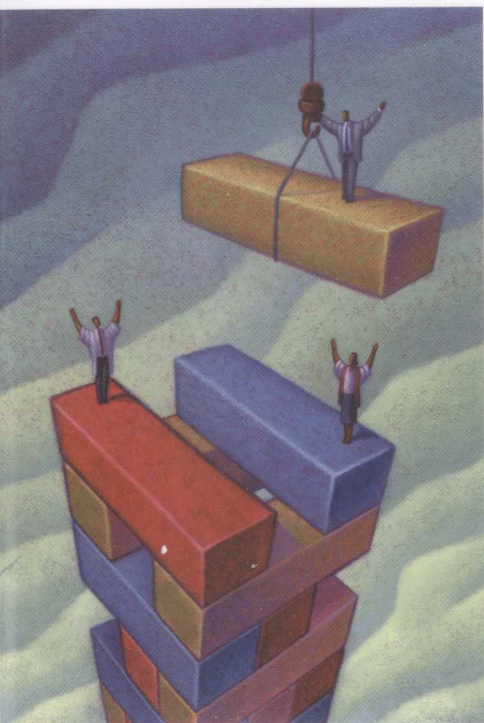


Harvard Business Review

ON

Manufacturing Excellence at Toyota



**Lessons from Toyota's Long Drive:
A Conversation with Katsuaki Watanabe**
Katsuaki Watanabe, Thomas A. Stewart, and
Anand P. Raman

**Decoding the DNA of the Toyota
Production System**
Steven J. Spear and H. Kent Bowen

Learning to Lead at Toyota
Steven J. Spear

**Another Look at How Toyota Integrates
Product Development**
Durward K. Sobek II, Jeffrey K. Liker, and
Allen C. Ward

Time and Motion Regained
Paul S. Adler

Managing in an Age of Modularity
Carliss Y. Baldwin and Kim B. Clark

Lean Consumption
James P. Womack and Daniel T. Jones

**From Lean Production to the
Lean Enterprise**
James P. Womack and Daniel T. Jones

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A HARVARD BUSINESS REVIEW PAPERBACK

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Lessons from Toyota's Long Drive

An Interview with
Katsuaki Watanabe

THOMAS A. STEWART AND ANAND P. RAMAN

Executive Summary

LAST DECEMBER the Toyota Motor Corporation officially forecast that it would sell 9.34 million cars in 2007—which could make it the world's largest automaker. However, rapid growth and globalization have created many pressures for the company, and the strain of success is already beginning to show. Two HBR editors interviewed Toyota's president, Katsuaki Watanabe, and several top executives to learn about the strategies they're developing to cope in the future.

For well over a decade, J. D. Power and other research firms have consistently rated Toyotas among the top automobiles for quality, reliability, and durability. But in 2006 a series of problems with its cars threatened to sully the company's reputation. What's more, speedy expansion to meet demand and the struggle to keep

pace with technological change have combined to challenge Toyota's grand ambitions and its famed "Toyota Way."

For Watanabe, being number one means "being the best in the world in terms of quality." If Toyota's quality continues to improve, he says, volume and revenues will follow. If problems arise from overstretching, he wants them made visible, because then his people will "rack their brains" to solve them—and if that means postponing growth, so be it.

Toyota's long-term strategy involves developing both global and regional car models in order to compete worldwide with a full line of products. Watanabe aims to achieve his goals through a combination of *kaizen* ("continuous improvement") and *kakushin* ("radical innovation"). One of his visions for the future is a "dream car": a vehicle that cleans the air, prevents accidents, promotes health, evokes excitement, and can drive around the world on a single tank of gas.

Toyota's way is to measure everything—even the noise that car doors make when they open and close as workers perform their final inspections on newly manufactured automobiles. By any measure, whether esoteric or mundane, Toyota Motor Corporation has become one of the most successful companies in the world today. This year marks the 70th anniversary of Toyota's founding, 50 years since the Japanese company started exporting cars to the United States, and a decade since it launched the world's first commercial hybrid, the Prius. If, as Toyota officially forecast last December, it sells 9.34 million vehicles in 2007, it

will overtake America's General Motors to become the world's biggest automobile manufacturer.

Toyota is, arguably, already the best carmaker on the planet. For almost 15 years J. D. Power and other research firms have consistently rated Toyota and its luxury line, Lexus, among the top automotive brands in terms of reliability, initial quality, and long-term durability. Toyota is also the most profitable car manufacturer: In the financial year that ended in March 2007, it made a profit of \$13.7 billion, whereas GM and Ford reported losses of \$1.97 billion and \$12.61 billion, respectively, in 2006. In fact, Toyota's market capitalization on May 10, 2007—of \$186.71 billion—was more than one and a half times GM's (\$16.60 billion), Ford's (\$15.70 billion), and DaimlerChrysler's (\$81.77 billion) combined.

