flat Rock be classified in only two job categories, production and skilled trades. Management also has the freedom to move workers between jobs, redesign jobs and schedule overtime (Perucci 116). Multiple job categories have largely become an anachronism in automotive plants, as most Big Three plants have very few as well. The General Motors plants at Kansas City, Kansas and Shreveport, Louisiana also have only production and skilled-trades categories.

New United Motor Manufacturing, the GM-Toyota joint venture in Fremont, California, is perhaps the best example of union-management cooperation in a Japanese transplant. The NUMMI plant transformed from one of GM’s lowest quality plants, with its most militant labor union at the time of its closure in 1982, to one of GM’s top performers after Toyota took over management of the plant with largely the same workforce. Brown and Reich (1989) mention that the union probably became much friendlier because, after two years of being laid off,

Fremont workers were likely relieved to be back on the job. Also, the most militant problem workers were weeded out in the selection process. Yet the NUMMI story is still a testament to the power of trust between labor and management. Both sides were taking a risk, Toyota with a unionized American workforce and UAW Local 2144 with new management and work rules.

Overall, the Japanese transplants tend to resist unions in the United States. Their plants in Japan are organized by company unions, which tend to function more in the interests of the company than of individual workers. However, Mazda, Mitsubishi and NUMMI have demonstrated a willingness and ability to work with American unions. Perucci's (1994) study of the determining factors of transplant location finds that a state's percentage of unionized workforce is not as strong of a factor as that of proximity to existing automotive suppliers and incentives given by the state government. The transplant business model seems flexible and adaptable to unions, able to succeed in a variety of environments typical of American labor.

B. Team Organization

The concept of production teams in automotive assembly is used by all transplants and about one third of Big Three plants (Pil and MacDuffie, 1999). The General Motors plants in which the author has worked all feature the team concept.

At the General Motors Fairfax plant, teams are organized in groups of 10-12 employees. An hourly team leader supports the team, relieves missing workers and performs other administrative tasks. A salaried supervisor, called a Group Leader, supervises three or four teams on the production floor. During meetings every Friday from 11 to 11:30 a.m., teams discuss issues in the areas of quality, safety, productivity and others. The teams have autonomy to make limited decisions, such as whether or not they will rotate jobs and how often.

The Fairfax system is similar to those used throughout General Motors as part of GM's Global Manufacturing System (GMS). General Motors' Saturn plant at Spring Hill, Tennessee started with its own team organization with different acronyms and today has generally migrated to GMS like the rest of GM. The Global Manufacturing System is itself a copy of the Toyota Production System (Liker, 2004), which GM has experienced first-hand through the NUMMI joint venture. Teams at NUMMI are smaller, with four to eight employees, but the group leader position is the same (Liker, 2004).

The Japanese transplants were successful in implementing the team concept from their beginnings in the early to mid-1980's. Around this same time, Big Three plants struggled with local unions and varying work rules to put team organization into practice. The traditional "Fordist" production regimes in place at American auto companies since the 1920's did not provide for teams or team leaders. Workers were simply assigned to a single job on the line and were managed by a supervisor, often called a foreman.

The experience of the General Motors plant at Van Nuys, California, as described by Brown and Reich (1989), is typical of a unionized Big Three automotive plant and the issues it faced in trying to adapt to the team concept. In early 1982, GM announced that it would need to close five assembly plants, and Van Nuys was placed on a list of possible plants to be shuttered. However, if workers would cooperate to improve quality and productivity, GM would close another plant instead. Van Nuys faced difficult labor-management relations. A coalition of management and community leaders began a campaign to keep the plant open, urging a boycott of GM vehicles in the Los Angeles area, the nation's largest automotive market. General Motors wanted to introduce the "team concept," an emulation of Japanese management like NUMMI had implemented, at Van Nuys. In May 1986, workers narrowly approved a plan to adopt the

team concept, but only after a new model was slated for the plant. However, management's interpretation was that a new model would be produced at Van Nuys only if production of the Camaro/Firebird did not continue; thus, there was controversy over the "new model guarantee." General Motors received a grant from California's Employment Training Panel (ETP) in return for a three-year commitment to keep the plant open. In November 1986, GM decided to close Van Nuys' sister plant in Norwood, Ohio, which also produced the Camaro/Firebird, granting Van Nuys a reprieve.

General Motors used the ETP grant to train Van Nuys workers in the team concept. The training was more theoretical than practical and did not simulate actual shop-floor production problems or team meetings. Hypothetical situations, such as deciding whether to fix an oil leak or broken concrete, were discussed (Brown and Reich, 1989). Continuous on-the-job training was the intent. The team concept was implemented in May 1987, even though the local union president tried to block it through the courts. The controversy surrounding the implementation of the team concept at Van Nuys caused it to develop unevenly, leaving some fully functioning teams and others that were teams in name only. The authors rate the adoption of the team concept at Van Nuys as a "minor success/minor failure" (37). This characterization is reinforced by the fact that the plant closed in 1992, three years after Brown and Reich's article was written. The Van Nuys example is typical of the problems experienced by traditional American automakers in converting their manufacturing workforces to teams, mostly in the 1980's. Often-shaky relations between local unions and management, as well as decades of ingrained Fordist thinking, did not help, either.

The transplants that opened during this time generally got a head start in implementing work teams, since they'd developed the concept in Japan. In his list of distinguishing

characteristics of large Japanese industrial companies, Sumi (1998) includes small-group activities, like teams, on the shop-floor level. Toyota's benchmark Toyota Production System is designed around team members, team leaders and group leaders. Toyota transferred TPS from Japan after decades of improving it, so that by the time Toyota's first wholly owned transplant at Georgetown opened in 1988, the company had an excellent system of team organization. Liker (2004) describes the team organization at Toyota as a system of bottom-up management. At the bottom of the pyramid are the team members, who do the actual assembly work. The next level of management, the team leaders, support team members by relieving them on breaks, fixing problems on the line, training team members, and other tasks. Team leaders perform tasks that might have traditionally been done by salaried managers, though they do not discipline their team members. The group leader handles discipline and does other tasks that human-resources or quality specialists may do in non-team-oriented plants.

