

From 0 to 60 to World Domination



By JON GERTNER
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Illustrations by Nathan Fox

1. Here Comes the Tundra

For most of the January morning, the reporters at the Detroit auto show crisscrossed the COBO convention center like a herd of livestock, moving at least once every hour to feed — sometimes literally, since Lexus offered fresh fruit. All the world's car companies were unveiling this year's models. Often, the back-to-back corporate announcements required everyone to scurry clear across the exhibit floor to get a seat at the next press conference. It was hard not to lose yourself in the scenery, however, as you passed by a dazzling showroom exhibit of Maseratis, for instance, or encountered some gleaming Infinitis. The event was a place untroubled by thoughts of traffic jams, long commutes or gas prices. It was also a place where C.E.O.'s like Rick Wagoner of General Motors showed off electric cars like the Chevy Volt that cannot yet be produced — at least until battery technology improves — but that can nonetheless be driven slowly across a stage toward a cluster of photographers. In this context, it seemed, G.M. was not a company that posted a \$10.6 billion loss in 2005, nor was Ford a manufacturer that announced plans last year to shed more than 30,000 employees. There were no overwhelming pension and health-care burdens.

Shortly after noon that day, in a ballroom just off the convention center's main floor, the crowd was waiting for Toyota to unveil the latest (and largest) version of its new full-size truck, the Tundra. From where I stood, pinned against a back wall in the darkened room, it was getting hard to breathe. At this point I had been following Toyota and the Tundra for months; I visited the company's new Tundra plant in San Antonio, its sales headquarters near Los Angeles, its executive offices in Manhattan and its Camry plant near Lexington, Ky. Apart from some recalls of faulty parts (an unusual and humiliating occurrence for the carmaker), Toyota had seemed as close to a juggernaut as any corporation in existence.

By any measure, Toyota's performance last year, in a tepid market for car sales, was so striking, so outsize, that there seem to be few analogs, at least in the manufacturing world. A baseball team that wins 150 out of 162 games? Maybe. By late December, Toyota's global projections for 2007 — the production of 9.34 million cars and trucks — indicated that it would soon pass G.M. as the world's largest car company. For auto analysts, one of the more useful measures of consumer appeal is the "retail turn rate" — that is, the number of days a car sits on a dealer's lot before it is turned over to a customer. As of November 2006, according to the Power Information Network, a division of J.D. Power & Associates that tracks such sales data, Toyota's cars in the U.S. (including its Lexus and Scion brands) had an average turn rate of 27 days. BMW was second at 31; Honda was third at 32. Ford was at 82 and G.M. at 83. And Daimler-Chrysler was at 107. The financial markets reflected these contrasts. By year's end, Toyota would record an annual net profit of \$11.6 billion, and its market capitalization (the value of all its shares) would reach nearly \$240 billion — greater than that of G.M., Ford, Daimler-Chrysler, Honda and Nissan combined.

When the Tundra finally arrived onstage in Detroit, Jim Lentz, one of the company's North American executives, told the packed ballroom that this vehicle "changed everything" for Toyota. It was researched, designed, engineered and built in America, Lentz pointed out; and it seemed, from his

presentation, to be the toughest, brawniest and most iconically masculine pickup truck anywhere, ever. Such boasts were in keeping with the spirit of car-dealership hucksterism at the show. Still, 50 years after coming to the U.S., Toyota views the Tundra, which arrived in American showrooms earlier this month, not only as another big truck but also as the culmination of a half-century of experimentation, failure, resurgence and domination. And as anyone with even a passing familiarity with Toyota's strategic history knows, the company never makes rash moves or false promises.

Whether Toyota has evolved into the world's most sophisticated modern corporation — one whose example has challenged the American model of manufacturing and management — happens to be a common topic of conversation among business analysts these days. "It's influencing just about every major company in the world, in that they're asking the question: What can we learn from Toyota?" says Jeff Liker, an engineering professor at the [University of Michigan](#) who has written several books on the company. Indeed, what you can learn from Toyota is something that even [Bill Gates](#) has pondered publicly. And yet deconstructing Toyota means breaking down a corporation that uses all its resources, and more than 295,000 employees worldwide, to construct things that are not meant to come apart.

