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## Management Review

**Robert E. Cole**

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# What Really Happened to Toyota?

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Given the spate of recalls and quality problems, managers wonder whether Toyota's difficulties throw its legendary manufacturing model into question.

BY ROBERT E. COLE

CONSUMERS WERE SURPRISED in October 2009 by the first of a series of highly publicized recalls of Toyota vehicles in the United States. Citing a potential problem in which poorly placed or incorrect floor mats under the driver's seat could lead to uncontrolled acceleration in a range of models, Toyota announced that it was recalling 3.8 million U.S. vehicles. The recall was triggered by the report of a fiery crash in California, where the accelerator of a Lexus sedan got stuck, resulting in the driver's death. Additional reports of unintended acceleration from sticky gas pedals prompted the National Highway Traffic Safety Administration to pressure Toyota to recall additional vehicles and models.

To car buyers and students of manufacturing excellence, Toyota was no ordinary company. It was in a class by itself, long known, even revered, for its sterling quality. For manufacturing executives who have strived for decades to emulate Toyota, the mere suggestion that it had quality issues was a serious matter, to say the least. All over the world, executives paused to wonder if they had been chasing after the wrong manufacturing model.

Despite Toyota's long record of building reliable, low-defect vehicles, public perceptions about quality are often greatly influenced by reports in the media and their overall timing. The public view can be at odds with the objective measures. In the case of Toyota, there were definitely indications that the quality level

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## THE LEADING QUESTION

Why has Toyota been struggling with quality issues?

## FINDINGS

- ▶ Management's recent focus on growth weakened the emphasis on quality.
- ▶ The quality of competitive products has improved.
- ▶ Public perceptions about quality can be greatly influenced by media reports.

of its products had fallen off in recent years. What's more, the changes had occurred during a period of time when many of Toyota's competitors, including Ford, Chevrolet and Hyundai, were producing better and better cars. The key question was the source of Toyota's problems: To what extent did they originate with the product designs and assembly, and to what extent could they be pegged to the company's manufacturing systems? (See "About the Research.")

The degree to which Toyota's quality problems should be seen as serious depends to some extent on whether we view them in absolute terms or relative to its competitors and on the size of the gap between consumer perceptions and objectively identified problems. Even before the March 2011 earthquake and tsunami hit Japan, the company had incurred huge financial and reputational costs stemming from the recalls and subsequent publicity. Since then, the effects of the earthquake and tsunami on both Toyota and many of its supplier companies have been significant, resulting in cut-backs in production and delays in the delivery of new vehicles. With reduced product availability, some prospective Toyota customers are likely to choose another brand, and the long-term risk is that some of these buyers will find that the other brands meet their quality expectations just fine.

### **Defining the Problem**

It would be difficult to overstate Toyota's role in shaping the modern approach to quality improvement. Beginning in the early 1960s, Toyota, together with its supplier companies, pioneered numerous quality improvement methodologies, providing the operational basis for Japanese total quality control. TQC, in turn, provided the basic building blocks for the Six Sigma methodology, which has been actively embraced by leading U.S. companies such as GE and Boeing. In the 1960s, Toyota management began to understand the critical links between quality, customer satisfaction and profit. The importance of these connections became deeply rooted in Toyota's management philosophy and an integral part of the company's employee training and growth. Quality emerged as a central element in Toyota's global strategy and became embedded in the renowned Toyota production system. In this context, referring to Toyota's recent quality problems as a "fall from grace" is not an exaggeration.

Toyota's quality problems in the United States were signaled with the initial recall in late 2009 for problems with floor mats, but they didn't end there. Over the next four months, the company recalled 3.4 million more vehicles in three separate recalls over and above the initial 3.8 million, for a total of more than 7 million. There were several issues: potentially sticky gas pedals, pedal entrapment and software glitches that affected braking on some models.

Back in 2006, well before Toyota's difficulties became public, the company's management commissioned a survey of U.S. consumers that included the following question: How much influence does having a recall on your current vehicle have on subsequently purchasing that same automotive brand again? At the time, 11% of U.S. car owners said a recall was influential, and 20% said it was highly influential.<sup>1</sup> But in Toyota's case, at least, the *actual* reaction was harsher than the hypothetical: A Gallup national survey in late February 2010 found that 31% of Americans believed Toyota vehicles were unsafe; the percentage among Toyota owners was only 14%, but for non-Toyota owners the figure shot to 36%.<sup>2</sup> Even if the media exaggerated the seriousness of problems and politicians politicized them, customer perception is the final arbiter.