Problem-solving is a major function of teams as well. Again, this idea originated in Japan, with the quality circles introduced in Japanese plants in the 1960's (Gavroglou, 1998). Teams would meet weekly or bi-weekly to discuss a particular issue, such as quality or work-procedure improvement, cost savings or safety. Suggestion plans, in which individual workers or groups could suggest an improvement to management in exchange for a monetary reward if the suggestion was adopted, were also implemented. According to Gavroglou (1998), the average Japanese worker submits one suggestion per month. Liker (2004) mentions that during one of his visits to Toyota-Georgetown, he learned that 80,000 improvement suggestions were submitted the previous year, with a 99% implementation rate. The suggestion system at GM-Fairfax is also very active, with yearly participation near 100%. As soon as an employee, hourly

or salaried, enters a suggestion, he is entered into a yearly drawing for one of two free cars, built at the plant, regardless of whether the suggestion is adopted.

The author's research and experience suggest that the Japanese transplants and traditional American manufacturers are now fairly similar in the way their workforces are organized into production teams, though Pil's (1999) estimate that only one-third of Big Three plants use teams suggests otherwise. Nevertheless, both the Japanese transplants and American automakers have realized the quality and productivity benefits of an empowered, team-oriented workforce supported by team leaders and group leaders.

However, while the Japanese transplants are able to draw on decades of experience with team organization from their parent companies and their factories in Japan, the Big Three face a legacy of distrust between the unions and management. This historically adversarial relationship has created an uneven adoption of production teams in American-owned plants. Gavroglou (1998) writes of a visit to a Ford plant at Edison, New Jersey in which he encounters skepticism toward management and labor integration, a requirement of the team concept. Conversely, the author recalls a recent visit to GM-Fairfax by a Harbour and Associates representative, after which she commented that Fairfax has implemented GMS better than most GM plants. This illustrates the unevenness of how American-owned plants, even those within the same company, have adopted team organization.

C. Lean Production

There is perhaps no bigger buzzword in manufacturing today than "lean." Lean production ideas have infiltrated all industries. The concept itself had its beginnings at Toyota in the 1950's. In 1950, Eiji Toyoda toured Ford's Rouge complex in Detroit. He returned to Japan

and gave plant manager Taiichi Ohno an assignment: improve Toyota's manufacturing productivity to equal that of Ford (Liker, 2004). Ford had huge economies of scale and could afford to build up inventories of parts in process and have warehouses full of parts. Tiny Toyota did not have this luxury, as it did not have the space or the money. Ohno studied Henry Ford's concept of continuous flow through the assembly line and developed a one-piece flow method that used a "pull" system of production rather than a "push" system like Ford (Liker, 2004). A part would advance to the next production step only when the next step was almost out of parts, therefore "pulling" the parts from the previous step. Likewise, parts used in assembly would be delivered to the line "Just-In-Time," when they were needed, instead of waiting days or weeks in a warehouse. In this fashion, Ohno and his team worked to continuously improve efficiency and eliminate waste from the system. This practice continues today at Toyota.

Much like their experience with the organization of production teams, the Japanese transplants have decades of lean production experience from which to draw, whereas the Big Three largely did not begin to adopt such methods until the 1980s. General Motors first experienced lean production up-close at NUMMI. Its Saturn subsidiary was designed to make use of the latest lean production methods, but at least into the late 1990's it reflected examples of pre-lean thinking. One such example was the Automated Search and Retrieval System (ASRS), an enormous storage system for painted plastic body panels. A robotic carrier would select a set of panels from the ASRS, basically a large bank of parts, which is what lean production tries to avoid. General Motors spent billions in the 1980's for a sweeping modernization program. The new Hamtramck assembly plant in Detroit was to be a showcase for the latest automation technology (Ingrassia and White, 1994). Automatic Guided Vehicles (AGV's) instead of forklifts carried parts to the line. Robots painted cars and installed major components on Buicks

and Cadillacs. Unfortunately, numerous technical glitches caused the robots to paint each other and the wrong bumpers to be applied to the cars. Ingrassia and White call Hamtramck a “fantastically expensive and inefficient parody of Toyota’s system” (111).

Toyota is not known for rapidly implementing new technology, but rather for sticking with proven technologies and cautiously migrating to new ones. Its principle of *nemawashi*, which means to make decisions slowly by consensus, and then, once decisions are reached, to implement them rapidly, applies to new technology (Liker, 2004). In contrast to Hamtramck, NUMMI initially used old technology to build a variation of a car design that had been on the market a few years (Ingrassia and White, 1994) while using the state-of-the-art in lean production at the time, TPS.

The American Big Three have made great strides in implementing lean production since the 1980s. As is the case with team organization, the degree of lean production implementation varies by assembly plant, and the transplants can be said to have had a head start in lean implementation. But lean production is more than a superficial set of tools that eliminate waste in a manufacturing system. Kenny and Florida (1993) argue that American and European automakers have embraced lean production but have yet to fully realize the importance of harnessing the intelligence and process knowledge of production employees. Liker (2004) emphasizes that lean production is simply a set of tools that results from deep thinking and a cultural transformation that enables all parts of a company to embrace lean thinking, as Toyota has. Unfortunately, many companies simply do a lean project or adopt Just-In-Time production and think they are lean, but they have only scratched the surface. This illustrates how difficult true adoption of lean production can be and how valuable the head start in lean thinking the transplants brought with them from Japan has been to their competitive advantage.