Certainly the most obvious example of Toyota's long view is the Prius hybrid. Press said he believes that every automobile in the U.S. will eventually be a hybrid. I asked how soon. Not in five years, he replied, "but I think at some point in the not-too-distant future." I asked whether Toyota developed and marketed the technology years ahead of the other major automakers because it possessed better technical skills. Press instead framed the issue as a matter of philosophy. Ten years ago, he said, at about the same time the Prius made its debut, Ford rolled out the huge S.U.V. franchise. "Both of us had the same tea leaves, the same research," he said. "One of us bet on hybrid, one of us bet on big S.U.V.'s." In his view, the wisdom of making big S.U.V.'s — Press left unacknowledged that Toyota eventually brought out its own line of S.U.V.'s — seemed dubious: "First of all, long term, is fuel going to get cheaper or more expensive? Is oil going to become more plentiful or less plentiful? Is the air going to become cleaner or more polluted? And so, do you do something proactive and innovative, to be in tune with where society is going? Or do you hold on to where it has been, and then don't let go, to the bitter end?" It was never a matter of altruism, he seemed to be saying, but an example of how corporations survive in society. "What's the right thing to do to sustain the ability to sell more cars and trucks?" he asked. The Prius was not about a fast return on investment. It was about a slow and long-lasting one.

The Tundra is hardly green like the Prius, yet it, too, illustrates Toyota's characteristic patience and belief that it should serve every kind of customer. The biggest-selling vehicle in the United States is not the Camry (448,445 sold last year) or the Accord (354,441) but Ford F-Series trucks (796,039). Not far behind in sales are the full-size trucks from Chevrolet. These are among the most lucrative consumer products around, yielding anywhere from \$6,000 to \$10,000 in profit for every unit sold. "To the American automakers, that's their bread and butter," Jeff Liker, from the University of Michigan, explains. "They break even on passenger cars, lose money on small cars. But all their profits come from large S.U.V.'s and trucks. For the American auto companies, this is the last hill that they dominate." Several auto analysts pointed out to me that G.M. and Ford trucks not only have an extremely loyal customer base; they're also widely regarded as extremely well built and engineered (often in contrast to their passenger cars). When I asked Jim Press how long the company had been thinking about creating a full-size truck, he said it had been a priority dating to the early 1990s, when Toyota failed with its first big truck, the T100. The company failed again in 2000 when its first (and smaller) Tundra came out; only 124,508 units were sold last year.

Within Toyota, there is a rare and secretive designation for certain development projects known as *irei*, which is roughly translated as "not ordinary" or "exceptional" and refers to vehicles that the company will spend any amount on and go to almost any lengths to engineer, market and perfect. In the early 1990s, the Prius had this designation. When it came time several years ago to begin redesigning the new Tundra, it received the classification, too. The success of G.M. and Ford suggested that it was a product that could eventually reap tremendous profits. It was also a vehicle that could conceivably cement Toyota's reputation, once and for all, as an all-American company.

3. The Engineers Open the Window on the Big World Out There

It's often noted that American carmakers are hobbled by their obligations to pay health care "legacy costs" to their ranks of retirees. Toyota has only about 1,600 retirees in the U.S., and many of its factories have never been successfully organized by a union. Yet Toyota has other strategic advantages too. For one thing, its enormous cash reserves allow it to spend billions on the pursuit of market share in the U.S. — designing a new car or significantly redesigning an old one usually costs \$1 billion, and building a new plant costs between \$1 billion and \$2 billion — and at the same time to think deeply about where society will be in 20 years.

These two pursuits, which might appear contradictory, actually reinforce each other. "Toyota has always gone where the money is, and there's money in trucks," says John Casesa, an industry consultant and a former automotive analyst at Merrill Lynch. "This is a company that has, as its mission, to serve any customer. But the other reality is that you've got to make a lot of money to develop the research and development for hybrids." Toyota spends \$20 million a day, Jim Press told me, on research and factories. "They are outspending G.M. in R.&D., product development and capital spending," says Sean McAlinden, an economist at the Center for Automotive Research, a not-for-profit consulting firm in Ann Arbor. "If that trend continues, we're dead. The problem is, suppose we made a car" as good as a Toyota. "Then we only have a car as good as they do. It's not just about catching up, or getting into the game. You've got to get ahead somehow. But how?"

