

EVALUATING A JOINT VENTURE: NUMMI AT AGE 20

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Abstract

In 2004, General Motors and Toyota celebrated the 20th anniversary of the formation of their 50-50 joint venture, New United Motor Manufacturing, Inc. Lessons learned in the new company have been applied by GM in its new Saturn plant, and have provided valuable information to Toyota as it developed wholly owned factories in the U.S. While both partners have benefited from the joint venture, it appears that Toyota has been better able to apply what was learned. This paper explores the evidence regarding the differences in benefits and the probable causes of these differences.

Introduction

In 1984, New United Motors Manufacturing, Inc. was formed as an independent California corporation located in Fremont. Competitors Toyota and General Motors received permission from the Federal Trade Commission to operate it as a joint venture for a period of twelve years. The manufacturing plant to be used was a General Motors facility that had been closed in 1982 due primarily to poor productivity, poor quality, and labor problems. In 1983, the labor union that had represented the workers when it was a General Motors factory, the United Auto Workers (UAW), was invited to participate in discussions concerning management-labor relations for the proposed new venture. Before the actual incorporation of NUMMI, the representatives of the union and representatives of the proposed joint venture signed a Letter of Intent stating their objective of developing a new, cooperative approach to relations between the union and management. After the incorporation of NUMMI, applications were sent to some 5,000 former GM-Fremont employees. The level of trust developed was such that workers were hired and initial production begun before the formal labor agreement was signed between UAW Local 2244 and NUMMI in 1985.

The plant produced its first Chevrolet Nova in December 1984 and its first Toyota Corolla FX16 in April 1986. Both automobile models were produced on the same assembly line by the same workers. Another assembly line was added in 1991 to produce Toyota compact pickup trucks. The company presently produces the Toyota Corolla, Toyota Voltz (a right-hand drive car that is exported to Japan), Pontiac Vibe, and Toyota Tacoma pickup truck. The company produced its five millionth vehicle in December 2002, is currently producing at its highest rate ever, and is unable to keep up with demand for the Tacoma in spite of running two shifts. (NUMMI, 2004a)

New United Motors Manufacturing Inc. has been a successful joint venture from the beginning. In 1993, GM, Toyota, and NUMMI jointly, and successfully, petitioned the FTC to vacate the original order limiting NUMMI to a twelve-year life and other restrictions that had been placed on it. It has increased its capacity for automobile production, added a new line for making pickup trucks. It has also added a number of lines for producing parts formerly obtained from outside, including a \$47 million stamping line added in 2000. Its Toyota vehicles have won a

number of J. D. Power and Associates Initial Quality awards, Top Car under \$15,000 ratings from the American Automobile Association, Consumer Digest's "Best Buy" rankings, and other recognition. The company has received a number of J. D. Power and Associates Plant Awards for its factory, and it has received DNV Certification Inc. Environment Management Certification (ISO 14001). (NUMMI, 2004b; Hoovers, 2004) Productivity is high. The labor turnover rate is lower than that of most U.S. facilities and labor relations are good.

Both General Motors and Toyota have benefited from what they have learned in the joint venture, and both have obtained high-quality cars for sale in the U.S. and, in Toyota's case, Japan. While both have benefited, it appears that Toyota has been better able to apply what was learned. In the next section, the objectives of both General Motors and Toyota in entering the 50-50 joint venture are discussed. In the succeeding sections, we review the approaches used at NUMMI and the results achieved, what each of the companies learned and how well they were able to apply what they learned. Finally, there is an evaluation of the benefits each received.

In preparing this paper, the authors of this article have used primary as well as secondary research. During the period from 1983 through 2004, the authors attended meetings and conducted interviews with Japanese executives in both Japan and the U.S., with American managers and workers from NUMMI, with a UAW union official, and with executives from General Motors. A visit was made to Toyota factories in Toyota City, Japan and several visits were made to the NUMMI plant in California. "Interviews, meetings, factory visits" are listed first under "References" at the end of the paper, followed by "Articles, books, Internet sources."

