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CHEAP CARS

New Tech Aims At Under $5,000

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SMART MACHINES
Computers That Can Think... Really

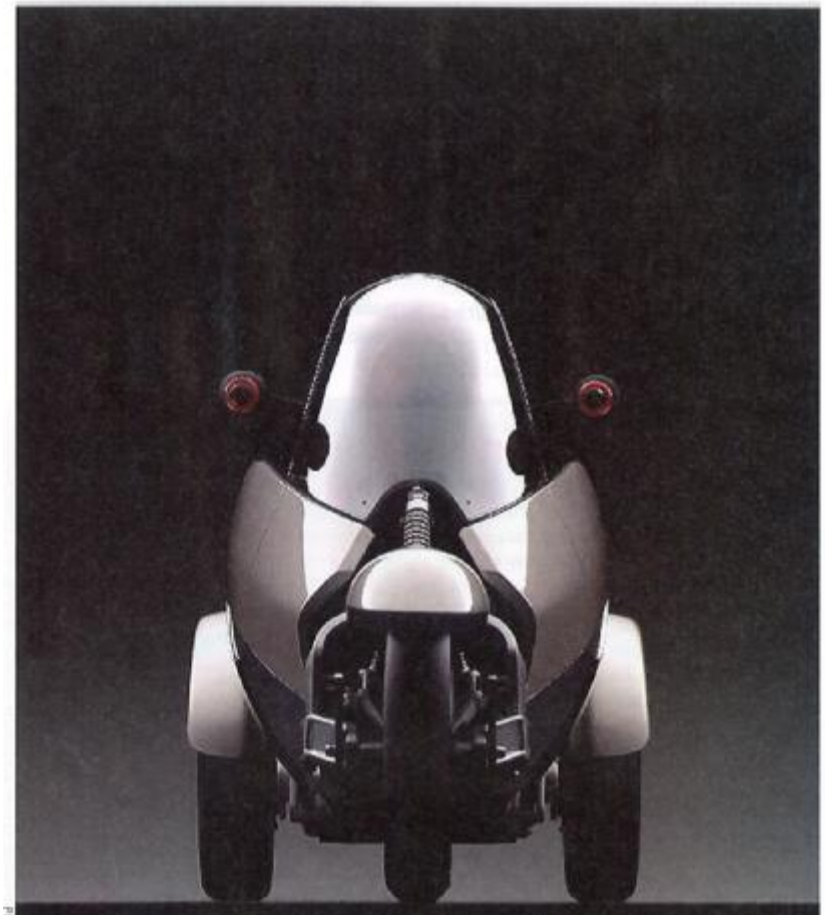
Tech that Drives Costs Down

In era of cost-cutting, startup opportunities abound.

Global competition to cut costs is driving innovation in the notoriously sluggish auto industry, giving rise to opportunities for startups up and down the supply chain. "A lot of VCs weren't particularly interested in the car market because it was perceived as a slow-moving market," says Dan Seats, chief operating officer at Broomfield, Colorado-based Oxlo Systems, a startup that makes software that helps manufacturers and dealerships share information (see profile, p. 35).

"But now that they have their backs up against the wall, we find that they're more aggressively innovating," Mr. Seats says, adding that competition will only keep heating up. "That's a good thing for us, because it's a change driver."

Labor costs enter into the equation, of course. "That's why you see markets like China and India becoming so interesting," says Thilo Koslowski, lead automotive analyst at consultancy Gartner. But technological innovation is also playing an important role.



PEUGEOT

No dumb car: The CLEVER runs on compressed natural gas and can reach 50 mph.

Akoya

Akoya, a spin-off of industrial equipment manufacturer Caterpillar, makes software that analyzes vehicle designs in order to lower the prices manufacturers pay for materials. Materials represent about 60 percent of carmakers' costs. By cutting these expenses, Akoya's software can offer manufacturers potential savings of more than 5 percent on the overall cost of cars, says CEO Ted Greene (pictured). Akoya's platform compiles auto parts information from manufacturers' computer-assisted modeling systems, then determines which parts, if tweaked, could bring about the most savings. The software can review hundreds of parts in minutes, identifying the top opportunities for redesign or sourcing from other suppliers. Customers pay a subscription for several years of service; deals vary from the low six figures to the high seven figures. One of Akoya's long-term goals is to develop software to help suppliers make the smartest, cheapest choices on parts before the vehicle is even designed.