Toyota itself keeps pushing ahead. Under its system, an engineer appointed to lead a new project has a huge budget and near absolute authority over the project. Toyota's chief engineers consider it their responsibility to begin a design (or a redesign) by going out and seeing for themselves — the term within Toyota is *genchi genbutsu* — what customers want in a car or a truck and how any current versions come up short. This quest can sometimes seem Arthurian, with chief engineers leading lonely and gallant expeditions in an attempt to figure out how to beat the competition. Most extreme, perhaps, was the task Yuji Yokoya set for himself when he was asked to redesign the Sienna minivan. He decided he would drive the Sienna (and other minivans) in every American state, every Canadian province and most of Mexico. Yokoya at one point decided to visit a tiny and remote Canadian town, Rankin Inlet, in Nunavut, near the Arctic Circle. He flew there in a small plane, borrowed a minivan from a Rankin Inlet taxi driver and drove around for a few minutes (there were very few roads). The point of all this to and fro, Jeff Liker says, was to test different vans — on ice, in wind, on highways and city streets — and make Toyota's superior. Curiously, even when his three-year, 53,000-mile journey was finished, Yokoya could not stop. One person at Toyota told me he bumped into him at a hotel in the middle of Death Valley, Calif., after the new Sienna came out in 2004. Apparently, Yokoya wanted to see how his redesigned van was handling in the desert.

When I spoke not long ago with the Tundra's chief engineer, Yuichiro Obu, and its project manager, Mark Schrage, both of whom work in Ann Arbor, they characterized their research for the Tundra as quite unlike what was done for the Sienna. For starters, designing a full-size pickup truck for the American worker is more complex than designing a van for a soccer mom. The way a farmer uses a truck is different from the way a construction worker does; preferences in Texas (for two-wheel drive) differ from those in Montana (for four-wheel drive). Truck drivers have diverse needs in terms of horsepower and torque, since they carry different payloads on different terrain. They also have variable needs when it comes to cab size (seating between two and five people) and fuel economy (depending on the length of a commute). In August 2002, Obu and his team began visiting different regions of the U.S.; they went to logging camps, horse farms, factories and construction sites to meet with truck owners. By asking them face to face about their needs, Obu and Schrage sought to understand preferences for towing capacity and power; by silently observing them at work, they learned things about the ideal placement of the gear shifter, for instance, or that the door handle and radio knobs should be extra large, because pickup owners often wear work gloves all day. When the team discerned that the pickup has now evolved into a kind of mobile office for many contractors, the engineers sought to create a space for a laptop and hanging files next to the driver. Finally, they made archaeological visits to truck graveyards in Michigan, where they poked around the rusting hulks of pickups and saw what parts had lasted. With so many retired trucks in one place, they also gained a better sense of how trucks had evolved over the past 30 years — becoming larger, more varied, more luxurious — and where they might go next.

Obu's team, which drew on hundreds of engineers, ultimately produced a pickup model with 31 variations that include engines, wheelbases and cabs of different sizes. Design engineers, however, cannot simply create the best truck they can; they need to create the best truck that can be built in a big factory. In other words, Tundra's design engineers had to confer with Tundra's manufacturing engineers at every step of the way to create a truck — or 31 trucks, really — that could be assembled efficiently and systematically. To that end, Toyota spent \$1.28 billion to build its San Antonio plant; it has the capacity to produce about 200,000 vehicles a year. The company considers it one of the most advanced manufacturing plants in the world.

I visited San Antonio in late November, after the factory had just begun operating. Management theorists who study Toyota's production system tend to say that it is difficult to replicate, insofar as the company's methods are not simply a series of techniques but a way of thinking about teamwork, products and efficiency. Still, some aspects of the system were clearly visible in San Antonio. In the Tundra plant, there is no real inventory of parts, which is a hallmark of Toyota's approach. Once a truck chassis begins its run on the factory line, an order goes out to, say, an on-site parts supplier that provides seats for the interior. At Avanzar, an independent company located in a large workroom adjacent to the assembly line, I watched workers build a car seat from scratch. They chose a raw steel frame with springs, put it on their own minifactory assembly line to add padding, then leather, and then they transferred it (via pulley, over a partition wall) to the Tundra assembly line, where it was installed in the truck. If the front seat had not been ordered 85 minutes earlier, it would not exist.

The idea of actually situating a parts supplier inside an assembly plant is wholly novel. But the methods of low inventory — or what's known as "just in time" production — are hardly unique to Toyota; these have been emulated with great success by other automakers. The same goes for other processes at the San Antonio plant: the line stoppages and quality checks, the time spent by workers discussing hand and body movements in the hope of shaving a crucial half-second from their work. Over the years, Toyota has assisted competitors, especially G.M., in helping to adopt its system, believing it to be in its interest to share practices, especially in exchange for insights into a rival's methods. Toyota's true technological advances, however, are another matter. In San Antonio, for instance, recent innovations in the paint shop that significantly cut production time were considered proprietary and off-limits to journalists.

