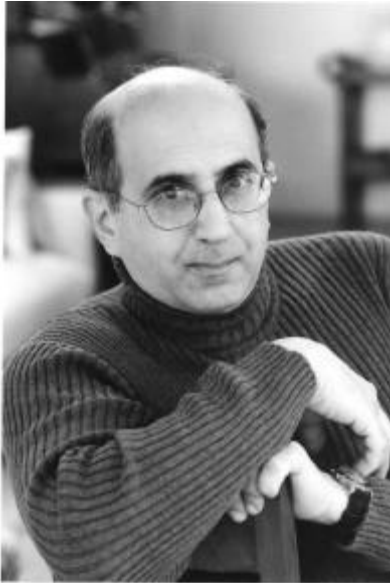


Materials Witnesses



Art Kleiner

During the past decade or so, people have increasingly looked to the private sector for solutions to global environmental problems — and the private sector has grown increasingly interested in providing them. BP's former chairman Lord John Browne, GE CEO Jeffrey Immelt, and Nissan CEO Carlos Ghosn, among many other corporate chief executives, have gone on record naming ecological sustainability as a central component of their corporate strategies. For every CEO joining the bandwagon, there are seemingly hundreds, perhaps thousands, of midlevel managers and engineers trying to implement solutions on the ground.

Which naturally raises the question: What kind of effect does the current wave of corporate environmentalism have — both on business culture and on the environment? For the past year, I've been paying close attention to a group whose work provides a living answer to that question: a particularly passionate consortium known as the Materials Pooling Project. Their stumbling but persistent progress demonstrates exactly how difficult the environmental challenge will be for most of the corporate world.

Some members of the consortium are household-name companies: Nike, Ford, BP, Unilever, Harley-Davidson, Hewlett-Packard. Others are specialized, innovative manufacturers with an environmental identity: Aveda (a division of Estée Lauder dedicated to ecological cosmetics) and Plug Power (a pioneering fuel cell company). The consortium also includes Sikorsky (a helicopter manufacturer), Pratt & Whitney (the jet engine division of United Technologies Corporation), and about 20 component and commodity suppliers at various times, of which the largest and most consistently present is Visteon, a former division of Ford. They come together under the joint auspices of the Rocky Mountain Institute (or RMI, a well-known think tank led by energy-efficiency and "hypercar" expert Amory Lovins) and the Society for Organizational Learning (or SoL, an international group focused on organizational learning practice, founded by *Fifth Discipline* author Peter Senge).

Materials pooling is supply chain management across corporate-customer boundaries — in this case, for environmental ends. In its simplest form, manufacturers pool their purchasing power to favor raw materials that are freer of toxins and waste, and easier to recycle or reuse; this gives suppliers more of an incentive to provide such materials. But that collaboration inevitably means sharing information, articulating definitions of such evanescent concepts as "toxins" and "waste," and ultimately opening the door to new intercompany relationships. Hence the attraction of such projects: The managers involved in the RMI/SoL Materials Pooling Project are enthusiastic, innovative, and capable, and their story is inspirational. I was immediately drawn to write about it when I heard their presentation at a 2004 Society for Organizational Learning conference. But their story is also sobering.

Once, companies thought it would be hard to build partnerships with environmental groups. In fact, that proved to be easy: DuPont and McDonald's have maintained close working relationships with the Environmental Defense Fund (now called Environmental Defense) for almost 20 years. The truly hard part turns out to be forging and maintaining

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relationships with other *companies*, especially competitors. In fact, there is a direct clash between the collaboration needed for genuine environmental impact and the control over information that is needed to maintain a competitive advantage. The Materials Pooling Project's slow start is a result of these warring imperatives, and thus has something to teach any executive who wonders why his or her company's environmental initiatives — or, indeed, any supply chain initiative — are failing to gain traction.

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-- Vanessa Margolis, Nike."

Reframing Industrial Society

In the last few years, supply chain management in general has moved away from an ethic of squeezing suppliers and pitting them against one another to a more cooperative ethic based on long-term relationships. (See "Building the Advantaged Supply Network," by Bill Jackson and Conrad Winkler, *Strategy + Business*, Fall 2004.) The materials pooling concept represents a similar move, a shift from fighting regulators separately to collaborating on solutions that regulators never thought of. There are pooling projects for automobile parts (uscars.com), consumer product containers (the Sustainable Packaging Coalition), cotton (the Organic Exchange), and environmentally benign lumber (the Forest Stewardship Council, known for certifying the wood carried in stores like Home Depot). But the RMI/SoL Materials Pooling Project is unique: It operates across a variety of industries. Its members have thus learned to talk about highly technical subjects, like materials specifications, with a rare quality of freewheeling transparency. This is what keeps many of the participants interested; indeed, it's an inherent part of the culture of both Rocky Mountain Institute and the Society for Organizational Learning, and thus originally helped to attract the man who instigated the project, Michael Braungart.