Objectives of the Joint Venture Partners

Background

Toyota's initial attempt to export compact cars to the U.S. in 1958 had failed because of poor quality and styling. After redesigning their automobiles and improving quality, they made a second, and successful, entry into the American market. The oil crises of 1973 and 1978-9 greatly increased U.S. demand for compact and sub-compact cars as gasoline shortages and sharp price increases occurred. Toyota and several other Japanese manufacturers were well positioned to supply this growing market with their high quality, fuel-efficient vehicles. (Duerr, Gurney and Nicholson, 2005, 47)

American automobile manufacturers had traditionally concentrated on the production of large automobiles. Several U.S. companies had produced small automobiles even before the Japanese entered the U.S. market but, at the prices offered, market demand for most models had been weak. (Studebaker had briefly made a popular small car, but production ended when the company ceased operations.) During the 1970s and 1980s, the growing demand for small cars was thus met largely by imported cars. The U.S. companies were not able to produce, in the United States, small cars at as low a price or as high in quality as those made in Japan. Thus, at the time of the oil crises, American manufacturers were not in a position to compete effectively in the small car market. The U.S. companies placed the blame on unfair competition, the cheap

and exploited/unreasonably hard-working Japanese labor force, and/or on American unionized labor that produced poor quality products at high cost.

The Japanese, with increasing dominance in compacts and sub-compacts, captured a growing share of the total U.S. market for cars. Employment in the U.S. automobile industry fell by 33.6 percent, a loss of 347,000 jobs. (Wong, 1989, 87)

When the American industry's marketing and manufacturing efforts failed to recapture the sub-compact market from the Japanese, the Reagan Administration convinced the Japanese government to impose a limit on its exports --- a Voluntary Restraint Agreement (VRA) --- in 1981. From the standpoint of the Japanese government, imposing a VRA seemed preferable to the possibility that the U.S. government might impose even stricter quotas. Under this agreement, Japanese imports were to be restricted to 1.68 million units per year or 17.5 percent of American market demand. (Prestowitz, Jr., 1989, 421-422) The limits were raised in 1984 and again in 1986, but still placed an absolute limit on the number of automobiles Japan could export.

The VRA did not reduce the profits of the Japanese automobile manufacturers. They had been selling at prices well below those that the U.S. competition could offer in order to gain market share. Faced with an absolute limit on the number of vehicles they could sell, they put more required options on their cars, introduced more expensive models, and raised prices. It has been estimated that the VRA thus increased the profits of the Japanese companies by \$1 billion to 1.6 billion in 1983, and by \$1.6 billion to \$2.6 billion in 1984. (Smith, 1989, 15)

The Japanese manufacturers still desired to increase market share in the U.S. beyond what the VRA would permit. Honda thus started manufacturing automobiles in a plant in Marysville, Ohio in 1982 and Nissan began production in Smyrna, Tennessee in 1983. (Wong, 1989, 89) These factories proved capable of producing automobiles of higher quality and at lower costs than the American companies could. (Japanese companies in other industries, including Sony, had established high performance plants in the U.S. earlier, but most of those did not have strong unions.)

Given the Honda and Nissan examples, American automobile manufacturers began to realize that at least part of the Japanese success was due to management policies and production systems. Still, most of the Japanese plants used non-union labor while all of the major American automobile companies had workforces with strong unions, and entrenched managements, that were both resistant to change.

Toyota's Objectives

Toyota's primary objective in beginning manufacturing in the United States was to protect and increase its market share. It has a long-range goal of surpassing General Motors as the world's leading manufacturer of automobiles. (Armstrong et al, 1985, 42) It had earlier overtaken Nissan to become Japan's largest automobile manufacturer, and did not want to have its position in America eroded. Toyota preferred to manufacture only in Japan and export their cars to world

markets. (Duerr, Gurney and Nicholson, 2005, 47) With the VRA, and Honda and Nissan now producing cars in the U.S., Toyota felt that it also had to establish manufacturing facilities there.

A U.S. plant would be Toyota's first overseas manufacturing facility, and the company had many concerns. A joint venture was viewed as an approach that would lower the risk while providing help in overcoming difficult potential problems. Toyota stated that it wanted to (1) gain experience with American unionized labor, (2) gain experience with American suppliers, and (3) help diffuse the trade issue between the United States and Japan. (Community Relations Department, 1990, 1) Regarding the third objective, the job-creating effects of foreign direct investment are believed to defuse the protectionist sentiment caused by imports. (Wong, 1989, 89) Douglas Fraser, then president of the United Automobile Workers union, earlier had gone to Japan to urge Toyota and Nissan to build factories in the United States and, receiving little encouragement at the time, had begun lobbying for protectionist policies. (Gelsanliter, 1992, 10-11) Against this background Eiji Toyota, then Chairman of Toyota Motor Company, stated that they hoped NUMMI would be "a model of economic cooperation between Japan and the United States – one that contributes to the American economy." (NUMMI, 2004) With regard to the overall results to be achieved from NUMMI, Toyota placed gaining of market share above profits.