It is a challenge to convey the scale of the Camry plant in Georgetown, Ky., which comprises 7.5 million square feet, or the orchestral complexity of its shop floor, where 7,000 workers assemble some 5,000 parts into 2,000 cars a day. I couldn't help wondering if a glitch in the flow of door handles, or a broken welding robot, would put a crimp in the entire enterprise. "But that's what the Toyota Production System is," Gary Convis, the head of the plant, countered. "You actually create the conditions where things have to work to make it work." Convis, like most Toyota engineers, mostly wanted to talk to me about Georgetown's ceaseless drive for improvement. When a plant changes over to a new car design, as Georgetown did for the 2006 Camry, production slows down as parts and systems are updated. The last time Georgetown overhauled the Camry, in 2001, 59 days were needed to fully convert the factory to new-car production; last year, the new model took 16 days. The extra cars probably meant additional revenue of about \$100 million.

Improving efficiency in the factory, though, doesn't necessarily lead to greater profits. Savings on the assembly line can mean a nicer dashboard without making the customer pay more for it. "If you're efficient in the things the customer doesn't see, then you can put it into the things the customer does see," Ron Harbour, a consultant whose company rates the efficiency of auto plants, told me. A result is a car more popular with customers. Success on the assembly line, in this way, begets success in the showroom.

4. The Long Road From Rural Japan to California and Beyond

Over the past few years, in an effort to amass a physical record of its business experience in the United States, Toyota has been tracking down and collecting automobiles it has sold here since the late 1950s. The Toyota USA Automobile Museum, as it's known, is located in an unmarked white-brick building on a side street in Torrance, Calif., a few blocks from Toyota's corporate sales campus. When I visited in early December, I took a leisurely stroll through the museum's main room, a spacious, high-ceilinged garage filled with Toyotas, Lexuses and Scions, all in immaculate condition, all parked aslant on a concrete floor.

The museum is open only by appointment; there were no other visitors. Time was compressed into a few strides. I passed a Toyota Corona (1966), a Corolla built in California (the first Toyota made in the U.S., 1986), a Camry from Kentucky (1989), an early Prius (2000) and an early Tundra (2003). To walk along the rows undermines any notion that Toyota's success has been sudden; the progression of cars — in styling, popularity and increasing Americanization — was methodical and incremental. "We don't move in an unpredictable manner," Jim Press told me a few weeks before my visit to the museum. "We move jojo, a Japanese term, meaning step by step."

Toyota grew out of an entrepreneurial foray by the Toyoda family — which made a fortune building textile looms early in the last century — in the 1930s under the leadership of Kiichiro Toyoda. (That's also when it was decided that the car company would be better served by replacing the family's "d" with a "t," in part because it was deemed easier to write and pronounce. The Toyoda loom works did not change its name.) Toyota's success has often been attributed to a Japanese quality of persistence and ingenuity. One of the first Western academics to look deep inside the company, Michael Cusumano, now a professor of management at [M.I.T.](#), debunked that notion when he compared Toyota and Nissan in the early 1980s. "The founders and the managers created and refined Toyota company culture, which is far more powerful than Japanese culture," he says. "It does build on many things that are Japanese — precision, quality, loyalty. But the Toyota culture dominates." Cusumano adds that Toyota's origins, in a rural prefecture, hours from the international influences of Tokyo, provided a beneficial insularity. The company began growing just after World War II, nurtured by government regulations that effectively shut out big American automakers. Still, the devastated postwar economy in Japan necessitated extraordinary resourcefulness: because there was a lack of materials and parts suppliers, for example, Toyota had to create them from scratch. Since the early 1930s, Toyota engineers have looked everywhere for inspiration while tearing apart American products to see how they work. Toyota's systems and worldview derive from an economy of scarcity. In 1950, the company's near-bankruptcy during a difficult year further defined its philosophy of frugality. Toyota soon began to focus obsessively on reducing muda — or waste — and building up a vast storehouse of cash for security.

