



Technology Strategy and Management

Reflections on the Toyota Debacle

A look in the rearview mirror reveals system and process blind spots.

VARIOUS EXPERTS IN industry and academia have long recognized that Toyota, founded in 1936, is one of the finest manufacturing companies the world has ever seen.^a Over the past 70-plus years, Toyota has evolved unique capabilities in manufacturing, quality control, supply-chain management, and product engineering, as well as sales and marketing. It began perfecting its famous Just-in-Time or “Lean” production system in 1948. I am a longtime observer (and customer) of Toyota, and have recently tried to understand how such a renowned company could experience the kinds of quality problems that generated numerous media headlines during 2009–2010.^b

First, to recount some of the facts: Between 1999 and 2010, at least 2,262 Toyota vehicles sold in the U.S. experienced unintended cases of rapid acceleration and are associated with at least 815 accidents and perhaps as many as 102 deaths. The incidents that were not due to driver error (stepping on the gas



Example of an unsecured driver-side floor mat trapping the accelerator pedal in a 2007 Lexus ES350.

pedal instead of the brake) appear to be the result of sticky brake pedals (easily fixed with a metal shim to replace a plastic component) as well as loose floor mats that inadvertently held down the gas pedal.^c Another possible cause is the software that controls the engine and braking functions, particularly in

vehicles such as the Prius and Lexus hybrids, which were also involved in the complaints. Toyota also encountered other quality problems that it mostly kept out of the headlines—in particular, dangerous corrosion in the frames of Tacoma and Tundra pickup trucks sold in North America between 1995 and 2000, apparently due to improper antirust treatment. Toyota did not recall these trucks, but silently bought them back from consumers.^d

a See, for example, J. Womack et al., *The Machine that Changed the World* (1990); or J. Liker, *The Toyota Way* (2003).

b My first book, *The Japanese Automobile Industry* (1985), presented a history of how the Just-in-Time system was developed at Toyota. A later book, *Thinking Beyond Lean* (1998), examined Toyota’s product development system. My most recent book, *Staying Power* (2010), looks back at Toyota’s manufacturing, product development, and learning capabilities as well as how it ended up with these quality problems in 2009–2010.

c There are numerous reports on the Toyota problem in the media and information available from Toyota directly. A particularly detailed early document is *Toyota Sudden Unintended Acceleration*; www.safetyresearch.net. Also see “U.S. Safety Agency Reviewing More Crashes,” *The Wall Street Journal*, (Feb. 15, 2010); <http://online.wsj.com>; and “Toyota’s Sudden Acceleration Blamed for More Deaths,” *Los Angeles Times* (Mar. 26, 2010); <http://articles.latimes.com/2010/mar/26/business/la-fi-toyota-deaths26-2010mar26>.

d Toyota’s buyback program covered Tacoma pickup trucks made between 1995 and 2000. See “Toyota Announces Tacoma Buyback Program for Severe Rust Corrosion,” *The Consumerist* (Apr. 15, 2008); <http://consumerist.com/379734/toyota-announces-tacoma-buyback-program-for-severe-rust-corrosion>.

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There have also been some minor complaints about the driving mechanisms in the Corolla and Camry models, and stalling in some Corolla models. Overall, during a 12-month period, Toyota recalled some 10 million vehicles through August 2010—an extraordinary number given that the company sold only approximately seven million vehicles during this same period.²

In the software business, producers and consumers are accustomed to product defects and an occasional recall as well as lots of “patches” or product fixes (see my earlier *Communications* column, “Who is Liable for Bugs and Security Flaws in Software?” March 2004, p. 25). Compared to automobiles, though, software product technology is relatively new, and the design and engineering processes are highly complex, especially for large systems with many interdependent components. But to what can we attribute so many quality problems in an industry as mature as automobiles and in a company so renowned for quality and manufacturing? Moreover, when even the mighty Toyota can falter, what does it say about “staying power”—the ability of a firm to sustain a competitive advantage and keep renewing or expanding its capabilities?

Systems and Managerial Process Problems

One way to think about the Toyota debacle is to divide the problem into categories: the production system, the product development system, and, for lack of a better term, general manage-

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ment. These systems and managerial processes also reflect intangible corporate values such as what kind of commitment the organization has to quality and customer satisfaction.

The Toyota production system does not seem to be the cause of the quality problems experienced over the prior decade. In the past, Toyota has exhibited a significant advantage over its mass-producer competitors in physical and value-added productivity. The competition has improved, but it is unlikely that any firm has actually passed Toyota in manufacturing prowess. Data related to manufacturing or assembly quality, such as the number of defects reported by customers in newly purchased vehicles, generally has placed Toyota at the top of the auto industry or at least among the leaders. This past year was different due to the recalls—Toyota fell from sixth to 21st in the annual J.D. Power’s survey of initial quality.³ However, the recent quality problems expose the limits of Toyota’s production system. Making components or receiving supplier deliveries “just-in-time” as the assembly lines need the components minimizes inventory and operating costs, and exposes quality problems visible to assembly workers. But it does not detect design flaws that surface during usage of a product.