GM's Objectives

General Motors had two major objectives in entering the joint venture: "to gain first-hand experience with the extremely efficient and cost-effective Toyota production system" and to obtain high quality automobiles for its Chevrolet division. (Community Relations Department, 1990) GM hoped that it could apply what it learned at NUMMI in its other plants, and thus gain great benefits company-wide.

General Motors' own multi-billion dollar attempt to meet Japanese competition in compact car manufacturing in the Lordstown plant had been a failure. The facility was provided with a very high level of automation, at a cost of billions of dollars. Labor strife had prevented achievement of the increase in productivity required to justify the expense of the high level of automation. The workers there had seen increases in productivity as threats to their jobs, and GM's policy of laying off excess workers confirmed labor's suspicions and fears. (Tsurumi, 1984, 100-101)

The car to be produced, the Nova, was one of a family of GM sub-compacts. It was to be priced so as to enable GM to compete more effectively in that part of the U.S. market.

Approaches taken

In the original division of responsibilities for the joint venture, Toyota was to be responsible for manufacturing while General Motors was to market all of the output. The only car to be produced was the Chevrolet Nova.

Toyota entered into the agreement with the full intention of using its own approaches to manufacturing. (Meeting, 1984) While preserving the basic Japanese model, as discussed below,

they attempted to learn everything they could about American labor relations and American values. Some modifications were made to the Japanese model as discussed below.

A General Motors executive commented that: “The nature of Toyota is not to copy anyone. They are avid learners and carefully watch what others do, learning from the mistakes of others as well as from their own mistakes.... They wanted a lot of counsel and advice - they knew nothing about (our) labor unions or the psyche of American workers.... They wanted more information about U.S. labor relations than GM felt comfortable in divulging.” (Interview, 1990c)

Some of the modifications they made were relatively minor, though quite effective. Suggestions from GM led them to take actions to appeal to the egalitarian nature of American workers. They provided only one cafeteria to serve both workers and managers, something that is not done in their Japanese plants (nor in typical American plants). The parking lot at NUMMI is on a first-come, first-served basis without reserved spaces for managers (though they are provided for visitors). Again, this is not done in Japan. In a visit to the NUMMI plant in 2004, the authors noted that now the employees wave to visitors going by in plant tour vehicles. This had not been the case in the past in prior visits, but the value of it was apparent. Besides giving a good impression to visitors, the visitors tend to give friendly waves in return giving a more friendly environment overall. (Factory visit, 2004)

The company stressed consensus decision-making and channels for staff feedback. A GM executive who worked at the plant indicated that this resulted in slow decision-making, but that the managers never experienced surprise changes when they arrived in the morning. (Interview, 1990a) Cultural openness, consensus decision-making, and channels for staff feedback are still in place. (Armstrong, 2002b, G1)

Key factors in Toyota’s approaches, however, were:

- (1) developing cooperative management-labor relations;
- (2) careful selection and extensive training of workers;
- (3) stressing teamwork and responsibility of the individual to the work group;
- (4) putting safety and quality first, assigning the responsibility for safety and quality to each worker, and giving them the authority to assure it; and
- (5) implementing Toyota’s ‘lean production system’ upon the foundation of the first four key factors.

Developing cooperative management-labor relations

Management-labor relations in Japan tend to be cooperative rather than confrontational. This is supported and reinforced by a system of sometimes called ‘lifetime employment’ in which employers expect total loyalty and dedication from their workers, while the regular employees can expect to be kept on the job even when major improvements in productivity or reduced demand for products makes part of the workforce redundant. This system was very widespread in major industries in Japan at the time NUMMI was formed. It is now changing somewhat, though it still provides the model for management-labor relations in Japan. (Duerr and Duerr, 1998)

The NUMMI joint venture could not offer “lifetime employment.” However, the United Auto Workers union was invited to participate in the development of a collective bargaining agreement along with Toyota and GM representatives (including former U.S. Secretary of Labor W.J. Usery). The Letter of Intent stated: “Both parties are undertaking this new proposed relationship with the full intention of fostering an innovative labor relations structure, minimizing the traditional adversarial roles and emphasizing mutual trust and good faith.” (International Labor..., 1990)