If history teaches another lesson, it is that Toyota's executives recognized early on that improving the process by which cars are designed and built is just as important as improving the vehicles themselves. In the 1950s and 1960s, this conviction was famously driven by Taiichi Ohno, an engineer who never earned a college degree but who revolutionized modern manufacturing. Ohno was in awe of Henry Ford, but he recognized that the market for cars in postwar Japan — the market for any modern consumer product, he later posited — required greater flexibility as much as the traditional means of mass production. For Toyota to compete with American companies, it had to make small batches of many models (think of those 31 Tundras) that could satisfy all kinds of customers. Ohno, who died in 1990, took an anthropomorphic view of raw materials: just as an employee shouldn't wait around without a task, neither should sheet metal or molded plastic. And so, at his factories in Japan, parts were created only in response to demand. Every worker was to focus on improving his efficiency, too (along with that of his co-workers). There was no best way to do something, but there were always better ways. John Paul MacDuffie, a Wharton professor of management, points out that the system was a "cognitive reframing of what is possible." It showed that quality and productivity were not mutually exclusive; Toyota could indeed produce a greater variety of more durable cars more quickly than anyone else. Some of Ohno's and Toyota's ideas also had a deeply subversive quality. It is human nature to cover up a problem rather than call attention to it. At a Toyota plant, the identification of a problem became imperative and exciting. Because then it could be addressed.

Toyota's production system first gained wide notice in the U.S. in the early 1990s, after the publication of "The Machine That Changed the World," which was written by James P. Womack, Daniel T. Jones and Daniel Roos and serialized in this magazine. According to Womack, whom I visited in his Cambridge office, creating a new product like the iPod or even the Prius is a far more modest achievement than developing a new process. The former are what we normally think of as inventions, of course. But the latter, at least in Toyota's case, presents a novel way of thinking about work and the capabilities of human organizations.

Womack notes that Toyota's managerial competence has extended well beyond Taiichi Ohno; the company has been fortunate that the Toyoda family's descendants, especially the former chairman Eiji Toyoda, have demonstrated tremendous leadership abilities. "They got very lucky with genetics," Womack says of Toyota. The company also benefited from the savvy of an early sales-and-marketing executive, Shotaro Kamiya. In the 1950s, when Toyota could barely sell its cars to the Japanese public, Kamiya decided Toyota could drive up demand by investing in Japanese driving schools. Kamiya also decided to send three employees to California in the summer of 1957 on a survey mission; a few months later, Toyota set up a small dealership in Hollywood to sell an austere, ugly and underpowered vehicle called the Toyopet Crown – "Toyopet is your pet!" its ads claimed. The car went on sale in 1958 for \$1,995; only 288 were sold. That year, the Christmas party, held in the new company's garage in Hollywood, consisted of about 30 people. The custodian's wife cooked the food.

The first years in the U.S. were in fact a disaster. Toyota sold a few Land Cruisers but eventually withdrew the Toyopet from the market. Meanwhile its engineers in Japan tried to create a passenger car that American customers would actually want. The result was the 1965 Corona, an air-conditioned and modestly priced vehicle. After that, sales grew steadily. A variety of factors helped – currency differences often made Japanese car imports cheap (for consumers) and profitable (for Toyota). Labor costs in Japan were lower, too. But perhaps the most important factor was timing. A few years after Jim Press began working at Toyota Motor Sales in California, the gas crisis of the early 1970s brought legions of customers to Toyota's more fuel-efficient cars. By the time the company began setting up factories in the U.S. in the mid-1980s (just over half of the Toyota cars sold in North America are now built here), it was gaining respect for the quality as well as the gas economy of its vehicles. Then came the success of Lexus in the early 1990s. "When they really went at the U.S. market seriously, in the late 1970s and 1980s, the product they brought out was far superior to what the Big Three were producing," Ron Harbour, the efficiency expert, says. "They created this impression and reputation early on. And in the ensuing years, Ford and G.M. have made great strides to make it up. They've narrowed a lot of those gaps. But when you lose that reputation, it's very hard to recover." Catching up is even harder, moreover, when Toyota's cars, like those from Honda and BMW, have consistently higher resale values.

Let's go back in time and say you've got a guy who in 1985 bought a Camry, Harbour says. That Camry buyer was surprised to find he never had to get his car fixed at the dealership. "That guy never, ever looked back," he adds. "G.M., Ford, Chrysler – they've basically lost a whole generation of Americans."