D. No-Layoff Policies

The Japanese transplants have all instituted no-layoff policies, in contrast to American-owned plants, which have traditionally laid off workers during sales slowdowns. Management at non-unionized transplants has pledged that employees will not be laid off during downturns in sales. At the unionized transplants operated by Mazda, Mitsubishi and NUMMI, the UAW local and management have negotiated formal employment security agreements (Pil and MacDuffie, 1999). Pil and MacDuffie (1999) and Sumi (1998) both cite lifetime employment as a defining characteristic of Japanese industrial organizations that has been transferred to the U.S. transplants.

Several historical, political and cultural factors led to the adoption of lifetime employment and no-layoff policies in Japan. After World War II, the Japanese ruling class had been defeated. Allied forces occupying Japan encouraged unions to form among the working class. These unions became increasingly militant. Enterprise, or company-based, unions became the norm rather than the trade unions common in the U.S. The U.S. government, along with U.S. and Japanese business interests, feared these unions would become a conduit for communism in the region and thus encouraged more conservative enterprise unions. A series of bitter strikes in the late 1940's and early 1950's broke the more radical unions, and friendlier unions were formed in their place (Kenney and Florida, 1993). Management therefore dealt with unions that were confined to their companies. Therefore, any strike or labor unrest would hurt only the company of which the union was a part, awarding profits and market share to competing companies in the industry (Kenney and Florida, 1993). Labor and management became more dependent upon each other for their well being. Out of this dependency emerged the lifetime-employment guarantees that persist in Japan and in the Japanese-owned U.S. transplants today.

Kenney and Florida quote the head of Mazda's Flat Rock assembly plant in Michigan, Osamu Nabuto: "Even in Japan, the idea of lifetime employment is a moral obligation between the employer and the employee, requiring commitments on both their parts. There is nothing formal" (31).

Any manufacturer that has a no-layoff policy, formal or informal, will be forced to innovate as new technology comes to market that could replace workers or as the market for the company's products slows. Nissan's Smyrna, Tennessee plant experienced such a slowdown in the market for its compact Sentra model in 1998. Instead of laying off workers, it instituted a four-day workweek to cut production numbers. Assembly workers were paid for 36 hours per week but worked only 32. Maintenance and management personnel continued to work 40 hours per week. While the exercise may have cost Nissan a little more in the short term, workers enjoyed the three-day weekends and responded with greater company loyalty, creating a win-win situation in the long term (Laws and Tang, 1999).

A no-layoff policy may be the single most powerful way for management to gain the trust of labor. Management takes a substantial risk in making such a promise. If a production slowdown must be implemented because of changes in the market, management must be prepared to support the workforce, even if it must cut production. Breaking the no-layoff promise can severely hamper labor-management relations for years to come. Liker (2004) mentions how Toyota management made such a promise to the NUMMI workforce when it took over the plant from GM in the mid-1980's. The plant's first product was the Chevrolet Nova, a re-badged Toyota Corolla. When sales of the Nova slowed in 1987-88, NUMMI was running at only 75% capacity. Management had promised that workers would not be laid off during such production cuts and found other work for them to do. Kaizen, or continuous improvement, teams

were a common assignment for idled workers. Management gained not only helpful new ideas from the teams, but also valuable trust from the workforce.

Layoffs, the way UAW contracts are negotiated today, appear to save companies little money. When General Motors Fairfax shut down in 2003 to convert to production of the new Chevrolet Malibu, most hourly union workers were laid off. However, they continued to collect 95% of their normal pay (McCracken, 2005) and benefits while on layoff. It was not uncommon for workers to complain about coming back to work or to stay on layoff if given the choice. Under such circumstances, there appear to be few, if any, reasons for management to lay off employees, other than to get them out of the way while retooling takes place. The American Big Three, therefore, have little to gain in the way of worker trust from no-layoff policies, since current UAW contracts so effectively insulate union members from the financial pain of layoffs.

E. Recruitment Socialization

The stereotypical American worker is intelligent but very individualistic. Before the arrival of the transplants, it was thought that American workers would not buy into the more homogenous Japanese system, where workers are organized into teams that function as units, rotating jobs on the line. However, each time a Japanese transplant auto factory has opened, it has been inundated with many thousands more job applications than there are jobs available. According to one assessment coordinator at a Japanese transplant, 54,000 applications were received, which resulted in 2,000 hires, a miniscule 3.7% acceptance rate (Perucci, 1999). The excellent pay and benefits the transplants provide are a substantial draw for the local workforce. The transplants can therefore be very selective in their hiring. Lengthy, detailed interview processes are the norm. Only the most skilled, qualified applicants are offered positions. New

hires then must complete weeks of intensive training. The transplants have developed a successful method of recruitment socialization, so new hires will already feel a strong bond to each other and feel special because they have made it through the rigorous hiring process.

Pils and MacDuffie (1999) state that, on average, only 5% of those who apply to work at Japanese transplants are actually hired. Nearly 40% of transplant assembly workers have some college education, compared to about 15% of workers in Big Three plants. When hiring assembly workers, Big Three manufacturers place the most emphasis on previous experience and technical skills. Transplants are more likely to look for a readiness to learn new skills and the ability to work well with others (Pil and MacDuffie, 1999). As a result, the transplants gain a highly motivated, skilled workforce eager to learn new philosophies and production methods, easing the cultural divisions that come with the transfer of the Japanese system.

The opening of a new automotive factory is a momentous event in any community. The media outlets in the communities in which the transplants are built provide heavy coverage on such subjects as the amount of jobs to be created and the amount of applicants expected. Recruitment socialization begins with this portrayal, that jobs at transplants are very desirable because of the huge number of applicants. Therefore, applicants who are hired will often feel special, a cut above other workers (Perucci, 1994).

Perruci (1994) describes the hiring processes at Mazda and Subaru-Isuzu transplants. Mazda requires two hours of written tests, a personal interview, a medical examination and simulations of the social situations and physical tasks involved in the job. A similar process is described for applicants to Subaru-Isuzu. A screening process of nearly five months includes written tests and questionnaires, timed group exercises and tests of physical endurance and

dexterity. Applicants who complete these lengthy screening processes together get to know one another, and a sense of camaraderie develops that they carry into the workplace if they are hired.