Moreover, the number of safety-related recalls kept growing. Between February and August 2010, there were 13 separate Toyota recalls. They affected old and new models and were based on a wide range of issues (including steering control and fuel leakage). Just as things seemed to be settling down last winter, the company announced two further recalls in January and February 2011. In May 2011, *Automotive News* reported that more than 20 million Toyota vehicles had been recalled since autumn 2009.<sup>3</sup>

### **The Consumer Perspective**

There is no question that Toyota's quality image among consumers suffered with the recalls. Not only is the decline visible in survey data, it has also been greatly amplified by the media. David Champion, senior director of *Consumer Reports'* Auto Test Center, has said that Toyota vehicles' quality measurably decreased in recent years. In 2007, the magazine observed that the fit and finish of some Toyota models, as well as overall vehicle quality, had declined. In 2008, *Consumer Reports* decided no

longer to give automatic “recommended” ratings to all Toyota models based on their previous evaluations.<sup>4</sup> J.D. Power and Associates, another influential evaluator of autos, also noted a recent decline in the quality of Toyota’s products.<sup>5</sup> Its Initial Quality Study surveys car owners and lessees 90 days after purchase, asking some 160 detailed questions. In 2009, before the recalls, Toyota was tied with Mercedes Benz for sixth place overall and was the top company among mass-market producers. The 2010 results, released in June 2010, told a different story. Toyota fell to 21st out of 33 brands, while the Lexus brand fell from first place to fourth place, behind Porsche, Acura and Mercedes-Benz.<sup>6</sup>

At first glance, the change between 2009 and 2010 appears to be stunning. However, J.D. Power’s data show that between 2000 and 2009, the quality of Toyota’s products actually *improved*. Part of the issue is in the way quality gets measured: J.D. Power looks at the number of defects per 100 vehicles. In 2009, Toyota had 101 problems per 100 vehicles; in 2010, the number of defects increased to 117. Although that may seem like a significant change in quality, for the individual car owner it is actually quite small (an increase from 1.01 problems per vehicle to 1.17), and it hardly suggests a collapse in quality. This method of reporting can make the differences among brands appear more substantial than they are.

At the same time, the auto quality ratings across brands have become compressed over the last three decades. That means that the relative changes in brand rankings from year to year, which are widely featured in the media, do not necessarily reflect important absolute changes in performance. J.D. Power reports in detail on brand performance in different categories of mechanical and design quality. From 2009 to 2010, the most notable decline involving Toyota’s models was in power train design, which declined from “about average” to “below average.”<sup>7</sup> These findings are consistent with other observations that Toyota’s quality problems are largely engineering rather than manufacturing problems.

Another factor worth noting involves the role of changing owner perceptions. People who bought a Toyota in 2009 likely did so in the belief that they were buying a high-quality car. They were reacting to what market researchers call a positive halo effect. All things being equal, buyers in this situation pay

## ABOUT THE RESEARCH

I began collecting data for this paper systematically in early 2010 and continued the research until May 2011. However, my long history as a researcher of automotive quality provided the underpinnings for this initiative. The initial efforts consisted of monitoring the media, both print and online, to see both what they reported and how they reported it. I also gained access to publicly available data from internal Toyota documents related to vehicle safety and defects submitted in response to congressional subpoenas, and I consulted with officials at the U.S. National Highway Traffic Safety Administration. Depositions from Toyota executives were made available to me. I showed early drafts of the paper to a variety of individuals, including former Toyota employees, retirees and quality experts in Japan, the United States and elsewhere. I interviewed and discussed particular issues with Japanese academics with deep knowledge of the auto industry. I also had access to a report commissioned by Toyota from the Japanese Union of Scientists and Engineers, titled “Findings by Independent Experts about Quality Assurance at Toyota.” Databases from *Automotive News*, NHTSA, the Project on Excellence in Journalism and information from Toyota annual reports also proved useful.

