The Economist

Toyota's supply chain

The machine that ran too hot

The woes of Toyota, the world's biggest carmaker, are a warning for rivals

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AS EXECUTIVES from Toyota, including the firm's boss, Akio Toyoda, squirmed before their tormentors in America's Congress this week, there was little public gloating from rival carmakers. Although it is Toyota that is currently in the dock after a crushing series of safety-related recalls across the world, competitors are only too aware that it could be their turn next. After all, there is not a single big carmaker that has not modelled its manufacturing and supply-chain management on Toyota's "lean production" system.

That said, there is a widespread belief within the car industry that Toyota is the author of most of its own misfortunes and that its mistakes hold lessons for others. In testimony delivered to the House oversight committee on Wednesday February 24th, Mr Toyoda, the carmaker's boss, acknowledged that in its pursuit of growth Toyota stretched its lean philosophy close to breaking point and in so doing had become "confused" about some of the principles that first made it great: its focus on putting the customer's satisfaction above all else and its ability "to stop, think and make improvements".

James Womack, one of the authors of "The Machine that Changed the World", a book about Toyota's innovations in manufacturing, dates the origin of its present woes to 2002, when it set itself the goal of raising its global market share from 11% to 15%. Mr Womack says that the 15% target was "totally irrelevant to any customer" and was "just driven by ego". According to Mr Womack, the requirement to expand its supply chain rapidly "meant working with a lot of unfamiliar suppliers who didn't have a deep understanding of Toyota culture."

By the middle of the decade, recalls of Toyota vehicles were increasing at a sufficiently alarming rate for Mr Toyoda's predecessor, Katsuaki Watanabe, to demand a renewed emphasis on quality control. But nothing was allowed to get in the way of another (albeit undeclared) goal: overtaking General Motors to become the biggest carmaker in the world. Even as Toyota swept past GM in 2008, the quality problems and recalls were mounting.

The majority of those problems almost certainly originated not in Toyota's own factories but in those of its suppliers. The automotive industry operates as a complex web. The carmakers (known as original equipment manufacturer or OEMs) sit at its centre. Next come the tier-one suppliers, such as Bosch, Delphi, Denso, Continental, Valeo and Tenneco, who deliver big integrated systems directly to the OEMs. Fanning out from these are the tier-two suppliers who provide individual parts or assembled components either directly to the OEM or to a tier-one supplier. CTS Corp, the maker of the throttle-pedal assemblies that Toyota has identified as one of the causes of "unintended acceleration" in some of its vehicles, is a tier-two supplier whose automotive business accounts for about a third of its sales.

On the outer ring of the web are the tier-three suppliers who often make just a single component for several tier-two suppliers. Although there are thousands of tier-two and tier-three suppliers around the world, their numbers have been culled over the past decade as the OEMs and the tier-ones have worked to consolidate their supply chains by concentrating business with a smaller number of stronger companies.

Toyota revolutionised automotive supply-chain management by anointing certain suppliers as the sole source of particular components, leading to intimate collaboration with long-term partners and a sense of mutual benefit. By contrast, Western carmakers tended either to source in-house or award short contracts to the lowest bidders. The quality Toyota and its suppliers achieved made possible the "just in time" approach to delivering components to the assembly plant.

Most big car firms now operate in a similar way. By and large, the relationships between the OEMs and the tier-one suppliers run smoothly. When problems crop up, it is usually with the other suppliers. One top purchasing executive says that consolidation, the need to trim capacity and the shock to demand that began in mid-2008 have put the weaker parts of the supply chain under great strain:

A consequence of Toyota's breakneck expansion was that it became increasingly dependent on suppliers outside Japan with whom it did not have decades of working experience. Nor did Toyota have enough senior engineers to keep an eye on how new suppliers were shaping up. Yet Toyota not only continued to trust in its sole-sourcing approach, it went even further, gaining unprecedented economies of scale by using single suppliers for entire ranges of its cars across multiple markets.

One senior executive at a big tier-one supplier argues that although Toyota's single-supplier philosophy served it well in the past it had taken it to potentially risky extremes, especially when combined with highly centralised decision-making in Japan. In the aftermath of Toyota's crash, the question the industry is now asking itself is whether sole-sourcing has gone too far. Until very recently, Toyota was the peerless exemplar. For now, at least, it is seen as an awful warning.