Through recruitment socialization, the Japanese transplants are able to recruit a skilled, motivated workforce that is willing to learn the Japanese philosophy. According to one assessment coordinator, they tend to avoid applicants who have extensive experience in the U.S. auto industry, preferring workers who don't have to unlearn "bad habits" associated with U.S. autoworkers (Perucci, 1999). Such stereotypes may be unfounded, but nevertheless, the transplants have been able to attract some of the best workforces in manufacturing.

F. Supplier Relations

The topic of supplier relations between an original equipment manufacturer (OEM) such as General Motors or Toyota and its parts suppliers is not directly related to relations between labor and management, but is a management technique that is worth discussion because it is a major enabler for the success of Japanese automakers and their transplants in the United States. Japanese manufacturers in Japan have historically had close ties with their suppliers. In many cases, the OEM owns part of the supplier. One study showed that Toyota and Nissan owned an average of 23% of the stock in their supplier partners (Pil and MacDuffie, 1999). In Japan, such networks between OEM's and suppliers are called *kieretsu* systems. A Japanese automaker that owns such a large stake in a supplier as part of a *kieretsu* will take great interest in the financial well-being of the supplier. Both sides will work hard to foster a close working relationship. This leads to rapid transfer of ideas and technologies and improves product design, quality and delivery.

When Japanese auto manufacturers first built transplants in the U.S., they used mostly parts imported from suppliers in Japan and simply assembled the vehicles in the U.S. The transplants originally located in the lower Midwest to be close to the existing network of U.S. parts suppliers. However, they soon found that American suppliers were not able to meet their quality requirements. For example, in 1990 Toyota estimated that the defect rate of parts coming from its American and European suppliers was 100 times greater than that of its Japanese suppliers (Kenney and Florida, 1993). The Japanese OEM's encouraged their suppliers to build plants of their own in the U.S. to serve the transplants, and an infrastructure of Japanese suppliers in the U.S. was born. More recently, some of the transplants' business has gone to U.S.-based suppliers that can meet their quality standards.

U.S. and Japanese OEM's have traditionally dealt with their suppliers very differently. A Big Three manufacturer typically has thousands of suppliers, and contracts are awarded to whomever offers the lowest price at the time. The strategy the Big Three have taken with their suppliers, as one supplier executive put it, is "line 'em up and beat 'em up until you get 'em to a point where they can't make money anymore. Then you've got the best price" (Kenney and Florida, 1993).

In contrast, a Japanese automaker encourages a long-term, mutually beneficial relationship with its suppliers. This is a requirement of a successful Just-In-Time production system. Suppliers must have close interaction in operations and product development and are often geographically close (Kenney and Florida, 1993). The transplants enjoy very high levels of quality from their suppliers and reward quality with renewed contracts.

Japanese OEM's sponsor supplier-development programs that assist suppliers in solving quality issues, designing new products and sharing best practices. Toyota does an excellent job

of developing its suppliers and is consistently at the top of suppliers' lists of the best OEM's with which to work. It even runs the Toyota Supplier Support Center, a consulting firm that contracts with suppliers and companies outside the auto industry to teach the Toyota Production System through projects at the hiring firm (Liker, 2004). Toyota purchasing has its own Toyota Production System experts, who help troubled suppliers. When a supplier has trouble and puts a Toyota plant in danger of shutting down, Toyota sends a team to the supplier's facility to help resolve the issue. Toyota-Georgetown manager Don Jackson recalls a time when he worked for a supplier to Ford and the supplier shut down the Ford plant for a day. No personnel from Ford came to his plant to help resolve the issue (Liker, 2004). A typical response from a Big Three manufacturer would be to berate the supplier and threaten to take the business elsewhere if problems were not fixed. The Japanese OEM's, like Toyota and its U.S. transplants, take the approach of nursing their suppliers back to health.

This is not to say that the Japanese companies do not criticize their suppliers. In Japan, Toyota's Operations Management Consulting Division (OMCD) runs *jishuken*, a clinic for suppliers who need improvement (Liker, 2004). Suppliers are told to join a *jishuken*, and attendance is mandatory. Experts in the Toyota Production System who work in the OMCD assign the supplier a project and give it specific goals and timing. The Toyota experts may verbally abuse the suppliers during the *jishuken* (Liker, 2004). But astonishing results are achieved, and suppliers who go through the process gain enormous confidence, in addition to improvements in their operations.

Good supplier relations are a major success factor for the Japanese transplants. Obviously, both transplants and the American Big Three will experience problems with their suppliers. But research suggests that the Big Three tend to take a more antagonistic approach

toward dealings with suppliers. As in the other management and labor relations areas, Japanese automakers and their transplants take a longer-term view. They seek to build lasting working relationships with their suppliers and spend time and resources helping them improve, as this is in the best interest of both companies.

G. Controversies Involving the Transplants

The Japanese transplants have used state-of-the-art management and labor-relations methods to achieve levels of quality and productivity once thought unattainable with an American workforce. They have transformed an entire industry and hundreds of communities in the United States along the way. However, while most of this transformation has been positive, it is important to note some of the controversies surrounding the transplants. There are disagreements about whether some aspects of the transplant business model are truly positive, or whether they do more harm than good.

Most transplants are non-union, though union-organizing drives at the transplants have found their supporters. Union supporters often cite the speed of work and concern for worker safety among their chief reasons for wanting union representation. Perucci (1993) echoes this sentiment in naming the disadvantages of Japanese industrial organization, which the transplants emulate: 1) The speed and intensity of the work. 2) The expectation that workers will stay as long as they are needed, rather than strictly set hours. 3) Potential physical and mental health risks. 4) The factory regime that tries to control a large part of workers' lives through policies such as dress codes and detailed codes of conduct.

