



The slow road to perfection

It looks like the set of a sci-fi movie: a roomful of dummies lolling disconcertingly on their seats or spilling electronic innards on lab benches under the gaze of white-coated technicians. The dummies are condemned to endlessly reprising the role of crash victims in the high-speed car smashes that are staged five times a day at Toyota's Higashi research centre in the shadow of Mount Fuji. They are extras in a drama with a plot as bold as any Hollywood movie: a quest to create a car that doesn't wreck the planet but saves it.

Sound preposterous? It's the goal of Toyota president Katsuaki Watanabe, who for the past two years has been piling pressure on his engineers to devise a 'dream car' that leaves the air as clean as it found it, avoids crashes and improves the health of those who drive it.

Among today's car manufacturers, only Toyota would dare to air such an ambition in public - and have it taken remotely seriously. As the Economist put it, 'There's the world car industry, and then there's Toyota.' This year the Japanese phenomenon is on course to churn out 9 million vehicles from assembly lines in 28 countries, in the process probably overtaking GM as the world's largest car-maker. Its relentless profitability (the last year it fell into the red was 1950, a record matched only by rival Honda) has been rewarded with a market capitalisation as great as GM, Ford and Daimler put together. Over the past few years the company has been growing faster than any firm in the industry's history, with the possible exception of Ford during the Model-T era a century ago.

As to the technology, at ¥800m (£3.3m) apiece, the dummies are bit players in the ¥900bn research investment that Toyota is pouring into its attempt to marry the conflicting claims of safety, the environment and individual desires, and create what Watanabe calls 'sustainable mobility'. He refuses to set a deadline for his dream car vision. 'But the engineers have developed a road map for achieving the goals,' he says. 'I am confident we shall get there.'

In fact, the company is already some distance down the track. At Higashi, engineers have reformulated Watanabe's challenge as simultaneously to 'zeronise' and 'maximise': systematically eliminating the car's negatives while optimising its pluses.

Take safety. Like other car-makers, Toyota began by focusing on passive safety - strengthening the car body and devising restraints to protect passengers in accidents. That's effective up to a point: Toyota says that fatal accidents in its cars in Japan have halved in a decade. But passive safety incurs other penalties in the form of extra weight - requiring more energy for propulsion and meaning greater waste when crashes do happen.

So the emphasis now is as much on 'active' and pre-crash safety - preventing the accident from occurring or at least minimising the damage. Anti-lock brakes, traction control and parking aids fall into this category, as do newer systems warning the driver of an unnoticed lane change, getting too close to the car in front, or even drooping eyelids. The driver remains in control - a fundamental Toyota tenet - while the car takes charge to tighten seat belts and apply braking only when an accident is inevitable. But the aim is to extend safety to every driving stage, from parking to rescue after an accident. This, says Seigo Kuzumaki, Toyota's head of safety development, involves merging passive and active safety measures into a complete 'integrated safety management concept' that will eventually link the car to its surroundings - and to other vehicles.

Toyota uses the same problem-solving cycle to overcome trade-offs between the environment and performance. Not everyone shares Toyota's faith in hybrid petrol-electric technology, as implemented in its Prius model, believing it to be a distracting half-way house on the road to hydrogen-powered fuel cells. But Toyota insists there is no contradiction, since the issue in both cases is not the propulsion system but obstinately lagging battery technology. It is therefore pushing ahead with both hybrid systems and fuel cells, the twin research teams sitting alongside each other to spur development and share advances.

On the hybrid side, Toyota is testing a second-generation Prius that can be plugged into a domestic electricity source overnight, saving a claimed 40 per cent in fuel costs over the original model. It has taken Toyota 10 years to sell a million Priuses; after 2010, Watanabe wants that to be a million a year, with eventually a hybrid option for every model, possibly even - provocatively - the company's Formula 1 car. In the meantime the Prius's popularity with Hollywood stars such as Leonardo DiCaprio and Kirsten Dunst can surely do no harm.

Fuel cells, even the impatient Watanabe admits, will take longer. Although, like rivals Honda, GM and others, Toyota has made considerable advances in range and durability, daunting obstacles remain: not only the battery bottleneck, but a hundredfold cost reduction for production viability. Watanabe concedes initial ambitions for production were over-optimistic. 'But we are doing everything we can to speed development up,' he says. 'We have to do it for the planet.'



Can Toyota pull it off? Systematically making light of trade-offs that defeat others has always been its trademark, a powerful reason it has pulled ahead of the rest of the pack. Yet Toyota already has its hands full with issues larger than any it has faced before. One is maintaining quality in the face of headlong growth; although for now it retains its high rankings in consumer surveys, over recent years the company has been obliged to recall unprecedented numbers of vehicles, a sequence that has continued this year in Japan. It also needs to continue to cut costs, both by further simplifying manufacturing (through its fabled kaizen or 'continuous improvement' process) and, just as importantly, by improving sales and service. At the same time it must preserve the integrity of its all-important culture as it moves into new territories. It also needs to reinforce both its luxury Lexus brand and what to international buyers remains, despite the success of the Prius, a slightly stodgy Toyota name.

Watanabe makes no bones about it: Toyota must improve on all fronts at the same time, he says. In the face of stern competition, growth will continue only if the company offers high quality, environmental responsibility, service and driving pleasure at the best cost - the right car in the right place at the right time, everywhere in the world.

Being number one in the world for size is irrelevant, he insists. It is important only as a measure of how far Toyota is getting the other things right. If it meets those tests in the years ahead, then at some point, he reasons, the dream car will no longer be a distant ideal - but simply the logical next step.