less attention to small problems (or don’t even notice them) when filling out surveys. If there were any initial irritants, owners in this environment frequently become used to them. But in 2010, in the midst of a barrage of negative news about Toyota’s problems, customers became far less forgiving about Toyota’s product flaws. Whereas consumers tended to overestimate Toyota’s objective quality with low reports of defects in 2009, in 2010 they tended to underestimate the quality with high reports of defects. Toyota’s objective quality problems, while significant, became greatly exaggerated by the media. While the objective data about the company’s quality performance suggest it has deteriorated, there is no evidence showing that it collapsed. The dynamics of specific measurements, combined with negative media coverage and the improved quality of competitors, have contributed to a further tarnishing of Toyota’s quality reputation and weakened consumer trust.<sup>8</sup> For years, Toyota’s core brand theme in the United States and Europe was advertised as quality, durability and reliability, with an added emphasis on value.<sup>9</sup> Increasingly, those themes were less effective in differentiating its products. That raises the question about how Toyota will market its vehicles going forward.

## Damage to the Brand

A possible parallel to the challenges Toyota faces can be found with Ford, which experienced significant negative fallout from rollover incidents involving the Explorer/Firestone tire failures in 2000 and 2001

and the company's alleged subsequent cover-up. Like Toyota, Ford received enormous media attention.<sup>10</sup> Ford was able to fix the problem relatively quickly by changing tire suppliers and redesigning the model. But the damage to its market position was costly and long-lasting. In the highly profitable light truck market between 2000 and 2005, Ford went from being the market leader, selling about 100,000 units more than rival GM, to being about 500,000 units behind.

Negative quality perceptions can linger long after the objective quality problems have been corrected. While many auto analysts predicted early in 2010 that Toyota would rebound from its troubles quickly, Ford's experience suggests that this view may be overly optimistic. Indeed, managers need to understand the relation between perceived and objective quality. Despite the growing volume and availability of real data, consumers form perceptions of auto quality on what is often limited information and personal experiences ("My brother loves his Camry"). They may hold on to their beliefs even in the face of objective information to the contrary.

Part of the reason brand reputations don't recover quickly can be traced to the media and to ongoing interest by government regulators. During January and February 2010, when Congress conducted hearings on the Toyota recalls, the recall story was among the top 10 news stories in all but one week. In a U.S. media fixated on celebrities and brands, stories about endangered icons are, by nature, eminently newsworthy. In this case involving unintended acceleration, with the safety of millions of drivers and passengers at stake, there was the added concern for public safety.<sup>11</sup>

### **Beneath the Problems**

A basic principle of risk management is to identify risks early and eliminate them while they are still minor problems. Toyota executives had a number of warnings about its deteriorating quality. In early 2009, for example, before the massive recalls, Toyota disbanded a high-level task force that had been set up in 2005 to deal with quality issues. A Toyota manager explained the decision by saying that management had come to believe that quality control was part of the company's DNA and therefore they didn't need a special committee to enforce it.

We have already discussed early signs of Toyota's quality problems as reported in *Consumer Reports*. In January 2008, Chris Tinto, Toyota's U.S. vice president in charge of technical and regulatory affairs, further warned his fellow executives that "some of the quality issues we are experiencing are showing up in defect investigations (rear gas struts, ball joints, etc...)." <sup>12</sup> These and other early warnings were ignored. In a pattern not uncommon in large organizations, politically powerful executives shrugged off early warnings of lower-ranking executives.<sup>13</sup>

There appear to be two root causes for Toyota's quality problems. The first is an outgrowth of management's ambitions for rapid growth. The second is the result of the increasing complexity of the company's products.

**Growth** Toyota's drive for growth moved into high gear in 1995 with the appointment of Hiroshi Okuda as the company's new president. Okuda, known for his aggressive efforts to remake Toyota, was the architect of an ambitious global growth strategy, known as the "2005 vision." It called for rapidly increasing Toyota's global market share from 7.3% in 1995 to 10% over the next decade. The company achieved a global market share of 9.7% in 1998 and then set a new target of 15% by 2010. Toyota was well on its way to achieving that goal (its global market share reached 13% in 2008) when the global financial meltdown and Toyota product recalls threw the effort into disarray.

Akio Toyoda, Toyota's current president (and grandson of the company's founder), puts the turning point at 2003; from then on, sales grew faster than the company could manage. He acknowledges that the strategic focus on growth warped the "order of Toyota's traditional priorities."<sup>14</sup> In other words, growth had taken priority over the company's traditional focus on quality.