In the history of the modern corporation, Toyota's march to the top from its humble beginnings as a textile machinery manufacturer in the mill town of Koromo—now Toyota City—is one of the most remarkable examples ever of managing for the long term. Toyota's rise wasn't quick or inevitable. Even in the early 1980s Ford and GM marketed bigger, better-looking, and plusher cars than Toyota did—although its soulless creations were more reliable and fuel efficient. The Japanese manufacturer closed the gap little by little, improvement by improvement. In 1970 GM had a 40% chunk of the U.S. car and light-trucks market, whereas Toyota had only a 2% sliver. Toyota's market share inched up to 3% in 1980, to 8% in 1990, and to 9% in 2000, entering double digits for the first time only in 2006, when it rose to 13% and GM's fell to 26%. Toyota's ascension is best captured by the Japanese word *jojo*: "slowly, gradually, and steadily."

Every executive has two questions about Toyota today: What can my company learn from the world's

greatest manufacturer? and (sotto voce) How is Toyota handling success? The answer to the former is obvious (plenty), but the jury is still out on the latter. Toyota is more confident than ever in some ways. The company is proud of the fact that its management principles are different from those taught in B-schools. Senior executives take great pleasure in explaining that other companies find it difficult to emulate Toyota because its management tools matter less than its mind-set. To some observers, the company has become insufferable. For instance, after it unveiled the Lexus LS600h L at the New York Auto Show in April 2006, the influential blogger Peter DeLorenzo complained, "The tone, the language, and everything about the presentation confirmed to me that the 'creeping' arrogance that has been brewing at Toyota for years has finally blossomed into full bloom for everyone to see."

A long and deep look at Toyota, especially in Japan, reveals a different picture. The company appears to be running scared. Toyota's executives were blindsided last year by a series of problems with its automobiles that blemished the company's reputation for manufacturing quality products. They are worried about always being the second (or the sixth, according to the 2006 Formula One standings) to enter new markets and to incorporate new technologies in vehicles. They are also gravely concerned about not having enough people to sustain their global growth. In fact, almost every aspect of Toyota is straining to keep pace with the company's rapid expansion and with technological change.

These pressures are compounded by three factors. First, in order to meet demand, Toyota has added the capacity to produce 3 million automobiles over the past six years. Perhaps the only other automaker to boost pro-

duction that fast, according to industry experts, was the Ford Motor Company, under Henry Ford in the early 1900s. Second, Toyota's ambitions have dramatically expanded. The company wants to develop Lexus into a big luxury brand in Europe, attacking European car-makers' biggest source of profits; to grow sales of its full-size pickup truck, the Tundra, in the United States, thereby assaulting American automakers' last redoubt; and to develop a new breed of vehicles for emerging markets such as China and India. Third, the rate of technological change both in manufacturing processes and in products is unprecedented. For instance, Toyota's vision is to develop "dream cars" that are revolutionary in safety and environmental benignity.

A series of interviews with Katsuaki Watanabe, Toyota's 65-year-old president, and several executive vice presidents revealed that Toyota's future will depend on its ability to strike the right balance—between the short term and the long term; between being a Japanese company and being a global company; between the manufacturing culture of Toyota City and the design culture of Los Angeles, where some of Toyota's cars take shape; between the cautiousness of Toyota's veterans, who are worried about growing too fast, and the confidence of its youngsters, who have seen only success. And Watanabe, who is using the Toyota Way to remake the company, told HBR's editor, Thomas A. Stewart, and senior editor Anand P. Raman that Toyota must also balance incremental improvements with radical reform. What follows is an edited version of our interview with the company's president that incorporates (and identifies) some comments by Toyota executive vice presidents.

Mr. Watanabe, you have spoken recently about how the early part of the twenty-first century is Toyota's "second founding period," when the company will set a course that will create a more prosperous society in the future. Almost in the same breath, you spoke about "fixing the foundations" of the company. Is Toyota poised for long-term growth, or does the company face a crisis?

Toyota must keep growing even as it builds a stronger foundation for the future; it has to do both for the company's long-term health. There are three keys to building a stronger foundation: We must improve product quality, keep reducing costs, and, in order to attain those two objectives, develop human resources. We have to create a stronger foundation at every stage of the supply chain, from product development to after-sales service. Our products must be the best in the world; we must be the first to offer them to customers; we must manufacture them at the lowest cost; and we must sell them through the best service networks. My focus is on how Toyota can achieve all those things at the same time.

What does becoming number one in the global automobile industry mean to you?

To me, becoming number one isn't about being the world leader in terms of how many automobiles we manufacture or sell in a year, or about generating the most sales revenues or profits. Being number one is about being the best in the world in terms of quality on a sustained basis. I attach the greatest value and importance to quality; that lies at the root of my management style. It's critical for Toyota to keep making the highest-quality vehicles in the world—the best products in every way,

manufactured without any defects. Unless we enhance quality today, we can't hope for growth in the future. That's why we are investing in the development of new technologies, new processes, and human resources. My top priority is to ensure that we do that resolutely, sure-footedly, and in a thorough fashion. We've never tried to become number one in terms of volumes or revenues; as long as we keep improving our quality, size will automatically follow.