The fact that the Japanese have a term for death from overwork, *karoshi*, can be an ominous sign for workers at transplants. Repetitive motion injury is a major concern for

autoworkers, and there is evidence that workers at transplants report more cases of repetitive motion injury than their counterparts in American-owned plants. In 1988, according to the Michigan Labor Department, workers at Mazda-Flat Rock reported 4.1 injuries per hundred workers, more than three times the Big Three average of 1.2 (Kenney and Florida, 1993). In the same year, the UAW health and safety representative reported that 20% of workers at Nissan-Smyrna reported injuries, a higher rate than normal (Kenney and Florida, 1993). The fact that the UAW has continually failed to organize the transplants, despite the fact that worker safety is one of the major issues of the pro-UAW platform, is evidence that perhaps the incidence of injuries has improved since the late 1980's. But it is difficult to obtain information on worker injuries at different plants, since they are often under-reported.

Another controversy involving the Japanese transplants is whether the transplants have tried to remain racially homogenous by locating mainly in white, rural areas. This trend may decrease with the latest transplants, such as Toyota's San Antonio truck plant, which is in an area with a large Hispanic population, and Hyundai's Montgomery, Alabama plant, which is in a community with a high percentage of African Americans. The earlier transplants, which were established in the Midwest, tended to locate in green-field sites in rural areas or small cities. Honda-Marysville and Subaru-Isuzu-Lafayette are in counties with less than 3% minority population. Mitsubishi-Normal is in a county with a 4.8% minority population, and Scott County, Kentucky, home to Toyota-Georgetown, has a 7.6% minority population (Kenney and Florida, 1993). One transplant executive is even quoted by Kenney and Florida (1993) as stating his plant was located to "avoid unions and blacks."

Such bluntness may be extreme, but the racial makeup of the transplants' workforce is probably their most controversial aspect. Honda and Toyota did significantly increase the

percentage of minorities in their transplant workforces between 1987 and 1990, however, to numbers higher than that of the surrounding communities (Kenney and Florida, 1993). This tendency of Japanese transplants to locate in less-racially diverse areas may be related to the homogenous environment they are used to in Japan. Still, in the melting pot that is the United States, companies cannot expect this, and their workforces must reflect the racial makeup of the communities in which they locate. So long as the transplants did not choose their locations based primarily on racial makeup, the accusations can be forgiven. Research suggests that incentive packages offered by state governments and proximity to existing supplier networks were the top considerations for transplant consideration, at least in the case of the first-wave transplants of the 1980's.

A third controversy surrounding the Japanese transplants centers on the incentives offered by the state governments to attract foreign investment. Perucci (1994) describes a trend called “corporatism” in which an activist local state provides millions in public funds in order to attract a foreign-owned company to locate a facility in the state. This phenomenon has resulted in some lavish incentives from the states to the Japanese auto companies. Some of these incentives are shown in Table 4.1 below:

Transplant	State	Start Date	Total Direct Incentives (millions \$)
Subaru-Isuzu	Indiana	1989	166.7
Toyota	Kentucky	1988	149.7
Mitsubishi	Illinois	1988	83.3
Mazda	Michigan	1987	48.5
Nissan	Tennessee	1983	33.0
Honda	Ohio	1982	20.0

Table 4.1: Incentives Given to Transplants by States
Source: Perucci (1994)

When negotiating with the state of Kentucky for the Georgetown facility, Toyota also secured \$800 million in industrial-revenue-bond financing, which exempted it from property taxes. Toyota located the plant outside the city limits of Georgetown yet still required that Georgetown and Scott County provide utilities and services to the plant. The city and county did not have the budget to support such a large industrial facility, so they had to negotiate with Toyota to annex the plant and gain revenue in lieu of property taxes (Kenney and Florida, 1993).

The controversy around incentives is clear: is it right for state governments to use monetary rewards to entice foreign investment? True, the Japanese transplants do create thousands of jobs and substantial tax revenue, which fuel economic growth. Jobs and revenue stay in the community, but the profits of the company ultimately end up back in Japan. Research suggests that incentives do not play a major role in the site selection process. Proximity to suppliers and customers is the most important factor, with anything else at least a distant second. Japanese transplants have become increasingly aware that their image in the community may be damaged if they accept heavy incentives, so the transplants have become more conservative.

Controversy may continue to surround the Japanese transplants, but they appear to have compelling arguments against the issues of race and location and financial incentives. The incidence of worker injuries in the transplants is difficult to fully determine, but it is reasonable to assume that if workers, as a whole, were mistreated or had unreasonable expectations put upon them by Japanese management, they would have unionized long ago.

5. Supporting Data

The labor relations and management techniques of the Japanese automotive transplants have translated into a successful business model. Japanese automobiles built in both Japan and

the U.S. garner excellent reviews from the press and are sales leaders across many market segments. Such external indicators are a measure of the design quality as well as the manufacturing quality of the vehicle. As the transplants themselves are in the business of manufacturing cars and trucks, rather than designing them, the best indicators of success are external measurements of how well the plants run. Quality and efficiency are the two main external measurements in which automotive assembly plants strive to continuously improve to beat competitors.

A leading quality indicator is the J.D. Power and Associates Initial Quality Study. Released each year in spring, this study ranks makes and models according to problems per hundred, as reported on surveys sent to buyers after 90 days of ownership. Automakers place supreme importance on the J.D. Power survey, as it is the only survey that allows advertisement based upon its results.