The final result was a labor agreement offering the highest level of security in the U.S. automobile industry. It provided for advance consultation with the union on major business decisions, non-confrontational problem-resolution procedures based on discussion and consensus, provisions combining the right of team members (workers) to stop the line combined with a limited no-strike provision. (Collective Bargaining Agreement, 1985)

A unique feature of the contract is that the company will not lay off employees unless compelled to do so by severe economic conditions that threaten the company’s long-term financial viability. (NUMMI, 2004a) This commitment was put to the test in 1986 when reduced demand for the automobiles caused line slowdowns and an excess number of workers. The company did not lay off any workers. They reduced the number on the assembly lines, but reassigned the workers to “continual improvement teams” and to training to upgrade their skills. While the Company and UAW together applied for and received some training funds from the State of California, NUMMI lost \$80 million in 1988 and additional money in 1989. (Hof and Treece, 1989)

The General Manager of Human Resources at NUMMI indicated that the real key to labor-management relations is the way people deal with each other on a day-to day basis. (Meeting, 1985) When a work dispute arises on the production line and cannot be handled there, a call for assistance is sent to the personnel office. Stationed together in that office are union officers and company personnel people. One of each will go together to attempt to solve the problem. Employees who are late or absent will be counseled by their team leaders, and assistance offered to them to solve their problems (transportation, etc.) if possible. Disciplinary actions will be taken only in chronic cases and only after consultation with union representatives. (Duerr, 1992, 10)

Careful selection and training of workers

Applicants for positions at NUMMI were (and still are) carefully selected. (Interviews, 2004) They were told that all employees needed to be willing to contribute to an atmosphere of trust and cooperation. Potential production employees went through a three-day assessment that included production simulations, individual and group discussions, and written tests and interviews. Those hired went through a four-day orientation covering the team concept, production system, quality principles, attendance policies, safety policies, labor management philosophies, and the competitive position of the auto industry. (NUMMI, 2004a)

The first 26 production workers hired included most of the former officers of the UAW local union. This might seem like a strange choice, given the difficult labor problems GM had when it operated the Fremont plant. However, the union had worked cooperatively in designing the new

management-labor system. Furthermore, having been elected union officers in the past indicated that the individuals had leadership potential.

The former union officers, now NUMMI hourly workers, were invited to help in interviewing and evaluating additional applicants for jobs. They participated in orientation sessions, played an important role in training, and participated in discussions about the selection of supervisors. Approximately 85 percent of the initial total workforce was comprised of former GM Fremont plant UAW workers. (Duerr, 1992, 5)

Though hiring began in May 1984, initial assembly did not start until December of that year and actual full production on the first shift wasn't reached until eleven months later. The reason for the slow start was Toyota's plan to provide a high level of training. Beginning in June 1984, several groups of 32 members each were sent to Toyota's Takaoka plant in Japan for three weeks of classroom and on-the-job training. The membership typically included group leaders, team leaders, and union representatives. Returnees became the trainees for newly hired workers. A total of 450 group leaders and team leaders eventually went to Japan. (Duerr, 1992, 6) A few NUMMI employees still go to Japan to observe operations and training, but most methods have been institutionalized at the Fremont plant now. (Armstrong, 2002, G1) Currently, almost all training is done at the NUMMI plant in a two to four week "Foundations in Training" program. (NUMMI 2004)

Stressing teamwork and responsibility of the individual (this section is drawn partly from Duerr, 1992)

From the beginning of discussions with the union, there has been an emphasis on a team approach. Each worker is assigned to a four- to eight-person team with a team leader who may also be a union coordinator. Above the team leaders are group leaders who coordinate three of four teams each. (Holden, 1986)

Each team is responsible for doing the work assigned to it, and each team member is responsible for supporting his/her team. Individual members are responsible for improving their own productivity and efficiency, and teams are responsible for improving operations in their areas of responsibility. Teams are kept informed of company objectives in quality, cost, production, and safety, and the teams' parts in meeting these objectives. There are periodic reviews and evaluations of performance.

Team members receive training in problem-solving methods. In accordance with the Collective Bargaining Agreement they are responsible "for participation in Quality/Productivity improvement programs such as QC circles." (Collective Bargaining Agreement, 1985). The company, teams, and individual employees take pride in the improvements that have been made due to their suggestions, particularly the suggestions that have subsequently been adopted in the similar Toyota plant in Japan. (Factory visit 2004; and earlier visits)

In the production groups, each member is cross-trained to do every job. For production line workers, there is only one work classification. Workers in the skilled trades are divided into three classifications. Under GM, there were over 100 different job classifications in the plant.