LOCATION Northfield, Illinois
URL www.akoyainc.com
SECTOR Software
FOUNDED 2004
CEO Ted Greene
EMPLOYEES 15
FUNDING $4.5 million, angel plus one round of venture funding
KEY INVESTORS Arch Development Partners, Village Ventures, Spring Mill Venture Partners

Cheaper by Design

Ten years from now, cars will be very different inside, even if they look the same on the outside, predicts David Bodde, a professor and senior fellow at the International Center for Automotive Research at Clemson University in South Carolina. "The electronics, the drive train, and the way they are made will be different," he says. "With motor fuel costs, we are teetering on the brink of a revolution here that will probably bring electric drive vehicles into the market."

In the meantime, startups and established suppliers are developing lighter materials, technologies that reduce materials needed to build cars, software that makes cars cheaper to design, and IT to make manufacturing more efficient, says Michael Robinet, vice president of global vehicle forecasts at automotive research firm CSM Worldwide, based in Northville, Michigan.

Light metals, alloys, plastics, and composites are generally more expensive than steel, but they can still save automakers money because they can reduce the weight of the car, making those materials worth the extra cost. Lighter-weight cars mean smaller suspension, axle, and support systems, among other things. Cars also get about an extra mile per gallon for every 100 pounds saved, says Mr. Robinet.

Partly for that reason, aluminum has become the second-most-widely used material in cars worldwide, recently displacing iron. Sometimes the whole outside of the car is made of aluminum now, says Alcoa, which contends that aluminum and aluminum alloys can be as strong as steel with lighter weight, translating into better performance and better gas mileage. For example, the Ferrari 599 GTB Fiorano (0 to 60 miles per hour in 3.2 seconds) includes an Alcoa-built aluminum-alloy space frame, which is basically the skeleton of the car. But Metcomb Nanostructures, an Austrian startup, has come up with something even better than regular aluminum, it contends (see profile, bottom left).

Fibers and plastics are also finding their way into cars. Both are lightweight, and plastics can be molded into more complex shapes so that one part can take the place of several. Techni-Lin, a flax fiber supplier in Normandy, France, makes a composite called flax-polypropylene to build interior door panels for the likes of Opel and Citroën. DaimlerChrysler has also adopted flax and other natural fibers, using them in interior parts and even as engine and transmission covers, and South American companies are using wood in door panels to trim expenses, Mr. Robinet says.

Electronics should also replace some of today's mechanical systems. Instead of a steering column with a rack and pinion, for instance, cars could eventually use "drive-by-wire" technology, eliminating weighty and costly components. The Holy Grail would be "drive-by-wireless," says Tom Kurfess, chair of BMW manufacturing and director of the graduate engineering center at Clemson University. "There are tons of wires, and if you didn't need wires to connect all the data, life would be very, very good," he says.

Watch the Road

But don't take the next curve too fast, now—the reality is, drive-by-wireless has yet to prove 100 percent reliable. Of course, even while drivers wait for that day to come, electronics content in cars

Metcomb Nanostructures

Companies large and small are working to replace heavy steel parts in cars with light metals, plastics, alloys, and composites. Metcomb Nanostructures makes a cellular aluminum material that loosely resembles a chunk of honeycomb and is light enough to float in water. The material is a quarter of the weight of regular aluminum and less than a tenth of the weight of steel, and is recyclable, says Metcomb, which came out of stealth mode in March. Less weight means smaller suspension, axle, and support systems in vehicles, and lower expense moving vehicles around the factories, says Michael Robinet, a vice president at Northville, Michigan-based CSM Worldwide, an auto industry research firm. Metcomb says its material can also be made into more complex shapes than steel, leading to further savings. Alcoa, the world's largest aluminum producer, and other material suppliers are Metcomb competitors.