Gavroglou (1998) compares the reliability of American automobiles to that of Japanese automobiles, as measured by the J.D. Power Vehicle Dependability Index, from 1990-1993. Frequency of repair, as measured by *Consumer Reports*, is also measured by Gavroglou (1998) from the 1973 through 1993 model years. While Gavroglou takes data for Japanese makes, which includes vehicles built in Japan, instead of only those built in Japanese transplants in the United States, his data provides a historical basis for comparison. U.S. autos shown in the data are solely made by the traditional Big Three American automakers. Graphs are provided, which plot model year against reliability rating, where 1 = least reliable and 5 = most reliable. The *Consumer Reports* graph for repair frequency shows Japanese and U.S. autos virtually tied at a rating of 3 in 1973. After this, Japanese autos begin to rise into the 4 to 5 range, where they remain for the rest of the period, which ends with the 1993 model year. Meanwhile, U.S. autos

decline to the 2 range by the mid-1980's and rise to 2.5 by the end of the period. J.D. Power Vehicle Dependability Index data is presented in table form, with the top five most reliable makes (not including European brands) and their index scores for each year. Higher scores in the VDI are better. Table 5.1 presents this data. For the years 1990-1993, 10 of the possible 20 spots are occupied by Japanese brands.

Year	Make	Origin	Score	Rank
1990	Toyota	Japan	149	2
	Honda	Japan	137	3
	Buick	USA	133	4
	Cadillac	USA	121	5
1991	Lexus	Japan	144	1
	Infiniti	Japan	142	2
	Honda	Japan	132	4
	Acura	Japan	150	5
1992	Honda	Japan	157	2
	Acura	Japan	150	3
	Lincoln	USA	137	4
1993	Acura	Japan	160	2
	Cadillac	USA	151	3
	Toyota	Japan	139	5

Table 5.1: J.D. Power Vehicle Dependability Index data.
Source: Gavroglou (1998)

The data does show that the Japanese makes are of higher quality, at least for the time period studied. Gavroglou's main purpose is to illustrate that Japanese labor relations techniques produce better results than the traditional American Fordist regime. The data also shows that American makes did improve after the mid 1980's. This improvement corresponds to the period when the Big Three moved to involve the workforce more in decision-making and problem-solving, a movement Gavroglou calls "Jointness."

This study aims to prove a similar relationship between management and labor relations techniques, but solely between the American and Japanese-owned assembly plants in the United States. J.D. Power Initial Quality Study data was obtained for the years 2002 through 2004. J.D.

Power released problems per hundred (pph) data for every assembly plant in North America. An average pph value was calculated for all Big Three-owned plants in the United States and compared to the corresponding average pph value of all Japanese transplants in the United States. Plants in Canada and Mexico were excluded, as were German transplants operating in the United States. Table 5.2 shows these results. Figure 5.1 arranges the results in a graph.

Year	American Big Three Avg. pph	Japanese Transplant Avg. pph
2002	138.8	135.0
2003	137.7	136.5
2004	123.8	126.0

Table 5.2: J.D. Power Initial Quality Study pph averages
 Source: J.D. Power Initial Quality Study, 2002, 2003, 2004.

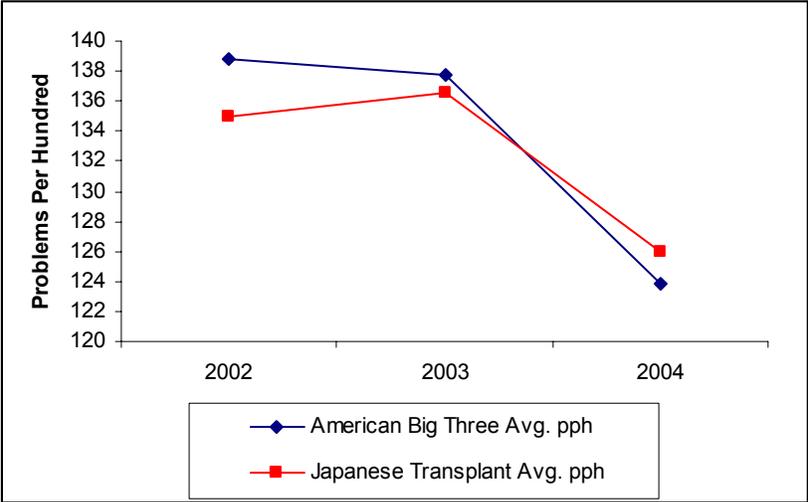


Figure 5.1: J.D. Power Initial Quality Study pph averages
 Source: J.D. Power Initial Quality Study, 2002, 2003, 2004.

This data illustrates the steady improvement in quality made by both Japanese and American automakers in recent years and reflects how the gap has narrowed to only a few pph. The drop from 2003 to 2004 is quite impressive. Even more interesting is the fact that, for 2004,

the American Big Three average is better than the average of the Japanese transplants. The omission of Canadian plants does change these results somewhat. General Motors' Oshawa, Ontario car plants have had pph scores in the 80's and 90's quite often in recent years and were the best performing North American plants in the 2005 J.D. Power Survey. The 2004 data for the transplants may also be somewhat skewed by the Nissan plant in Canton, Mississippi, which scored 225 pph. The year 2004 was Nissan-Canton's first year in the survey, so it was still dealing with startup issues, though high quality at launch is increasingly expected in today's marketplace.

A second study was conducted to compare the efficiency of the American Big Three plants versus the Japanese transplants in the United States. The Harbour Report is an annual study of efficiency of North American automotive assembly plants, measured in hours per vehicle. Harbour Reports were requested for the years 2000 through 2005, but only 1999 through 2001 data could be obtained. The Harbour Report data was averaged along the lines of Big Three plants and Japanese transplants in the United States, in a similar fashion as the J.D. Power data. Table 5.3 presents these numbers, while Figure 5.2 shows them in graph form.

	1999	2000	2001
Big Three	28.28	27.39	27.47
Japanese Transplants	22.90	22.00	22.57

Table 5.3: Efficiency data in hours per vehicle from the Harbour Report
 Source: The Harbour Report, 2000 and 2001.

