



## A roadmap to sustainable transport

**The massive efforts to save the automobile industry will keep it going for a few more years. But for the industry to survive beyond that, it must introduce not just new car models but a whole new set of business models.**

“The automobile industry is not sustainable in its current form,” says **Paul Nieuwenhuis**, Director of the Centre for Automotive Industry Research at Cardiff University in Wales. “The problem is the car industry we have today was designed for a different set of circumstances and a different set of rules. Those rules have changed.”



Today’s car is a sophisticated machine. It can transport several people and their luggage hundreds of kilometres without refuelling. Yet most of the transportation potential of an automobile is wasted. On average, cars are parked 96 per cent of the time. Even when they are driven, most people drive them for an average of only 70 kilometers. And most people drive alone.

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**Renato J. Orsato**, Senior Research Fellow at the INSEAD Social Innovation Centre and author of *'Sustainability Strategies: When Does it Pay to be Green?'* writes that a modern car consumes most of the fuel it carries just to transport itself.

“If just one person occupies the car, it means that out of 100 litres of fuel, 97.6 transport the car and just 2.4 litres, the driver,” Orsato writes in *'Sustainability Strategies'*. “Despite more than 100 years of development, the modern automobile is incredibly inefficient.”

### A structural problem



The car industry essentially relies on two technologies -- the internal combustion engine and the all-steel body. Neither of these is modern. Karl Benz received a patent for an internal combustion engine in 1879, and the all-steel body, which made the mass production of automobiles possible, was invented in 1912.

But the problem with these technologies is not their age but their cost. Each requires billions of dollars in capital investment, according to Nieuwenhuis. To pay off those investments, manufacturers need to produce ever-higher volumes of vehicles at ever-lower profit margins.

"This forces you into pushing cars onto the market whether there is a demand for them or not, and this creates the oversupply problem which is one of the reasons why the industry is unsustainable," Nieuwenhuis told INSEAD Knowledge in an interview following the INSEAD Alumni Sustainability Executive Roundtable held in June.

"If you need to sell 100 million cars per year, which is the forecast of the industry for the year 2020, then you have to ask yourself where are you going to put all these cars and what is the environmental impact of this," says Orsato. "Maybe it's the moment for the car industry to rethink that not everyone needs a car in the world."

This dependence on the internal combustion engine and the all-steel body has caused profit margins to decline regularly for decades. General Motors posted profit margins of 20 per cent in the 1920s, but by the 1960s they had dropped to 10 per cent, and by the 1990s they were at five per cent. Today, anywhere above zero would be cause for celebrations. And GM is not alone.

"A lot of people think this is a temporary thing only affecting General Motors, but in fact you can get similar graphs for other mass-market players," Nieuwenhuis says. "So we think it's a structural

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problem of the mass car system as we know it today."

### Time to focus on value?



To become sustainable, the automobile industry needs to come up with a new business model that focuses on the use of vehicles rather than their *manufacture*, Nieuwenhuis says.

"The existing business model of the car industry is 'fire and forget': put it on the market then forget about it," he says. "But most of the value stream in the life of a car is after the sale, that's where most of the business opportunities are. And that's exactly how we should change the automotive business proposition, by focusing on that value stream rather than on the upfront manufacturing side."

Most of the solutions proposed so far by the car industry are short-term technological fixes that don't address the long-term problems. Smaller, cheaper, more fuel-efficient vehicles like the Tata Nano still rely on internal combustion engines and all-steel bodies. Hydrogen fuel cells use platinum, a rare metal that some forecast will be depleted in a few generations. Hybrid cars still use fossil fuels.

What's needed instead may be diversity of transportation solutions focusing on how and where people use vehicles.

"We're not talking about substituting one dominant method of production or type of car for another," says Orsato. "We're talking about a shift from a dominant technological regime to a more diverse system in which multiple power train technologies coexist: electric vehicles in European cities, ethanol-powered vehicles in Brazil and hydrogen fuel cells in Iceland, for instance. In other words, different solutions for different uses and locations."

Diversity also implies a wider range of options for 'personalised mobility'. Operators such as Better Place (see related article) will make the zero-emissions private car a commercial reality - eventually at a lower cost than cars using petrol. But there are more options out there, which represent untapped market spaces. Decreasing IT costs, for instance, are making car-sharing more convenient

for many people – including those who have never owned a car. Drivers can choose from a wide range of vehicles adapted to the job (and so are more efficient) at viable costs. In other words, car-sharing organisations will increasingly make personalised (or individual) mobility more convenient and attractive to a large number of consumers.

“It’s like thinking of a more diverse ecosystem,” Nieuwenhuis says. “The more diverse we can make our ecosystem, the more robust it will be. At the moment, the car, to a large extent, is a monoculture and we know from agricultural experience what happens to a monoculture.”

Whatever the solution, one thing looks certain: the automobile industry as we know it today is fast approaching the end of the road.

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