Toyota's aggressive growth targets were out of character for what historically had been a conservative company. Under family leadership, Toyota had pursued growth cautiously; for example, it was the last of the major Japanese auto companies to begin manufacturing vehicles in the United States. Given its huge cost and quality advantages, it is likely that Toyota could have gained U.S. market share much more rapidly than it did. However, to avoid protectionist sentiment, management had been careful

not to exploit the company's ability to reduce prices to build market share, preferring to rely instead on its reputation for reliability and durability.

Okuda convinced corporate leaders to pursue rapid sales growth and profits while downplaying the risks associated with this strategy. The 15% market share target meant surpassing GM as the global volume leader and expanding production to new locations. It also meant hiring significant numbers of new employees, contracting with new non-Japanese suppliers and hiring large numbers of contract engineers. Between 2002 and 2008, Toyota's overseas manufacturing facilities increased from 37 to 53, and global sales rose an average of 9% per year.<sup>15</sup> That expansion gave management little opportunity for adjusting its systems and practices to accommodate such strong growth. Organizational incentives, especially informal ones, became skewed toward growth. Without specific policies that preserved the traditional quality focus, key decisions affecting product development, supplier management and production became biased in favor of meeting sales, delivery, cost-cutting and profit targets. Many of the changes were subtle (for example, tilting promotion criteria more in favor of success at meeting growth targets), and they may not have been what Okuda and members of Toyota's executive team intended. But cumulatively, they had negative impacts on quality. Top corporate leaders tend to underestimate how their mandates get transformed as they travel down the hierarchy.

**Product complexity** The other root cause of Toyota's quality problem can be linked to the growing technical complexity of today's vehicles.<sup>16</sup> For a variety of reasons — stricter government regulations on safety, emissions and fuel consumption, and rising customer demand for vehicles with "green" and luxury features — cars are becoming increasingly sophisticated both in terms of how they are designed and how they are manufactured. A typical auto sold in the United States or Europe has more than 60 electronic control units and more than 10 million lines of computer code — a fourfold increase over what was common a decade ago.<sup>17</sup> In effect, cars have become computers on wheels.

To be sure, other auto companies, not just Toyota, have had to come to grips with the issues of product complexity. The competitive pressures to produce ve-

hicles that are safe, clean, fuel-efficient and comfortable are industrywide. But for Toyota the challenges were even more intense, complicated by the already considerable challenges associated with global growth, including rapid expansion of manufacturing capacity and the proliferation of hybrids and other technologically advanced new models. Between 2000 and 2007, Toyota's North American sales increased from 1.7 million units to 2.9 million units, and the company's offerings grew from 18 to 30 models. Lead time between exterior design approval and start of sales was compressed to less than 20 months. Accelerated design cycles strained the company's development and production systems and pushed human resources to the limit, creating the conditions for quality failures. Although Toyota's Lexus and Prius models accounted for less than 25% of its sales in 2010, they were among the most technologically complex products and were involved in more than half of the number of recalls.

The combination of rapid growth and increased product complexity has had major implications for Toyota's supplier management system and its overall performance. Around 70% of the value added in Toyota's vehicles comes from parts and subassemblies produced by its suppliers. So the consequences of the growth and complexity were felt across the company's supply chain. First, Toyota personnel were stretched increasingly thin as the company's growth accelerated. In response to the growth, Toyota had to delegate more design work to outside contract engineers and take on new suppliers because the internal engineering resources and existing supplier base couldn't keep up with the demands.

A high-level Toyota executive publicly acknowledged in 2010 that, facing internal manpower shortages, the company had no choice but to use a large number of new contract engineers to boost engineering capacity. In his view, that contributed to the increases in quality glitches.<sup>18</sup> The company came to use outside engineers for as much as 30% of its development work globally.<sup>19</sup> That meant hiring contract engineers overseas; it also gave rise to a new policy of hiring temporary engineers in Japan, which challenged the company's established ways of doing business. Toyota engineers had been accustomed to communicating among themselves and with Japanese suppliers with whom they had established long-term relationships that often relied on tacit knowledge built up over the years. The influx of

new, mostly non-Japanese-speaking engineers and overseas suppliers during a short period of time led to problems of coordination and miscommunication. Less experienced Toyota engineers were increasingly assigned to global technical centers to work with and monitor new overseas suppliers, who were also inexperienced in Toyota practices and standards. The result was a convergence of inexperience, with the key parties insufficiently trained in Toyota's standard practices.