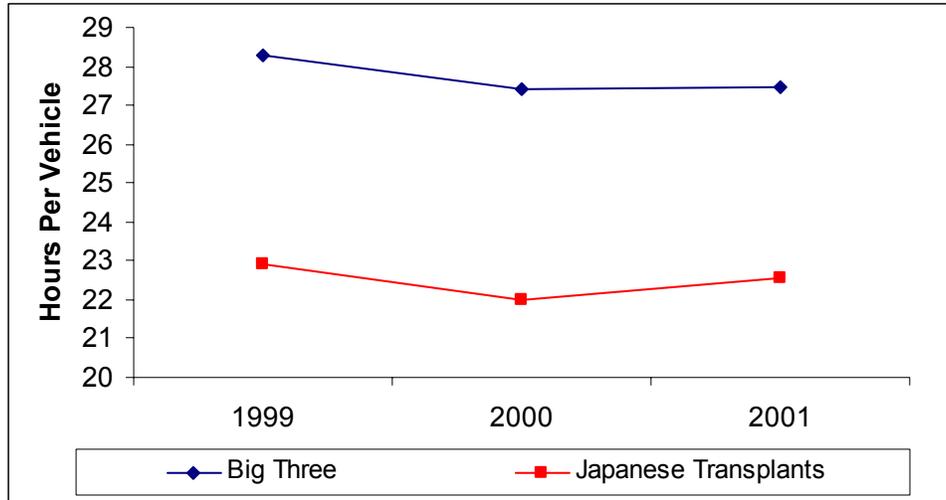


Figure 5.2: Efficiency data in hours per vehicle from the Harbour Report
 Source: The Harbour Report, 2000 and 2001.

Harbour Report data shows that the transplants do have a significant advantage over the American-owned plants in hours per vehicle. The management and labor-relations techniques transferred from Japan to the transplants over the past 25 years have contributed to this advantage in efficiency. More recent data would likely show a decrease in the gap between the Big Three and the transplants, as the gap has closed in initial quality as measured by J.D. Power. However, the transplants continue to lead the Big Three in hours per vehicle.

6. Conclusions

This study has explored the reasons behind the success of the Japanese-owned automotive assembly plants in the United States, known as the transplants. As the assembly plants themselves are not responsible for the design and engineering of the vehicles they build, their success is measured in terms of quality and efficiency. It is the management and labor-relations techniques employed by the transplants that make this success possible. Chapter 4 detailed six main factors that were identified as enablers for the success of the transplants in efficiently

manufacturing high quality vehicles. Chapter 5 showed the results of implementing these enablers through quality and efficiency statistics obtained through third-party studies.

One possible conclusion might be to determine which of the six management and labor-relations techniques employed by the transplants is most important or does the most good toward improving quality and efficiency. Examining the six enablers — non-unionization, team organization, lean production, no-layoff policies, recruitment socialization and good supplier relations — it is difficult to choose one to recommend to a Big Three manufacturer to implement fully to have the most opportunity for success. This is not surprising. Obviously, there is no simple recipe for success that the Big Three, who have studied Japanese manufacturing and management practices and have had first-hand experience with them through joint ventures over the last 20 years, have not yet identified.

It is possible to succeed in quality and efficiency with a union, such as the United Auto Workers. The Big Three are at a large disadvantage today, compared to the transplants, because their cost structures come from the generous wage and benefit packages they've negotiated with the UAW over several decades. Stereotypes of American union auto workers characterize them as lazy and caring only about what the company does for them in terms of a paycheck rather than what they do for the company in terms of quality of work. Unionized transplants, with NUMMI as the best example, demonstrate that UAW workers can thrive under Japanese-inspired management. In fact, as Deming would emphasize, it is management's responsibility to create the systems and processes that enable workers to produce quality products. The author's first-hand experience in General Motors plants at which the Global Manufacturing System, itself a copy of the Toyota Production System, is in place indicates that UAW workers are as capable as any in the world under management educated in these principles.

The next two techniques used extensively by the transplants, team organization and lean production, are widely used across the Big Three today. Work teams could be considered to be an integral part of a lean-production organization, though the two concepts were discussed independently. Both strive to eliminate waste. Team organization does this by eliminating unneeded layers of management, and lean production does this by removing unneeded inventory and processes. It's safe to say that any automotive manufacturer serious about achieving world-class quality and efficiency must implement lean production and team organization in its assembly operations.

The no-layoff policies instituted by the transplants distinguish them from the Big Three plants more than the other enablers. This is because, historically, the Big Three have freely used layoffs as a way to adjust their labor supply to market demands. Contracts between the UAW and the American automakers have continuously increased layoff benefits to the point that today, laid-off UAW workers get 95% of their wages and benefits while they are not working. The transplants sought to avoid this issue altogether by promising that they would not lay off their employees, except in extreme cases. These agreements required a significant amount of trust from labor. The transplants, having kept their no-layoff promises, continued to gain the trust of their workforces, something with which the Big Three struggled. No-layoff policies are not as effective under today's rich union contracts, and while management should do everything it can to gain the trust of labor, other methods may be more effective.

Recruitment socialization is another distinguishing characteristic of the transplants. The typical Big Three plant workforce spans a wide array of ages, though its average age is in the 50's. Newer plants tend to employ workforces that have come from older plants that have closed. For example, a new General Motors plant under construction in Lansing, Michigan will employ

the workforce idled from the closing of an older GM plant in Lansing. The workers have been on the job for some time, and although small groups may have hired in together, the large-scale recruitment of new workers experienced when a transplant opens is not seen in this and other Big Three plants. The transplants' rigorous interview processes and training programs bond those who make it through together. Whether these teams as a whole are stronger or work better together than teams whose members have been together in the same plant for years, though they came in at different times, is not known; it really depends on the individuals within the team.

