

Behind the Scenes at GM-Toyota

Joint venture results in drastic changes in traditional operations, human relationships

BY R.T. KINGMAN*

Let me start out by telling you what I do for a living.

I am the General Motors corporate spokesman in Washington and it's my job to represent my company when a newsman needs a General Motors quote on some highly controversial public issue or a talk show host needs someone to show up and debate one of our impassioned Washington critics, and sometimes I luck out — like when an organization such as LES needs a speaker at the Breakers.

I start out here with my job description to let you know that I do not come to the platform with the credentials in international technology transfer of your other speakers. When I explained that I am a generalist, and maybe what you wanted from GM was a specialist, I was told, "What we want to hear about this very fascinating joint venture is sort of the big picture. Take us behind the scenes a little bit and give us an idea of how it fits into the pattern of all these extraordinary changes we read about at General Motors — if there *is* a pattern to all these strange moves at GM!"

So, I said, "Fair enough." There *are* lots of changes. Very few people outside the automobile industry have an appreciation of the drastic surgery we are going through. Perhaps no major industry in history has tried to revise its style and its objectives as radically as the U.S. auto industry has in the past few years, under double-barreled incentives of a cyclical downturn in our economy and in our business, and the growth of intense competition from overseas here in our home market. And, yes, there is a strategic pattern. I think you may be surprised at the pivotal role the Fremont venture plays in that overall strategy.

I shall describe chronologically how the GM-Toyota joint venture was put together, tell you what it is *not*, and then try to show you what it really *is*, which I think you will see is a somewhat more complicated assignment than you might imagine.

20 Years Back

As I began to put together the ingredients for this report, I realized that, if I had been smart I should have

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predicted the GM-Toyota joint venture more than 20 years ago. At that time I was GM's spokesman on the West Coast, headquartered in Los Angeles. Out in the San Fernando Valley, at Van Nuys, we had a set of relatively new Chevrolet and Fisher Body plants — twins of an identical set of plants on the outskirts of Flint, Michigan, which were state-of-the-art examples of automobile assembly technology at that time. The Van Nuys complex had some 25,000 visitors every year — and it seemed that almost all of them were Japanese, each with a very fine camera. We used to sort of giggle now and then and say that we bet there was a little Van Nuys complex being cloned somewhere in Japan. Little did we know!

Since then, of course, we have quit giggling. A little nervous whistling in the dark, perhaps, as various Japanese manufacturers snap at our heels — and with great respect for their organizational skills and their demonstrated ability to take our technology and enhance it, and then show us how to use it better.

The GM-Toyota joint venture began to take shape on paper in February 1983 when the two companies signed a memorandum of understanding to produce a new automobile — designed for the entry level end of the market — on the site of a closed GM assembly facility in Fremont, California, south of San Francisco. The agreement calls for a limited production arrangement for a period of no more than 12 years with Toyota and GM each owning 50% of the company.

Toyota was to design the manufacturing layout, coordinate the acquisition and installation of equipment, and implement the production system. General Motors was to purchase the new car and handle all marketing through Chevrolet dealerships.

In September 1983 the United Auto Workers and the joint venture entered into a letter of intent — a significant milestone. The interim agreement followed some six months of discussions. *Fortune* magazine called it "one of the most innovative labor agreements in U.S. industry," pointing out the extremely significant breakthrough that "the UAW accepted that the venture was a new company, not bound by the seniority rights, work rules, and rigid job classifications of the old GM contract."

Construction

In the same month that the UAW letter of intent was signed — a year ago September — construction work began on a stamping plant and a month later we began converting the assembly plant. We had to move forward without full approval, because we needed the entire 3 million square feet ready to go when production begins in December 1984.

In the next month, just three days before Christmas,

1983, the Federal Trade Commission announced that it had reached a preliminary conclusion that the proposed joint venture was pro-competitive. It entered into a provisional consent order placing formal limits on the scope of the venture. The two companies immediately established New United Motor Manufacturing, Inc. — which we call NUMMI — which now owns all 220 acres of the Fremont facility. The President and Chief Executive Officer of NUMMI is Tatsuro Toyoda. He has at least two outstanding credentials — he has an MBA from New York University, and he is the son of the founder of Toyota.