Takahiro Fujimoto, a leading Japanese researcher on Toyota, reports that in the wake of rapid growth, Toyota increasingly failed to properly evaluate and approve components designed by outside overseas suppliers.<sup>20</sup> As a result, Toyota's relationships with suppliers became less collaborative, thereby weakening the company's distinctive "relational contracting" system characterized by long-term close OEM relationships with suppliers. Ironically, it was the collaborative practices that had originally distinguished Toyota from its Western competitors.<sup>21</sup> We can see this play out in the results of the annual U.S. auto-parts supplier surveys since 2007. Toyota traditionally has ranked best in its relationships compared with other automakers. Its ranking, however, while still high, has fallen steadily from 2007 through 2010. Suppliers attributed their growing problems with Toyota to less experienced staff in Toyota's purchasing group who had not internalized the "Toyota Way."<sup>22</sup>

As much as growth and product complexity were at the root of Toyota's recent quality problems, any thorough analysis would also need to acknowledge the role of the company's centralized management structure. Toyota's information and decision making has been highly centralized. The result: Top management in Japan has been less sensitive to the expectations of regulators, culture and politics in overseas markets, and consequently, they have been slower to respond to local problems. For example, in October 2004, Toyota recalled pickup trucks and SUVs in Japan for steering defects, but it didn't extend those recalls to the United States until September 2005. As one executive commented, "[Toyota headquarters] is the kind of brain of the company. We don't have any independent knowledge outside of them."<sup>23</sup>

IT IS TOO EARLY to know how quickly Toyota can overcome its quality problems. However, it is clear that senior executives have worked hard to under-

stand the magnitude of the problems and are acting to eliminate them. This determination is demonstrated by several major initiatives in North America and elsewhere to improve product quality. For example, Toyota is reportedly seeking to reduce its percentage of outside engineers to 10%.<sup>24</sup> In addition, Tokyo headquarters has delegated more power to the company's North American executives to make decisions affecting recalls and strengthening the independence of quality management activities in each region. Furthermore, Toyota has reorganized and, in effect, deliberately slowed down the product development process by establishing a new team of about 1,000 quality engineers and by greatly expanding its rapid quality response teams around the globe. Although driver error appears to have been the primary cause of the acceleration problems, user error can be reduced by good design. In today's environment, that is a corporate imperative. To that end, Toyota has reconfigured the shape of the accelerator pedal in response to its floor mat problems.

Still, there is a lingering question raised by Toyota's recent quality problems: What do the product recalls say about the effectiveness of the company's legendary production system? Why should other companies try to emulate Toyota if it is struggling with so many serious design and production issues itself? The reality is that Toyota's problems were not caused by a faulty production system but by poor management decisions. In particular, the company's executives failed to respond aggressively to early signs of quality problems. Toyota's stumbles are a powerful reminder that there is no such thing as corporate DNA, and that superior production systems, important as they are, cannot be taken for granted. As new senior management teams move into positions of power, they need to recognize that there are no guarantees that the systems and values that have provided the underpinnings for the organization's success can be sustained without renewed commitment. Ensuring continuity requires clear incentives for the promotion of best practices, adhered-to processes, especially strong problem-solving processes, flexibility, effective socialization of new employees and a supportive organizational culture. In any organization, there will be internal and external factors that threaten to weaken the foundation, be they opportunities for growth,

temptations to skimp on training or pressures to lower costs. Therefore, corporate leaders need to be vigilant in maintaining practices and values that support high-quality production systems, even as they learn to adapt to emerging challenges. Despite its vulnerabilities, the Toyota production system still represents state of the art in manufacturing and continues to provide an important model to companies in a wide range of industries.