You might figure that Toyota is elated at the way things have gone lately: its market share in the U.S. has risen in the past couple of years while American automakers like Ford (and to a lesser degree, G.M.) have been in a tailspin. But this assumption is probably only partly correct. "We want them to be strong," Jim Press says, referring to Ford and G.M. "When you play a ball game, you don't want to win by errors." Jim Womack puts it more bluntly: "The last thing Toyota wants is for any of those guys to collapse." For one thing, it could be politically disastrous for the Japanese company if it were considered responsible for the death of a grand American institution. "But it's also completely worthless to Toyota in the market," Womack adds. "They're selling all the vehicles they can make already. What they actually want is just continuous, slow decline – decline at the same rate that they have the ability to organically expand. That's the ideal world for them."

5. Toyota Has It Made in America

McAllen, Tex., is a small city in the state's southernmost tip, which has among the highest numbers of pickup-truck sales in any U.S. market, according to Toyota's research. That made it an ideal location for focus groups and marketing research: What did these people need? What did they think of Toyota? And what would actually get them to drive a Tundra? Toyota ultimately decided to pursue customers it calls "true truckers." True truckers aren't ordinary pickup owners; rather, these men are the Platonic ideal of truck-driving authenticity. They might work on the ranch or the construction site; they might fish for bass every weekend. "They're the taste makers, the influentials," Ernest Bastien, a vice president of vehicle operations, told me in San Antonio. "I think all consumers are influenced by professionals. The professional uses a certain tool, and then they want it, too." What Toyota needed was to find the true truckers, get them

behind the wheel of a Tundra and then hope that Obu and Schrage's engineering would take care of the rest. If the true truckers bought it, their followers would, too.

Toyota expects that some buyers will be moving up from its smaller truck, the Tacoma; others will be trading in their weaker, older Tundra for the new model. Still other buyers may be families that view pickup trucks with big back seats (so-called double cabs) as an alternative to an S.U.V.'s. But building a new factory in the U.S. for the truck, locating the plant in the heart of Texas pickup country and then flying the Texas flag outside all speak to the company's focus on severing truck owners' blood ties to Ford and G.M. These loyal owners are the hardest to woo. Indeed, they may be beyond reach. Just as G.M. and Ford may have lost a generation of car buyers, Toyota may have put off a generation of full-size truck buyers with the T100 and the first Tundra.

The company doesn't think so. In recent years, Toyota has successfully marketed cars like the Prius and brands like the Scion through grass-roots endeavors, which often meant showcasing the Prius to an audience of influentials. With Scion, the company wanted to get the cars in the hands of hipsters who would make them seem desirable and rare to young drivers, a strategy backed by limiting production this year to 150,000 vehicles, even as demand will probably exceed that amount. Some of these techniques seemed appropriate for the Tundra too. "There are so many of these buyers that probably will feel uncomfortable going into a Toyota dealer because they don't see a Toyota on the construction site and never have and they don't want to be the first one to show up with one," Brian Smith, the head of Toyota's truck operations, told me. So for the past year, the company's marketers have tried to "soften" resistance to the brand. "Street teams" drive Tundras to big construction sites with water in the summer and coffee and doughnuts in the winter. "We say: 'Hey guys, you ever been in a Toyota before? Just take a moment to sit in it and tell us what you think,'" Smith says. Already Toyota has sent its street teams on hundreds of runs.

Toyota focused the marketing of the Tundra on what Smith calls five "buckets": 1) fishers and outdoorsmen; 2) home-improvement types; 3) [Nascar](#) fans; 4) motorcycle enthusiasts; and 5) country-music lovers. Anyone wondering why Toyota has become a major booster of Nascar or a sponsor of bass-fishing tournaments can see the logic. It's also why Toyota is sponsoring Brooks and Dunn, the country-music duo. And dealers are taking new Tundra trucks to Nascar events, country-music concerts, fishing tournaments and the like. "Parking lots tend to be a long ways away from where the events are," Smith explains, referring to motocross competitions, "so we have our dealers setting up shuttles." The plan is to pull up in a Tundra, offer visitors a ride but have them drive to the event on a slightly indirect course (laid out by a Toyota dealer). "At the end," Smith says, "we say, 'Thank you, you're guests of Toyota, here's a bottle of water, take a lanyard.'"