The FTC gave its final approval to the venture in April 1984. It gave these reasons why its staff investigators and the majority on the commission considered it to be pro-competitive:

1. It will “increase the total number of small cars available, allowing American consumers greater choices at lower prices.”

2. It will “facilitate the transfer of cost-reduction techniques to U.S. industry by affording managers the opportunity to observe, firsthand, Toyota’s efficient production system.”

3. It will “encourage a positive labor/management relationship that stresses cooperation — not confrontation — between labor and management, that will serve as a demonstration project for U.S. industry.”

4. It will “give Toyota valuable experience with American suppliers and workers that will increase Toyota’s incentives to unilaterally enter into U.S. production.”

Hiring of the first employees — supervisors, skilled tradesmen and team leaders — began in May. The first group of 25 left the following month for Japan for three weeks of training — the first of 240 who will get that training. Initial employment is expected to reach about 1,000 by the first of 1985. There should be 2,500 employees by early 1986, when the plant is to go to a two-shift operation, with production capacity of 200,000 cars a year.

The car itself will be an attractive piece of merchandise — a new subcompact with an engine and power train designed by Toyota inside a body styled by General Motors. We will call it the Nova. It will come in two versions — a four-door and a hatchback — and it will resemble the Corolla/Sprinter family. The Nova will show up next spring in Chevrolet dealer showrooms, and we expect it to fill an important niche for Chevrolet dealers in appealing to young, first-time buyers. About half of the value of the vehicle’s content will be supplied by Toyota and other manufacturers, including engines and transmissions. The other half will be provided by U.S. suppliers, who will employ about 12,000 workers in providing parts and components. That U.S. content is expected to increase.

Limited Arrangement

Now, to say what the joint venture is *not*. It is not a merger; it is a limited arrangement having to do with one car, in one plant, with limited production over a specific period of time. It is not, as some of our critics have charged, a scheme to replace our domestic Chevette with a thinly-disguised import. For one thing there is nothing disguised about our import objectives — we have made it clear that we have worked with two other Japanese firms to produce small cars for the U.S., and although we are going to start importing them in small amounts (the

Suzuki Sprint has already showed up in some West coast dealerships and the Isuzu Spectrum will appear in some East coast dealerships next month) we would import more of them. They will add up to about the same volume as we will get from the Fremont plant, if the Japanese quotas are lifted. Even at that volume we would still need the Chevette to round out our offerings in that end of the business.

Another thing the GM-Toyota joint venture is not: It is not a so-called “conspiracy” by two manufacturers to get together and take over the small-car market in this country. GM and Toyota will remain highly competitive. There certainly is no incentive to relax our marketing efforts on our other products. (It is sort of interesting that Chrysler, which has gone to court to oppose the joint venture, has made it clear they see no problems if Chrysler and a Japanese firm do exactly the same thing; it’s only a problem, they say, if it is GM that is entering a joint venture!)

And, finally, it is *not* a mechanism for GM to get out of the small-car business. True, the joint-venture Nova, along with the Spectrum and the Sprint, are going to help us a great deal in the low end of the market, but there is a strong parallel to the light-truck situation of a few years ago, when we imported the LUV from Isuzu until we could bring out our own S-10. The real importance of the GM-Toyota joint venture is the truly unique role it plays in our learning how to produce a competitive, domestically produced small car. This role is a little hard to envision, so I am going to use a rather odd approach to try to explain it.

The reason I say I need help to be convincing is that I am now going to describe the General Motors project that has the responsibility for enabling us to build our own small car in this country at less cost and with higher quality than anything the Japanese or Europeans can ship here.

Our objective is not only to erase the Japanese cost advantage of \$2,000 per car, but to actually leapfrog them, with technology far in advance of anything they have now, or anything we can see for them in the foreseeable future. Now, I know this strains credibility somewhat, considering our track record over the past few years. But I hope to convince you that we are absolutely committed to that course. It is, literally, a matter of life and death for the future of domestic production, and also for the future of our successful participation in the world market.

Saturn Project

We call it the Saturn project. It has three elements — a new kind of car; new kinds of production technology; and new kinds of human relationships — under a radically different management system — to make it all work.