The company does not employ multi-skilled relief workers without permanent assignments who can fill in for absent employees. Because each team member is cross-trained and there is a lack of restrictive job classifications, other members of the team can fill in for a member who is missing. When a person is absent from his team, the other members are expected to do his/her job in addition to their own. Thus if an employee is late or absent, it places an additional burden on all of his/her teammates. This provides peer pressure for being on time and doing a full share of the work. (Meeting, 1985)

The company uses a consensus style decision-making process for major decisions, obtaining input from all areas concerned, and holding discussions until agreement is made. Where the union is concerned, as was the case when adding additional capacity for manufacturing compact trucks was proposed, they were consulted. The company indicated that, in order to make such an expansion economically feasible, they would hire additional workers but would also need to be able to assign involuntary overtime. The union representatives objected to any mandatory overtime so the company said they would not make the addition. The union members, in turn, objected to what their leaders had decided and they immediately recalled the existing leaders and elected new ones. The expansion then went ahead.

For decisions affecting only their own team or area, team members are encouraged to make their own decisions.

Putting safety and quality first

From the beginning, NUMMI recognized that for safety and quality to be given primary emphasis, the workers must be able to have some control over the process and operations. This is accomplished in two ways. First, any assembly line worker can stop the line in the event of safety or quality problems simply by pulling an overhead cord. No prior consultation with a supervisor is required.

Second, there are electric signboards located throughout the plant that are controlled by the workers. Each board has three lights: green, yellow, and red. Green indicates that everything is okay, yellow indicates that there is a problem that requires assistance but does not require shutdown of the line, and red indicates line shutdown. Yellow or red lights may be triggered by sensors on the machines themselves or by the workers pushing a button. The yellow light typically results in assistance being provided by the team leader or group leader.

Each worker and each team is responsible for ensuring that the materials, parts and components coming to them do not have identifiable defects and do fit properly into the assembly they are making. They are also responsible for ensuring that their work is done properly.

The company's commitment to quality was clearly illustrated in August 1990. It was discovered that parts that had been received from a new supplier were defective. Rather than continue production with parts that might later require replacement, the plant was shut down for three days until new parts could be obtained. Cars that had already been produced were not shipped to dealers but were held for part replacements. Since it was not the workers fault that the parts

were defective, and NUMMI wanted to encourage them to report defects, the company offered the workers full pay for the period the plant was shut down. (San Francisco Chronicle, 1990, B1)

Implementing Toyota's lean production system

Successful implementation of the Toyota lean production system required the cooperative labor-management relations, careful selection and training of workers, development of teamwork, and giving workers the authority to assure safety and quality outlined above. The elements of the lean production system include just-in-time inventory system, continuous improvement and standardization of improved procedures.

The just-in-time (JIT) inventory system is designed to produce only what is being ordered or sold rather than to produce for inventory that will be used to absorb ups and downs in demand. Lowered (or eliminated) inventories of incoming, in-process, and finished goods saves space and costs of money tied up. It also:

- results in quicker identification of problems arising due to defective inputs or processing problems;
- results in increased emphasis on avoiding breakdowns (and thus on preventive maintenance); and
- provides additional pressure to make production processes more flexible (such as being able to produce more types and styles of vehicles on one assembly line (as is done at NUMMI).

The JIT system has been modified at NUMMI to account for the fact that some parts are obtained from suppliers located at a distance from the plant, may be subject to delays, and need to be purchased in quantities that may be shipped economically. Modification was also required by the need to run assembly lines at constant speeds in order to maximize productivity. Therefore some inventories of incoming materials and finished goods do occur, but are kept at a minimum. Finished parts are kept on the premises for 48 hours or less. (Factory visit, 2004)

Continuous improvement and standardization of improved processes have resulted from suggestions made by teams and individual team members. Adopted by the company and made into standard practices, these have resulted in making work safer, easier, and/or more productive. (Factory visit, 2004; and earlier visits).