Based on the company's track record, it's tempting to predict a resounding victory — if not a quick one, then a slow and steady one. But Toyota is by no means infallible. It failed in the large-truck market in the 1990s, and it faltered in the youth market until it came up with the Scion strategy. Its vehicles are sometimes outranked in Consumer Reports in safety and customer satisfaction by other automakers, especially Honda. The company's growth has sparked tremendous internal concerns about quality-control problems.

And Toyota has worries abroad too. Many auto analysts wonder if Toyota has the ability to succeed in emerging markets. "Toyota is fairly weak in what we see as the second-largest growth market in the world, which we consider India," Ashvin Chotai, a London-based auto analyst for Global Insight, told me. In China, the largest growth area, Toyota expects to have 10 percent of the market by 2010, but the company faces intense competition, from both its American and Asian rivals. Jim Press often says that Toyota is not doing as well as the headlines suggest. The trustworthiness of this claim is debatable — Press also says that G.M. is doing just fine — but it's undeniable that the company will soon assume leadership in a market that's both global and brutal.

However the Tundra does in the next few months, the company's history suggests that it never relinquishes a goal before reaching it. And what's striking is that if Toyota succeeds, it won't necessarily be because the company has done anything different this time. Toyota has never really caught the Big Three by surprise. Its marketing strategists have been trying to establish an aura of American authenticity since the

early 1970s, when Toyota's TV ads featured four Dallas Cowboys squeezing into a Corolla. When I asked Takahiro Fujimoto, a management professor at the University of Tokyo and a longtime Toyota observer, whether the company's victories — or the fact that it is now the world's largest automaker — were hard to envision, he said no: "Since almost everything that happened to this company in the past several decades has been evolutionary rather than revolutionary, there have been few surprises."

Toyota's triumphs are often reduced to spare inventory and just-in-time productivity, but that's too simplistic; there are many factors at work. Among management theorists, success derives from what they call the Toyota Way — the company's culture of efficiency and problem-solving. Among historians, Toyota's supremacy is a product of happenstance, specifically its early years in the rural precincts of ravaged, postwar Japan. For those in the marketing world, Toyota has triumphed in its packaging of brands like Lexus and Scion. On Wall Street, its success is defined by huge profits and driven by low retiree costs and close relationships with parts suppliers. Toyota's prosperity also owes a large debt to its dealers, the true links to the consumer, who are very good at letting company executives know what customers like and don't like. And to the fact that Toyota does not award huge stock-option grants or bonuses to its executives. Our culture of excessive compensation has never really caught on there.

All this doesn't make Toyota virtuous. But it does make Toyota different — in some deep, cellular way — from many American companies. Nothing in its DNA, to borrow a fashionable term among business-school academics, is focused on short-term gains. What's more, the long view as a business outlook seems to link so many aspects of the company's success. The long view took Toyota to California, and to its most important market, in 1957 and kept it in the United States even after the Toyopet failed miserably. The long view allowed Toyota to understand the need for improvement and the potential rewards of meeting a higher standard. And when it met higher standards, the company looked ahead at the evolution of its American customers, marshaled its resources and tried to figure out what should come next.

6. Getting the Carbon Out of Cars

Toyota's president, Katsuaki Watanabe, who like all of the company's top executives is based in Japan, recently declared that his dream for Toyota is to build a car that does not hurt anyone and cleans the air when it's running. This is not quite as fantastical as it sounds. Several automakers are developing cars with sensors that literally prevent them from crashing (though not from being crashed into). And in the heavy intersections in Tokyo where air quality is poor, Takahiro Fujimoto told me, part of Watanabe's vision is already real: "The emission gas of some advanced cars is in fact cleaner than the intake air." The most vexing challenge, though, is what fuel cars will run on in a future where oil is too scarce or tailpipe emissions too dangerous on account of [global warming](#). About 10 percent of global carbon emissions come from cars, S.U.V.'s and pickup trucks. Many automakers, Toyota included, now trumpet their vehicles as "clean," but this label, while by no means unimportant, refers to engine technology that reduces smog-forming emissions like nitrogen oxides or unburned hydrocarbons. But every gallon of gas burned still produces more than 19 pounds of CO₂.