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## REFERENCES

1. J. Press, "A New Era for Toyota and TMA in North America," (internal Toyota presentation, Sept 20, 2006), <http://commerce.senate.gov>.
2. Gallup, "Americans, Toyota Owners Still Confident in Toyota Vehicles," March 2, 2010, [www.gallup.com](http://www.gallup.com).
3. N. Roland, "Toyota Doesn't Go Far Enough on Safety Management Changes, Panel Says," *Automotive News*, May 23, 2011.
4. D. Sedgwick, "Toyota Likely to Win Back Consumer Reports 'Recommended Rating,'" Feb. 26, 2010, <http://autos.aol.com>.
5. J.D. Power and Associates, "J.D. Power and Associates 2010 U.S. Initial Quality Study" (Westlake Village, California: J.D. Power and Associates, 2010).
6. C. Jensen, "Toyota's Image Falls in J.D. Power Survey," *New York Times*, June 18, 2010, sec. B, p. 5.
7. J.D. Power redesigned the IQS survey in 2006, doubling the number of items ranked, going beyond defects that can, presumably, be repaired to include design problems. With quality differentials sharply diminishing, the survey was in danger of becoming irrelevant, but with a doubling of items to be scored, brand differentials were increased. Many of these new items have little or nothing to do with the fundamental safety, quality, value and performance (in that order) that consumers, on average, say is most important when buying a vehicle.
8. Ordinarily, just equaling longtime quality leaders is not enough to dislodge them from their leadership position. In Toyota's case, however, these developments combined with the publicity given its successive recalls.
9. M. Rehtin, "Fay in the Fray of Toyota Image Turn-around," *Automotive News*, Sept. 13, 2010, 20.
10. Parker Waichman Alonso LLP, "Chronology of Events in Ford/Firestone Controversy," May 21, 2001, [www.yourlawyer.com](http://www.yourlawyer.com).
11. Adding to Toyota's woes, its recalls are getting far more publicity than those of other automakers. In late October 2010, Toyota issued a voluntary recall on 1.5 million cars globally to replace a brake master cylinder seal. A few days later, Nissan recalled 2 million cars for ignition problems. Both recalls were reported on [msnbc.com](http://msnbc.com). The Toyota article was 966 words and described the company as "lurching from recall to recall"; the Nissan article was only 285 words long and suggested that there was nothing unusual about Nissan's recall. P.A. Eisenstein, "Dark Clouds Gather Over Toyota After New Safety Setback," Oct. 21, 2010, <http://msnbc.com>; and "Nissan Recalls 2 Million Cars Worldwide," Oct. 27, 2010, <http://msnbc.com>.
12. A. Frea, "Fears Over Potential Toyota Problems Surfaced in 2006, U.S. Senate Told," *Times Online*, March 3, 2010, <http://business.timesonline.co.uk>.
13. J.S. Busby, "Failure to Mobilize in Reliability-Seeking Organizations: Two Cases from the UK Railroad," *Journal of Management Studies* 43, no. 6 (2006): 1375-1393.
14. N. Shirouzu, "Toyoda Concedes Profit Focus Led to Flaws," *Wall Street Journal Asia*, March 1.
15. Toyota Industries Corporation, "A New Direction for a New Millennium: Annual Report 2001" (Kariya, Aichi, Japan: Toyota Industries Corporation, 2001); and Toyota Motor Corporation, "Driving to Innovate New Value: Annual Report 2008" (Aichi, Japan: Toyota Motor Corporation, 2008).
16. J.B. White, "What's Safer: A Chevy or Mercedes?" *Wall Street Journal*, Sept. 22, 2010, sec. D, p. 1.
17. D. Barkholz, "Fixing Cars' Brains Saves Ford Millions," *Automotive News*, May 11, 2010, 12B.
18. N. Shirouzu, "Inside Toyota, Executives Trade Blame Over Debacle," *Wall Street Journal*, April 13, 2010.
19. M. Ramsey and N. Shirouzu, "Toyota Is Changing How It Develops Cars," *Wall Street Journal*, July 6, 2010, sec. B, p. 6.
20. T. Fujimoto, "Toyota Overwhelmed by Demon of Complexity," *Asahi Shimbun*, March 3, 2010, [www.asahi.com](http://www.asahi.com).
21. R. Dore, "Taking Japan Seriously" (Stanford, California: Stanford University Press, 1987), 173-192.
22. R. Sherefkin, "Detroit 3 Score Higher with Suppliers," *Automotive News*, May 24, 2010, 16B; and R. Sherefkin, "Toyota Loses Luster with Suppliers," *Automotive News*, May 25, 2009.
23. N. Roland, "Toyota's U.S. Execs: Japan Didn't Share Info," *Automotive News*, Aug. 9, 2010, 3.
24. Ramsey and Shirouzu, "Toyota Is Changing."

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