Another pressure for improvement comes from the electric signboards indicating the status of each process step at all times. A team leader who met with the authors away from the plant, and requested anonymity, indicated that some of the workers believe management wants all of the green lights to be on most of the time, but not all of the time. If the line is on green all of the time. Except for unanticipated breakdowns (which should be virtually eliminated by preventive maintenance), it means things are too easy. Then the line speed should be increased until yellows and/or reds appear occasionally. These distress signs will point up the weakest parts of the system, which can then be studied to find ways of improvement. When the line is back to all green again, another speed increase can be used to identify the next bottleneck. (Duerr, 1992) (The speeding up of a production system to identify and fix weak points has been observed by the authors during consulting work for other companies, but none used the electric signboard system that results in workers directing attention to weak points.)

A question arises over the effect of the continued increase in line speeds has had on worker support of NUMMI's overall approach. Ken Higashi, when president of NUMMI, indicated that the workers went through several stages after the beginning of production at the plant. First, they were very happy just to have jobs with good pay and benefits, and did not complain. Then they began to feel that they were being pushed too hard. But in 1987, when there were no layoffs in spite of low demand and cutbacks in production, "the workers realized that they were greatly appreciated" and "began to fully realize that we really do value them as an important part of the company." (Interview, 1990c) Since then, the company has continued to add more workers as production has increased, and it appears that the workers do realize that their hard work is giving them secure employment.

Applicants for jobs at NUMMI must go through several hours of testing of skills, attitudes, etc., to determine if they can be placed on the list of potential employees. The company has over a hundred accepted applicants waiting for positions to open.

Results Achieved

Manufacturing at NUMMI, under the control of Toyota, has been a success from the relatively early in the operations. Marketing, originally under the exclusive control of General Motors, was a problem for some time. The latter problem was eventually resolved by beginning to produce Toyota-branded vehicles for marketing by Toyota, and subsequently increasing the percentage of production devoted to producing Toyota-brand cars and trucks.

Operating results

The NUMMI plant quickly became 40 percent more productive than the average American automobile manufacturing facility. (AJBS, 1988) Researchers at the Massachusetts Institute of Technology estimated in 1988 that productivity at the NUMMI plant exceeded that of all American-owned U.S. automobile plants, except for Ford's Taurus facility with which it was approximately equal.

Labor relations improved dramatically. At the end of the time when GM was running the plant there was a backlog of over 1,000 grievances and 60 dispute firings. With absenteeism at over 20 percent, there were many days on which the plant could not start on time because not enough workers had showed up. (International Labor..., 1986, 15).

In the first two years under NUMMI management, attendance was at 98 percent with most of the absences occurring for excusable reasons. Only one grievance was not solved informally. (International Labor..., 1986, 16) Absentee rates are still low and labor relations still good in 2004.

The cars produced have won a number of quality awards.

Marketing results

There were serious problems in marketing. Falling sales of the Chevrolet Nova resulted in a need to cut back production at NUMMI. Four problems have been suggested as accounting for Nova's poor sales: ineffective advertising (Treece, Zellinger and Walecia, 1989, 126); "experience with small Chevrolets has imbued customers with brand disloyalty that's hard to overcome" (Consumer Reports, 1986, 81); somewhat dull styling; and the fact that the Nova seemed somewhat expensive when compared with other small Chevrolet cars.

An attempt was made to alleviate the problem by Toyota authorizing the production of some Toyota Corolla FX automobiles at the Fremont plant. This meant that the original division with Toyota simply handling production and GM doing all marketing was no longer valid. Unfortunately, the Corolla FX was nearing the end of its life cycle and its sales were not enough to maintain full production at NUMMI, leading to the diminished output and financial losses mentioned above.

Introduction of a new Geo Prism (for General Motors) and a new model of Toyota Corolla brought production at the Fremont plant back up. The new Geo Prism, with similar styling to the new Toyota Corolla and with identical quality did not sell as well as expected while the new Corolla sold better than expected. Consumer simply believed that the Toyota was a better car. An article in Fortune in 1988 noted that "It may take years to turn around GM's reputation for bad quality and uninspired design." (Moore, 1988, 35)

Production of Toyota compact pickup trucks began in 1991, and a redesigned model, the Tacoma was produced beginning in 1995. Other models of the very popular models were introduced subsequently. The last Geo Prism was built in 2001, and production of the Pontiac Vibe started in 2002. A right hand drive model of the Vibe, built for Toyota for export to Japan and named the Voltz, also went into production in 2002. (Armstrong, 2002, B1)