Each of these elements is important. Some, at least for General Motors, are going to be easier to handle than others. But in reaching all three goals we have a parallel course to follow. First, getting together the best research brains we have — working in a laboratory or a network of laboratories to come up with creative ideas — and second, rounding up the best practical development people we can find — working at a proving grounds or a network of proving grounds to make sure those ideas are going to work the way we expect them to in the real world.

What I really need to do to be convincing is to take you inside those laboratories and proving grounds so you can see for yourselves what is going on.

A great way to do that in this sort of setting, of course, is to bring a whole stack of slide carousels and project pictures on this big screen. But your convention committee leaders, having spent all that money on those lavish banquets, and other amenities, say that they simply cannot afford another projector operator. So what I am going to ask you to do is *pretend* I have slides . . . that on that big screen up there you see the colorful, crisp, dramatic photographs you would expect in a slick presentation from General Motors, prepared by a very high-priced Madison Avenue agency.

I am going to start with the Saturn element that is the easiest to explain — and actually the easiest for General Motors to deal with — the car.

There! Isn't it a beauty? Look at those clean lines, that vibrant color! You will notice in this comparison shot in one of our design studios that although it is a foot shorter than our Cavalier and weighs 600 pounds less, it has the same interior passenger space. And you can see from this wind tunnel shot that it has an efficient aerodynamic shape. It has a fuel economy target of 45 miles per gallon in the city and 60 miles per gallon on the highway — and a performance target of zero to 60 in less than 13 seconds.

Now this shot under the hood shows that it has a new kind of engine, and this shot of its various components shows it has a new kind of transmission, and some components of new materials. None of its parts are common to any other car we have ever built.

Now, you may be saying, "This guy wouldn't be showing us these pictures even if we had a projector operator." And I guess that's true. You never know when you will find a Ford dealer masquerading as a busboy. And there is always the chance that Lee Iaccoca will be shooting a commercial out in the patio there.

But if I had slides I think you could see my point — that what you need for all three of these elements is a *laboratory setup* and a *proving ground setup*. Although, in this computer age, the slides showing the new car being designed in the studio and tested on the track might not be what you have come to expect. We would see designers working at computer terminals rather than drawing boards; we would see them developing three-dimensional concepts (through an enhanced version of Computer Aided Design) which can actually be depicted as machineable parts (through a GM process called GMSolid) and then displayed as a finished car, complete with light reflections from various surface shapes and textures (through a really remarkable GM process now being developed at Research Labs called AUTOCOLOR). And at the proving ground you would see engineers twist and bend and even crash car bodies and frames on the computer — years before the real thing is available in metal.

However, you would still be comfortable with the *places* where all these things are happening. When we talk about designing and testing a car, the idea that you have to have a laboratory and a proving ground is pretty obvious.

Productivity and Quality

That's not quite as easy to see in the second element — the new technology that will help us improve productivity and quality. In this case my laboratory shots would show production engineers laying out assembly lines, although they wouldn't be linear as much as modular, like the spokes of a wheel; and model makers in a cabinetry

shop building a whole plant to scale, and craftsmen in a machine shop at General Motors manufacturing development headquarters — or in the laboratories of key GM suppliers — putting together some experimental machinery. And computer specialists figuring out how to make robots talk to each other.

Incidentally, I think you know that General Motors has been working with computer vision — a wonderful quality if you want a robot to inspect and reject faulty parts all day long without getting tired or bored. We are also working with robots that can have a sense of touch — like fingers; a sense of torque — like wrists; and can hear, through sonar. By the end of this decade, we expect to have 200,000 "programmable devices" in our factories — all of them able to talk to each other by means of a technique called Manufacturing Automation Protocol, which we developed with several leading computer manufacturers, and which we hope will become an international standard for machine intelligence.

This push to change production technology drastically has led General Motors to move outside in a rather uncharacteristic manner, not only to improve our efficiency, but also to help us sell some of this new technology to others. We formed a joint venture with a Japanese firm to build robots in the U.S. We acquired minority holdings in five computer vision firms; they will work on applying this technology to the factory floor while our research scientists continue to explore new ideas. And we recently acquired Ross Perot's highly-regarded computer services firm, EDS, which we think can do a great deal to improve our data communications.