What I found within Toyota is that its engineers and executives all take environmental issues seriously, but on their own terms. For many consumers, of course, Toyota's hybrid innovations established a green halo over the company. Yet the environmental community is more wary of the company's lauded progressivism than you might expect. Many environmental advocates are dismayed by Toyota's participation (as a member of the Alliance of Automobile Manufacturers) in a suit to block California's new laws curtailing greenhouse-gas emissions. And some view Toyota's strenuous efforts, especially in the U.S., to sell gas-guzzling trucks and S.U.V.'s as counterproductive. "I think the reality is that Toyota's focus on the truck market has been to make them look as American as possible, rather than be the global environmental leaders they are on the car side," Jason Mark, the former head of the vehicle program at the [Union of Concerned Scientists](#), told me. As Mark sees it, Toyota's activities matter more than any other automaker's. "First, they'll be the biggest car company very soon," he says. "Second, they've demonstrated a knack for innovation with the Prius. And third, they've demonstrated a commitment for stewardship that I don't think one could attribute to the domestic automakers."

When I spoke with John DeCicco, an automotive specialist at Environmental Defense, a New York-based advocacy group, he said that in the near term, at least, it's better not to count on a silver bullet — a drastic changeover to hydrogen-powered vehicles, for instance. There are many reasons that this will remain a long-term goal. One is that cars, especially ones of good quality, last a long time. Another is that automakers are profit-driven public corporations, and any new technology has to be competitive in the marketplace. To see just how long that can take, consider that Toyota began developing the Prius at a time, 1991, when gas was plentiful and cheap. Today, seven years after its introduction in the U.S., it has less than 1 percent of the car market. Higher gas prices or gas taxes may alter this. But for now, environmental advocates like DeCicco urge carmakers to focus on making modest changes to popular vehicles (making S.U.V.'s lighter, for example, thereby increasing fuel efficiency), which could have a more significant environmental impact than a sophisticated new technology. When DeCicco began analyzing total greenhouse-gas emissions from each car company's American fleet, he noticed that in 2003, for instance, there was a significant change for the better in Toyota's rate. This wasn't because of its hybrids but because of its redesign of the Corolla. "When you make a small change in efficiency in a high-volume product like that," DeCicco told me, "it can have a bigger net effect in your carbon than a major change in a small-volume seller."

Still, more economical cars for the short term cannot solve the long-term problem. Toyota expects to be in business 100 years from now, one person in the company's West Coast office told me, long after oil has been depleted or rendered unusable because of its carbon content, and for that reason it has placed all its bets on hybrid technologies. Indeed, Toyota created its hybrid systems not so much with the current era in mind, but because it views hybrids as more practical and energy-efficient. Whether the future is in biodiesel, ethanol or hydrogen doesn't seem to matter; the hybrid system could be adapted to any of those fuels, says Bill Reinert, Toyota's U.S. engineer in charge of advanced vehicle planning. Reinert also told me that the current Toyota system already has the ability to accommodate the larger battery capacity of a plug-in hybrid, which would use electric power for local trips and fuel only for longer excursions. But those large batteries don't yet exist. Was that extra capacity put there on purpose? "Hell, yes," he says. "This company is not stupid."

Reinert adds that every Toyota engineer designing a new car gets an environmental-impact budget as well as a financial one. Designers must consider the total amount of carbon dioxide produced in the design, production and lifetime operation of a new vehicle. This sounds both encouraging and socially responsible. But you have to wonder too if it's really an equation for sustainability. Right now, Reinert says, there are about three-quarters of a billion cars worldwide; by 2050, if market trends continue, "we could conceivably have 2 billion or even 2.5 billion cars." Accommodating those cars will entail building new roads and new factories and spending vast amounts of energy to make shipments. All those activities will create enormous emissions on their own. So even with giant strides in clean-vehicle technology, just doubling the number of vehicles could increase the overall environmental effect by a factor of three.

To their credit, engineers at Toyota like Reinert do not soft-pedal the immensity of the challenge. And they argue, sometimes convincingly, that Toyota will be a large part of the solution. Jim Press does, too, but his is a different kind of optimism. A few days after the new Tundra made its debut, Press gave a speech to the Society of Automotive Analysts in Detroit in which he seemed confident that this would be Toyota's century. New technologies are on the way, he promised. And the demographics of the American market look good: boomers are buying more cars. Americans are living longer. And the growth rate of the U.S. population is greater than China's. Even in the face of what looks like a difficult year for car sales, the industry is on the verge of a golden era. "This is one of the few countries on earth where we have more cars per household than drivers," he said. "Isn't that great?"

At the beginning of his speech, Press joked to the audience that he was about to reveal the secret of Toyota's success. He never really did, except to look ahead with relentlessly bright expectations.