The marketing situation for General Motors automobiles remains cloudy. The company continues to lose market share in cars. At NUMMI, only 20 percent of current production is for the Pontiac Vibe, with the other 80 percent taken up by Toyota Corolla and Toyota Tacoma. The line producing the Tacoma is running at full speed on two shifts and cannot keep up with demand. (Factory visit, 2004)

Applying Lessons Learned and Evaluating the Benefits

Both General Motors and Toyota feel that they have benefited from participating in the joint venture. On February 12, 2004, Fujio Cho, President of Toyota Motor Corporation, and G. Richard Wagoner, Jr., Chairman and CEO of General Motors Corporation, held a by-invitation-only meeting to celebrate the 20th Anniversary of NUMMI. The meeting was followed by a dinner with remarks by NUMMI President Yukio Azuma, Bruce Lee of the United Auto Workers, and various dignitaries. (Meeting, 2004). All stressed the benefits of the joint venture

to each participant. In a press conference, Wagoner stated that “From the start, NUMMI has succeeded in bringing jobs and economic development to California, in showing that global auto manufacturers can work together and learn from each other, and in demonstrating the value of global trade and cooperation.” Cho commented that “NUMMI was Toyota’s initiation into North American production. We are very proud to build quality products with GM. Without their partnership 20 years ago, Toyota would not be where it is today.” (Hokubei Mainichi, 2004)

There appear to be significant differences in the amounts or degree benefits received. The following presents the authors’ views what has been achieved compared to the original objectives of the participants.

Toyota

The experience of Toyota at NUMMI has helped the company in realizing its primary objective. It successfully applied what it learned in the joint venture, and its increased confidence in its ability to successfully manufacture in other countries, in new wholly-owned factories in the U.S., Canada, Europe, and elsewhere. It has increased its U.S. (and world) market share greatly over the past 20 years. It became the world’s third largest carmaker by sales in 2003 and, in 2004, surpassed the automobile sales of Ford Motor Company.

Toyota’s share of the American market has been increasing steadily since it began manufacturing in the U.S. From 1993 to 2002, its share of the passenger market increased from 7.4 to 12.8 percent, and its share of the sports/utility market increased from 4.1 to 9.2 percent. The company now makes over 80 percent of its profits from the U.S. market. (Mackintosh and Grant, 2003, 11) It should be noted that Honda and Nissan have also done well in the U.S. More than a third of all cars sold in the U.S. now carry a Japanese nameplate. (Mackintosh, 2003, 10)

At NUMMI, Toyota learned that it could work effectively with American unionized labor. It has made some adjustments to the approaches it used in Fremont while keeping others the same:

- Its next factory was established as a wholly-owned subsidiary, and located it in Georgetown, Kentucky where it could hire a non-union workforce.
- Having found that it could achieve high productivity and quality with a moderate level of automation, it decided that it could do even better by investing in a higher level of automation for its new plant.
- Its favorable experience in Fremont has been followed with the implementation of similar policies in selection, training, sharing of information, and the use of the team approach in Georgetown. (Duerr, 1991)

Toyota made the greatest possible use of the experiences gained by the executives and managers initially assigned to NUMMI. Most of them were transferred as a group to the Georgetown factory. The personnel manager was later transferred from Kentucky back to Japan, where he was eventually put in charge of worldwide personnel relations for Toyota.

The company did learn to work effectively with American suppliers or, to put it another way, American suppliers learned to work with Toyota.

With the experience and confidence gained at NUMMI, Toyota went on to open other factories abroad in the U.S., Canada, Europe, and elsewhere. Toyota now holds 43 percent of its long-term assets, including production facilities. (Suemura, 2004, 32)

General Motors

General Motors two objectives were to gain experience with the Toyota production system and to obtain high quality automobiles for its Chevrolet Division. General Motors did gain valuable experience with the New United Motor Manufacturing, Inc. joint venture, but found it difficult to apply what it had learned to other GM plants. They also obtained high quality small cars but, because of the image and marketing problems discussed above, were not able to sell as many of them as they had expected.

General Motors provided a number of managers with experience in working at NUMMI, and thousands of workers and managers with visits to the Fremont facility. (Moore, 1988, 35) But this experience did not prove as valuable as had been hoped for several reasons. One factor was that in their assignments following work at NUMMI, the managers were not kept together, but rather distributed to various positions around the company. In their post-NUMMI positions they were surrounded by workers and managers whose traditional adversarial relationships were so entrenched that they simply could not be changed by one individual or even a small group of people. (Interview, 1990a) It could reasonably be argued that the adversarial relationships were so strong that even as a group they could not have changed the culture of a single existing plant.