"Proving Ground"

So much for my laboratory shots on this part of the Saturn project. For my proving ground slide I would show you a place we call the "Factory of the Future," in Saginaw, Michigan. It has 70,000 square feet that we expect to be somewhere beyond the current cutting edge of new technology, with 40 flexible manufacturing cells, tied together by the first fully integrated multi-vendor machine intelligence system in the world. It will have extremely flexible computer-aided machinery, which can be reprogrammed easily and monitored automatically and continuously. It will have very little inventory and no paper — all messages will move electronically, and components will be provided by nearby supplying plants just-in-time, when their own monitors show we need them, and they will be counted by the line itself and by the finished product.

Now, I might just turn off my imaginary projector for a minute and engage in a philosophical discussion covering three questions that might be in your minds at this point:

1. Where is all this wonderful new technology going to come from?
2. What makes us think we can make such great progress in production efficiency when we haven't been all that distinguished in that field lately?
3. Do we really believe we can eliminate that \$2,000 per car cost advantage held by the Japanese?

It has been estimated that about 80% of this technology exists now. It can be found in some form somewhere in the world, either at GM or elsewhere. Nobody has it all in any one place. So that part of the job

is to put it all together and enhance it.

The remaining 20% is brand new and exists only at General Motors as far as we know. About half of that we're pretty sure of. About half still needs some hard work.

As to GM's track record in product technology, outshining our track record in production technology, we would have to agree — we calculate that we are four times closer to optimum in our products than we are in our processes. But this just means that we can make greater relative gains. For example, we are looking at machines that are 40 times faster and 6 to 8 times more accurate, with much greater flexibility and far less waste, than the machines they replace.

On the third question — the \$2,000 Japanese cost differential — here is a way to look at it:

- The Japanese have two major advantages — the weak yen and their lower wage cost (less than half the U.S. rate).
- They have two major disadvantages — they have almost no natural resources compared to us and they are 8,000 miles away from the center of the U.S.

Also, it can be said that although they have greater manufacturing efficiency than we do, we have better technology than they do. It is a principal objective of this part of the Saturn project to overcome their manufacturing efficiency advantage by making much better use of our technological advantage.

Human Relationships

Of course, we will have to do more than just apply new technology to improve our manufacturing efficiency. And that brings up the third element in the Saturn program — creating and testing a radically different management system, built around a new style of participative human relationships — to make all the rest of it work.

This is the fuzziest of the three elements to deal with — and it is a bit harder to visualize the laboratories and the proving grounds. But they do exist — and in fact in many locations the lab and the proving ground are the same place.

But for the purposes of my slide presentation I am going to pick a place that is only a laboratory — the principal creative location for this part of Saturn. My first slide shows the first sign on the door — it reads "JOINT GM-UAW STUDY CENTER." My second slide shows the sign after they had been in business for a few weeks. It just says "GM-UAW STUDY CENTER." A small change, but symbolic. The GM and UAW participants — diverse as they are — got to understanding each other so well that they decided that the adjective "joint" was a bit redundant. It was one center, not two combined jointly.

Then my next series of slides would be some group photographs. First, 35 people from GM management, including plant managers, production managers, superintendents, personnel directors. Then, 42 production workers — all members of the UAW — including painters, die makers, assemblers, welders, utility men. They include some presidents of union locals, some shop chairmen, some committeemen. Then, the Study Center's professional staff — four from GM and eight from the union. Finally, ten members of the UAW national negotiating committee. Altogether, 99 people — representing 55 GM plants in 17 divisions, and 41 locals in 14 of the 16 UAW regions.

Project large blowups of two rather remarkable policy

statements — one from GM and one from the UAW. The participants rather early in the process began to get just a bit nervous that some of the ideas that were beginning to pop into their heads might sound like outright treason to some of their colleagues, so they asked for top-level policy protecting them from criticism, or even ostracism, for what they might come up with. In effect, the memos say: "Leave these folks alone. It is OK for them to be different."