In terms of product development, including design and testing processes, Toyota has slipped a notch. The company seems to have tried too hard to reduce costs due to rising competition from low-cost but high-quality competitors such as Hyundai in Korea or new entrants in China. It is clearly a lapse in design and testing when accelerator pedals get stuck on loose floor mats, or when new types of plastic pedal materials become sticky after being exposed to moisture and friction. It is also a problem of design and testing when drivers feel that braking software or on-board computer controls and sensor devices seem to malfunction or operate crudely. Toyota’s engineers and U.S. government safety investigators have not been able to replicate the conditions that caused some customers to complain about these software-related problems. But the kinds of problems we saw in 2009–2010 indicate Toyota engineers need to do a better job in product de-

velopment to make sure their vehicles work properly under all conditions. Whether the component comes from an in-house Toyota factory or a supplier makes no difference. Toyota engineers are responsible.

In terms of general management, such as of the supply chain and overall quality, Toyota clearly failed to live up to its historical standards. Executives within the company admit they overstretched their managerial resources and overseas supply chain in the push to overtake General Motors as the world's largest automaker, which Toyota finally did in 2009. More specifically, the quality problems appear connected to overly rapid expansion of production and parts procurement outside Japan, particularly given the decision to use a different brake pedal. In the past, Toyota manufactured new models in Japan initially for a couple of years, using carefully tested Japanese parts, and only then did it move production of the best high-volume models to overseas factories. Over the last decade, by contrast, Toyota ramped up overseas production of new and old models with new suppliers much more quickly and, apparently, with inadequate stress testing.

Also at the management level, Toyota executives seem to have paid increasingly less attention to product and process details. It may well be that Toyota managers as well as staff engineers believed their company had already reached such a high level of perfection that there was nothing much to worry about. But automobiles are themselves very complex systems, with lots of hardware and software, and as many as 15,000 discrete components. It is not surprising that some things go wrong and recalls are common in the industry. Other automakers over the past year recalled more than 10 million vehicles, not counting the Toyota recalls.² In the grand scheme of things, moreover, the number of accidents and even deaths attributed to Toyota are not so large compared to what other companies have experienced. For example, Ford had a massive recall in 2000 of some 13 million faulty tires made by Firestone and fitted on its Explorer SUVs, reportedly resulting in over 250 deaths and 3,000 catastrophic injuries.^{1,4} Nonetheless,

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Toyota redefined mass production and built its reputation around quality and reliability by paying attention to details, large and small. The recent slew of recalls definitely indicates something changed for the worse in the company.

What shocked me most was that the quality lapses seemed to take Toyota's senior managers by such surprise. CEO Akio Toyoda, and other senior executives in the U.S. and Japan, admitted to having little or no information about these quality issues, which first surfaced in Europe. They were unprepared to explain the source or nature of the problems—to themselves or to the global media. Toyota also made its predicament worse by responding much too slowly to customer complaints and allowing bad news to leak out sporadically, while executives continued to deny—at least initially—that there was a real problem.

Companies with true staying power fix their problems and recover from their mistakes. Here, Toyota has not disappointed us. By the fall of 2010, Toyota managers and dealers had gotten their act together and were working hard to rebuild customer confidence. The problems seemed mostly contained to the pedals and floor mats, though Toyota also upgraded some of the software in its hybrid vehicles. Service technicians worked overtime for months to fix recalled vehicles. Sales and profits recovered. And Toyota now recalls any vehicle immediately with even the slightest hint of a problem.

Technology and Management Lapses and Lessons

The Toyota debacle offers many lessons about technology and manage-

ment. But one observation is that, although we can learn a lot about best practices from looking at exemplar firms and their unique processes, like Just-in-Time production, we also need to have some perspective. An enduring management principle that truly differentiates firms over the long haul must also be separable from the experience of any particular firm, including the originator. This sounds like a contradiction but it is not. Every company, market, and country will experience ups and downs. Even the best firms are likely to decline at least a little as competitors catch up or when managers lose their focus. Moreover, success often brings with it the potential seeds of decline—such as increases in the size, complexity, and global scale of operations, which can be much more difficult to manage. In this case, Toyota's quality problems in 2009–2010 do not mean the principles of “lean production” or lean management more generally are any less valuable to managers. What managers need to understand are the limitations of any best practice as well as the potential even for great companies to lose their focus and attention to detail—at least temporarily.

The best outcome for Toyota will be for managers, engineers, and other employees to reflect deeply on what happened to them and use these insights to create an even stronger company. They should become better able to handle adversity and change in the future because they now know what failure looks like. The Toyota way used to be that one defect was too many. That is the kind of thinking that Toyota seems to be regaining. ■

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