Experience with NUMMI was also applied by GM in an innovative small-car project named Saturn, originally conceived by GM CEO Roger Smith in 1983. It was to “make superb little cars to beat the Japanese at their own game.” (Taylor, III, 2004, 119) In order to free the project from the bureaucratic constraints of GM, allow the development of cooperative labor management relations, and to provide it with its own identity, it was set up as a separate company. Any GM employees desiring to work for Saturn had to give up their positions and seniority with GM. After seeing the results achieved at NUMMI with a just an average level of automation, GM scaled back the level of automation to be used at Saturn.

Saturn was a success in achieving a high level of labor management cooperation, gaining sales to people who previously had purchased Japanese or European cars (70 percent of first time Saturn buyers had previously owned foreign-nameplate automobiles), and achieving high customer loyalty. However, most Saturn buyers never traded up to other GM cars, and looked to other brands when they wanted bigger or more stylish automobiles. (Welch, 2002, 80; Taylor, III, 2004, 125) Saturn developed right-hand drive cars for export to Japan in 1997, but disappointing sales resulted in abandoning the effort in 2000. (Taylor, III, 126) The company has never made money in its history. (Welch, 2003, 32) This has been blamed on a number of factors including the few models available, poor design of some models, and competition for resources from other divisions of GM coupled with a temporary loss of interest at the top corporate level when GM’s Roger Stempel was forced out as CEO in 1992. It is now planned that Saturn will work closely

with other GM divisions on engineering, designs, sharing of platforms and parts, and sharing production capacity. This will make it a more integrated part of General Motors, at the possible cost of losing its unique identity. (Taylor, III, 2004, 119-127)

What General Motors learned helped them to make great strides in improving productivity, though they still lag behind Toyota. They also made great strides in improving quality, surpassing some European manufacturers but still lagging behind the major Japanese companies. At the same time, Ford has also made major improvements, benefiting from its own observations of the Japanese companies and its long-time partnership with Mazda. All three of the major U.S. manufacturers have increased the use of shared platforms and parts, (Welch and, Kerwin, 2004), developed faster and cheaper methods of designing new vehicles, and adopted aspects of lean production. But again, they still lag their Japanese counterparts.

Even if the 'big three' U.S. automobile manufacturers were to achieve equality in productivity with Toyota, Honda, and Nissan, they would still be at a competitive cost disadvantage relative to the Japanese plants in America. All three U.S. companies have large pension costs with an increasing proportion of retirees to workers. They also have higher health benefit costs. The total health care and pension costs per vehicle at General Motors is \$1,360 while the same costs at Toyota amount to only \$180 per vehicle. (Kiley, 2003, 2B)

General Motors has experienced a general downtrend in market share for the past 20 years, with occasional short-term recoveries. From 1993 to 2002, its share of the passenger market decreased from 33.5 to 25.1 percent, and its share of the sports/utility market increased from 29.7 to 32.0 percent (largely at the expense of DaimlerChrysler). (Mackintosh and Grant, 2003)

Summary

Toyota appears to have benefited more than General Motors from the New United Motors Manufacturing, Inc.

Toyota learned how to work effectively with the American workforce and suppliers. It used this knowledge, and the confidence it gained, in its subsequent worldwide expansion of manufacturing facilities. It has greatly increased both worldwide market share and profits, becoming the world's second largest automobile producer and the most profitable. It did substantially reduce trade friction resulting from automobile imports by the U.S., though some concerns remain regard international trade in parts.

General Motors, because of internal problems and problems beyond its control, was not able to gain as much from the joint venture. Because of image and marketing problems, it could not sell the expected number of small cars produced by NUMMI. It is not clear how well GM understands the need to improve its image, or even how it can do so. Though it did learn and apply much from the Toyota production system, it was unable to replicate the system in any existing plant. Workers and managers at existing GM plants have such a long history of confrontational relations, and such a distrust of each other, that a system based on mutual trust and cooperation apparently could not be implemented. General Motor's attempt to create a new

company based largely on cooperation and trust had some successes. But for a variety of reasons, including scale of operations and number of models offered, style and advertising at some points, and lack of adequate support at times, Saturn never made money. It is now being changed to look somewhat more like a traditional GM division.

Even if General Motors were able to gain equality in productivity and quality with Toyota, it would still likely not be as profitable because of its relatively high costs of pensions and health benefits.

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