That's an ambitious agenda. But there are several pressures operating on Toyota right now. For instance, between 2004 and 2006 the company recalled more vehicles than ever before. When you took over as CEO in June 2005, you talked openly about "big-company disease" and the risks of complacency. How do you manage the tensions that growth and globalization have created?

Since I became CEO, Toyota has continued to grow very rapidly. We produced around 3 million more cars in 2006 than we did in 2000. We opened about a dozen new facilities during that period, and we are building five more plants. In 1995 there were 26 Toyota factories; in 2007 there will be 63. I've personally visited our new manufacturing facilities in China and the United States and seen the new plants we're building in Thailand, Canada, China, and Russia. Sure, every Toyota plant faces distinct challenges and difficulties, but I realize that our system may be overstretched.

We must make that issue visible. Hidden problems are the ones that become serious threats eventually. If problems are revealed for everybody to see, I will feel reassured. Because once problems have been visualized,

even if our people didn't notice them earlier, they will rack their brains to find solutions to them.

That's the DNA we've all inherited through the Toyota Production System. What are the problems with the new models we have launched? Have we trained our new workers well enough to produce quality? Are our new facilities operating all right? What would be the most appropriate way of marketing and selling the Tundra, given market conditions in the United States? As long as we know what needs and challenges we face, we can come up with countermeasures.

If there are problems that go beyond our immediate capability to deal with them, we must stop if necessary, postponing projects and growth. When I drive, I have my hands on the steering wheel but I also constantly think about when I should apply the accelerator and when I should brake. I may not need to brake right now, but if a time comes at Toyota when I need to put my foot on the brake pedal rather than on the accelerator, I won't hesitate to do so.

When a Toyota worker on the shop floor notices a problem, he or she has the freedom to pull the andon cord immediately, stop the line, and ensure that the problem is fixed before restarting production. But is it really possible to do that with the entire company? Don't you have to fix things as you go along?

The same principle applies to management, too, and it's my job to pull the andon cord. Soon after I became president, as you know, we confronted several quality-related problems. We created teams specializing in different areas and instructed them to analyze the root causes of problems in each area. We found that in several cases the

problems had occurred because of design flaws or because of short lead times that didn't allow our engineers to build a sufficient number of physical prototypes. If we had thought about product designs more clearly or had the time to conduct more experiments, we could have avoided those problems.

To prevent more problems, I suggested that we extend the deadlines for several projects by six months, even if that meant delays in new launches, and that we postpone or eliminate other projects. Of course, we couldn't delay some critical projects; we kept our eyes on market conditions and technology trends and invested additional resources to tackle problems related to those projects first. But I will not allow the same problems to recur; we won't use half-baked ideas to tackle half-cooked problems. We have to improve quality even if I have to slow our pace of growth. After examining every project in our pipeline, product by product, market by market, we have created a new product-development plan. Some projects have taken a different direction, and I have halted others—just as workers stop the line.

As Toyota's president, you have a responsibility to the capital markets. As you expand faster around the globe, will the variability of its share price—the company's beta—increase? How does Toyota address that risk in strategic terms?

The priority of Toyota's top management team is to increase shareholder value steadily over the long term. As the company continues to expand outside Japan, we will increasingly face market risk, which will vary from country to country. To create a company that can resist fluctuations all over the world all the time is difficult.

However, we use the concept of leveling fluctuations (*heijunka*), which is part of the Toyota Production System, to reduce risk. For example, the conditions in some Asian markets, such as Taiwan and Indonesia, are still tough. Japan's economy is doing better, but the automobile market is stagnant except for the minivehicles [whose engines have less than 660 cc capacity] segment. There will always be such vicissitudes in different markets, so leveling out those peaks and troughs is impor-

The Long-Term Growth Strategy

In 2006 Toyota President Katsuaki Watanabe unveiled the full extent of Toyota's ambitions. The company strategy puts equal emphasis on taking in opportunities and avoiding or absorbing risks; it utilizes global car models and also regional models. With global models such as the Lexus, the Camry, and the Corolla, and regional models such as the Crown (Asia) and the Tundra (North America), Toyota will offer a full line of appropriate vehicles in all the world's markets.

	Japan	North America	Europe	Asia	Others
Premium			Lexus		
Large	Crown	Avalon		Crown	
Medium	Mark X	Prius			
			Avensis	Reiz	
			Camry		
Compact		Scion			
		Matrix			
			Corolla		
		Vitz/Yaris			Vios
				Model for Emerging Markets	
Truck	Alphard	Sienna		Hilux, Innova, Fortuner	
SUV	Estima	Tundra			
Minivan		RAV4			