Then, I would proudly display the rather unusual first precept they came up with: "GM cannot become internationally competitive in small cars in the United States under the current GM-UAW relationships." (Pretty radical stuff!) Next, a series of slides showing various committees making visits — there were 170 of them altogether — to seminars, to academia, to other GM plants, to auto manufacturers overseas, to a well-run supermarket chain; to a successful McDonald's franchise; to Japanese-managed firms in the U.S. and nonunion firms. Then committee meetings — conducted professionally, each with a staff consultant — analyzing what they learned about the common threads they found in the best operations.

And then, this conclusion: "If you believe in what you are doing; if you believe your input is important and will be listened to; if you find your job fulfilling, you will work hard and work long hours."

Then I would show slides of GM plant locations where this radical philosophy is at least partly in place — plants whose managers never wear neckties, never have special parking places, where everyone eats in the same cafeteria.

Management Enthusiastic

Now I would turn up the house lights again for another brief philosophical discussion. I would explain to you that these kinds of projects, in various plants around General Motors, sound so wonderful that I can't help being a bit skeptical about them.

I have heard our top officers tell us with great enthusiasm that they are absolutely sold on these new relationships (which we generally put under the somewhat unsatisfactory acronym of QWL, for Quality of Work Life), and I have been involved in setting up visits by some rather cynical newspaper and magazine writers who have come back totally convinced, saying they have seen well-known union activists practically turning themselves into cheerleaders for the company.

But I have to say that I have never actually seen this kind of thing myself, and I can't help wondering whether there aren't some plants where the old Prussian system which worked so well for so long in this country — "do whatever the boss says and keep your mouth shut" — is so engrained that it is going to take a new generation of bosses and workers to make a major change. Yet, it must be done.

Then would come the show-biz part of my slide presentation. As I gradually cut down the lights, I would tell you that there is a powerful new mechanism coming on stream with profound implications for changing these worker-management relationships forever.

With the screen still black, I would say that it is a combination laboratory and proving ground, and that it gets its great potential because it comes from a new and different direction, propelled by powerful free-market incen-

tives and international pride, and then I would pause for a moment with the room in complete darkness and throw a slide on the screen.

At last, here is the Fremont plant! If I have led up to this properly, you know where it fits into our thinking. We believe this can become the most important single laboratory/proving ground for the most difficult task we have to perform in order to change the domestic automobile industry radically enough to keep automotive employment in this country at a high level with a small car that can compete successfully with the imports on quality and cost.

Of course, this is not the only place where there will be creative and cooperative efforts to fashion new labor-management styles, and there are other Japanese manufacturers building cars in this country under that wonderful free-market incentive — the need to make the customer happy with high quality and a low price tag. But this one is quite special — it is the United Auto Workers and Toyota.

FTC Conclusion

In its lengthy investigation of the joint venture, the staff of the Federal Trade Commission came to the conclusion that Toyota is a logical partner for this transfer of management techniques. But their suitability goes beyond mere skill and efficiency. They also bring to the venture an enormous pride. Toyota has a great deal at stake here in prestige among its colleagues, and in demonstrating that its management techniques will

work with an American labor union in an American environment.

At the same time, the UAW has a great deal at stake, too. And the former Fremont local is certainly no patsy. It was formed from two plants in Oakland — a part of the consolidation of Chevrolet and Fisher Body plants into the General Motors Assembly division.

Almost every time we have melded two units together like that it has resulted in a rather feisty local, partly because you start out with two of lots of people you just need one of — two union presidents, two shop committees, and on down the line — and this creates a certain amount of restlessness that can characterize the new local for many years. So, to see these kinds of UAW members undergoing very progressive psychological tests to see how well they will be able to function as members of a team before they are hired, and to see them signing up for several days of round-table discussions about Toyota's production philosophy — which every applicant agrees to — is eye-opening.

The plant is not in production yet, so it is too early to tell how well this will work, but the initial press accounts, mostly of interviews with NUMMI production employees, are nothing short of mind-boggling. If you had told me just five years ago that those auto workers would have put up with any of this — let alone all of it — and be enthusiastic about it to boot, I would have thought you were an unusually naive social scientist from an unusually far-out Washington think tank.

But it does seem clear that here is an important experiment with particularly powerful incentives for success.