LOCATION Schwarzenau, Austria
URL www.metcomb.com
SECTOR Nanotech
FOUNDED 2006
CEO Gerald Hoegl (pictured)
EMPLOYEES 5
FUNDING $6 million, angel round
KEY INVESTORS Angels

TierConnect

TierConnect claims to save vehicle assembly plants up to $2 million annually by better managing defective or wrong parts called scrap. Normally, employees note the problem on a tag and throw the part into a bin. When the bin is inspected anywhere up to 30 days later, more than half of the tags turn out to be inaccurate, illegible, or incomplete, says CEO Mike Betts (pictured). As a result, manufacturers are unable to charge suppliers for those parts. Inventory managers don't know how many parts have been scrapped, and end up double ordering parts or needlessly paying for premium shipping. TierConnect's TagTracker software allows employees to press a button that prints out a tag while simultaneously entering the scrap into the plant's inventory tracking system. Launched in September, TagTracker can reduce premium shipping costs by up to 20 percent, scrap costs by up to 40 percent, and material loss by up to 70 percent, totaling about $3 to $6 per vehicle, Mr. Betts says. Customers include Ford Motor and revenue is already in the seven figures, he says.

LOCATION Wixon, Michigan
URL www.tierconnect.com
SECTOR Software
FOUNDED 2004
CEO Mike Betts
EMPLOYEES 12
FUNDING Angel round, amount undisclosed
KEY INVESTORS Founders and angels

is expected to roughly double in the next five to seven years, according to Tony Grover, a managing director at Ann Arbor, Michigan-based venture capital firm RPM Ventures. In theory, automotive electronics costs could double as semiconductors and computer processing units multiply. Mitigating that trend to a degree, one semiconductor design house (an RPM portfolio company still in stealth mode) is working to integrate more functions onto single chips, potentially allowing automakers to use fewer chips and cut costs that way.

Opportunities to slice manufacturing expenses abound in other ways, of course—through increased automation, standardization of parts, and more efficient, IT-driven manufacturing processes. "The bottom line is that automation really gives you the repeatability that you need, and it also reduces costs," Mr. Kurfess says. Aside from the higher precision and upfront savings, automation reduces employee health problems associated with repetitive motion, he says. With General Motors spending some $1,500 per car on healthcare, those considerations are not to be waved aside,

Oxlo Systems

Oxlo Systems' software enables manufacturers to better match production to demand, with real-time information feeds between manufacturers and dealers. Very little dealership information—such as customer interest, the actual prices cars are fetching, or the kinds of repairs different models require—is currently fed back to manufacturers. Oxlo feeds are designed to help manufacturers manage their parts inventories more efficiently, quickly respond to problems by changing parts, designs, or warranties, and better analyze demand so they can adjust production volumes accordingly and create more effective incentives. The savings come from reduced warranty costs, which RPM Ventures Managing Director Marc Weiser says amount to $5 billion annually, and fewer price reductions for consumers, which are often applied more broadly than needed. Customers include General Motors, Ford, Hyundai, Volkswagen, and Audi.

LOCATION Broomfield, Colorado
URL www.oxlo.com
SECTOR Software
FOUNDED 2004
CEO Jim Lejeal (pictured)
EMPLOYEES 24
FUNDING $5 million, one round
KEY INVESTORS Mobius Venture Capital, Appian Ventures, RPM Ventures

Ten years from now, cars will be very different inside.

says Marc Weiser, a managing director at RPM.

SAP, Oracle, Hewlett-Packard, Sun Microsystems, and Dassault Systems, among others, are working on technology to make manufacturing processes more efficient, Mr. Koslowski says. So are startups such as Oxlo Systems, TierConnect (see profile, left), and Akoya, a Caterpillar spin-off based in Northfield, Illinois, which makes software that analyzes designs to reduce the amount that manufacturers spend on direct materials (see profile, p. 34).

New Order

Global competition, and a truly global market, enlarges the opportunity for both established majors and auto startups. For one thing, a bigger market vastly increases standardization and thus whole new economies of scale that manufacturers can use to their advantage, Mr. Robinet says. "As manufacturers move more assertively into markets like India or Iran, they increase their global build and therefore bring their costs down," he says.

Like it or not, all these changes are shaking up the industry. They will give new and old players the chance to see which innovations and approaches make the best fit in a brand-new automotive world order.

The new order, in fact, will reorder processes in ways most people probably never even contemplated. For example, while new automotive technologies usually go into higher-end vehicles first, and then trickle down to the cheaper cars, the new focus on making cheaper cars will cause the opposite effect. So drive-by-wire steering could conceivably replace more expensive mechanical systems in the cheapest commodity cars first because that is the segment where cost pressures are the greatest.

Manufacturing techniques designed for the low end will eventually spill into high-end manufacturing, as Clemson's Mr. Bodde points out. "We just happen to live in some very interesting times for new vehicle technology."