Improving supplier relations should be a priority for any automaker that has difficulty dealing with its suppliers. The Japanese transplants clearly have an advantage in this area, as evidenced by recent supplier surveys. Domestic manufacturers still need to improve in this area, especially as they give greater engineering and design responsibility of key vehicle components to their suppliers. Exactly how to improve these relations could be the subject of further research, but it is clear that the Japanese transplants seem to take a more hands-on approach toward working with suppliers, especially when helping them fix problems.

Despite the business success and positive press the transplants have gained over the past 25 years, they are subject to controversy. Japanese automotive transplants do both harm and good in the United States. Obviously, they harm the domestic auto industry by making it easier for their foreign competitors to gain market share. This, in turn, puts many more jobs at risk than the transplants provide, since the Big Three employ so many more people. However, it is also true that the transplants and foreign competition in general have helped the Big Three by forcing them to make better, higher-quality products, in turn serving the greater good of the American public. From the worker perspective, transplant workers seem to work harder, with less

individuality, than their unionized Big Three counterparts. However, wages and benefits are competitive enough to keep unions out, and this will be the case for the foreseeable future.

Looking forward, the American auto industry seems to be experiencing a paradigm shift. The Big Three, especially Ford and GM, lost money in 2005 and face huge challenges in cutting health-care costs and regaining market share. The recent bankruptcy of Delphi, the world's largest automotive supplier, indicates the degree to which the cost structures of the Big Three must be realigned. Retiree pensions and health care are an enormous drag on company profits. Each General Motors employee currently supports over two GM retirees, and health care costs add around \$1,500 to every car GM builds. It is obvious that the survival of the Big Three, in the face of strong competition from Japan and up-and-coming competitors from Korea and even China, depends on major restructuring of health-care costs to bring them in line with foreign competition. Health-care costs are a national issue that threatens the vitality of the U.S. economy, and the solutions require much further research than is the scope of this project.

The Big Three domestic auto manufacturers have responded to foreign competition, including the transplants, with improved quality and efficiency, implementing all of the six management and labor relations techniques discussed here to varying degrees. As seen in the J.D. Power data, the large gap in quality between American and Japanese-branded vehicles that once existed has become very small, though the average American consumer does not yet realize this. The Harbour Report indicates that a larger gap may still exist in efficiency, though it, too, is closing. The next decade will likely see these gaps continuing to close. The Big Three plants will see the bulk of their manufacturing workforce, which comes from the Baby Boomer generation, begin to retire. Though they will lose valuable experience with these retirements, the domestics will have the opportunity to employ a younger workforce that, with proper training,

can be more skilled in the problem-solving and technical skills demanded of the 21st century auto assembler, in the vein of Kenney and Florida's innovation-mediated production model. The average age of the Big Three worker will inch closer to that of the transplant worker.

Management must evolve as well. While the Big Three automakers have adopted many of the Japanese management and labor-relations techniques, their applications are still uneven across companies and individual plants. Ford, GM and Chrysler have each undergone significant corporate restructuring since they began to adopt Japanese-inspired management and production techniques in the 1980's. These changes have made the adoption of the new techniques less uniform. For example, GM's Saturn division started as an independent subsidiary, with a very progressive agreement between the Corporation and the UAW in the mid-1980's. But now, Saturn has become merely a GM brand, sharing components and platforms with other GM divisions. Its innovative plant in Spring Hill, Tennessee is now just another GM assembly plant, and its workers have adopted the national UAW agreement. So, although GM's manufacturing plants have vastly improved in quality and efficiency since Saturn's inception in the 1980's, mainly through the Toyota and NUMMI-inspired Global Manufacturing System, Saturn was brought into the fold and has become less innovative in management and labor relations.

The auto industry in the United States will continue to prosper for, despite the growth in Asia, it remains the world's most lucrative automotive market, and its driving population is still growing rapidly. The transplants have introduced a new, more successful business model for automotive production and taken much of the market from the traditional domestic auto manufacturers. The Big Three have learned from the transplants and applied many of their techniques in management and labor relations to increase their own successes. Results can be seen in recent quality and efficiency studies. Going forward, the author sees the business models

used by the transplants and the Big Three continuing to converge, as new challenges arise from upstart automotive companies in China. Together, both the domestic and foreign companies assembling automobiles in the United States must strive to advance the role of the United States as a center for automotive manufacturing.

7. Suggestions for Further Research

This project examined the success of the Japanese-owned automotive assembly plants in the United States, as a result of the management and labor-relations techniques they employ to enable their workers to produce high-quality vehicles with a high degree of efficiency. Judging from J.D. Power quality data, it could be said that American and Japanese manufacturers are now generally even in assembly quality. American manufacturers now produce better designed and engineered cars and trucks that rival their foreign competition. Yet American manufacturers continue to lose market share to their foreign rivals. Further research might investigate what the American manufacturers might do to change the perception that persists of their cars as being of lower quality and desirability than Japanese or German cars. Such research would focus more on sales, marketing and public relations than on management and labor relations in a manufacturing environment.

A second suggestion for further research would be to examine the positive and negative affects of the Japanese transplants on American communities. Perrucci (1994) studies some of these impacts in his book, though the transplants he studies are in the upper South and Midwest. It may be worthwhile to update this study and address the impacts of transplants built more recently in the Deep South, such as Honda and Hyundai in Alabama and Nissan in Mississippi.

The management and labor-relations techniques of the transplants could easily be applied to other industries, even those outside manufacturing. Liker (2004) provides chapters on applying the Toyota Way to other organizations. In the same way, additional research could be performed on how to implement work teams and strengthen supplier relations, for example, in other industries.

Finally, since this project was concerned with identifying what management and labor-relations techniques the Japanese automotive transplants used to gain their success and how they enacted them, further research could be done on any of the individual techniques identified: working without unions, team organization, lean production, recruitment socialization, and improving supplier relations. Best practices and new applications could be identified for these techniques as well.

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Appendix A: Approximate Locations of Japanese Transplant Auto Assembly Plants in the United States