A chemist and former Greenpeace activist, Mr. Braungart is the coauthor, with architect William McDonough, of an unusual and influential book called *Cradle to Cradle: Remaking the Way We Make Things* (North Point Press, 2002). The book points out that nearly every mass-produced product, from chair fabrics to children's toys to printer cartridges, contains trace elements of heavy metals and mutagenic materials. In aggregate, over time, these might well be hidden causes of cancer, infertility, and genetic damage (although it is admittedly difficult to know for certain). By redesigning such products from scratch, Mr. McDonough and Mr. Braungart argue, industrial society could transcend mere pollution prevention to eliminate waste altogether and to "generate nutritious effects on the environment." Cars would produce not carbon dioxide gas, but carbon pellets, which could be sold to rubber manufacturers as raw materials; clothes could be made of edible fabric, recycled perhaps as animal feed. Nothing would be discarded; instead it would be broken down to its component materials and reused. Hence the title "cradle to cradle" (instead of the more conventional phrase, "cradle to grave"). To demonstrate how plausible this future could be, Mr. McDonough and Mr. Braungart produced their book on pages made from a resin-based material that contained no wood, emitted no toxins, and (unlike many materials) was infinitely recyclable; it could be reformed into pages, ground back into resin, and reformed again and again.

And yet, around the time *Cradle to Cradle* was published, Mr. Braungart was heard to say at a Society for Organizational Learning event: "We haven't had any luck in making this happen." In other words, the industrial world was not leaping to change fast enough. He thought SoL's sustainability subgroup, led by two energetic management/environmental consultants named Sara Schley and Joe Laur, could help jump-start some progress with its corporate members. And indeed the idea proved popular with member companies, who felt their license to operate depended, more than ever before, on meeting and transcending environmental regulations. Automakers, for example, faced a pending European Union rule called the "End-of-Life Vehicle Directive," with such targets as 85 percent automobile recyclability by weight by 2006, and 95 percent by 2015. (Already, if you count scrap metal, 75 percent of the material in most cars is recycled.) "The directives had us thinking," recalls Visteon's Matt Roman. "If we were to take back and recycle our components whenever a car was scrapped, what would that framework look like?"

Pressure also came from increased liabilities and regulations concerning product toxicity. Consider, for example, hexavalent chromium, which is routinely used in engine parts and fas-

teners. It's inexpensive, it prevents corrosion, it resists wear, and it shines appealingly even when scratched. But when swallowed or inhaled, it is highly carcinogenic (the crime that triggers the lawsuit in Steven Soderbergh's film *Erin Brockovich* is carelessness with hexavalent chromium). New European regulations have outlawed its use in automobiles beginning in 2006, but other manufacturers recognize the public-affairs benefit and general moral benefit of reducing this material. At Harley-Davidson, Hugh Vallely, the director of motorcycle product planning, raised the point simply: "If this material is so toxic, why are we using it?"

By mid-2003, there were four active groups of companies in the Materials Pooling Project, focusing respectively on replacing hexavalent chromium; sourcing lightweight corrugated cardboard; researching the environmental impact of different types of leather (as used in Nike shoes and Visteon seats); and managing polypropylene, a plastic resin often used in consumer packaging. There was a constant swirl of activity: weekly phone calls for each group and quarterly meetings of unusual enthusiasm. "We were on the leading edge of a field that was just starting to take off," says Aveda's vice president of package development, John Delfausse. "Not only did we really want to be there, but lightbulbs started turning on. 'We could do this.'" They talked about rethinking product design in Braungartian fashion. They also found unexpected connections — Mr. Delfausse, for example, recalls scoring a potential cache of recycled polypropylene, to be used in lipstick caps, from an electronics supplier who shipped disk drives in plastic racks. "I've got tons of this stuff, and we would love to harvest it for you," the supplier said.

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Christina Page, the Rocky Mountain Institute project manager for the consortium, recalls the sheer excitement that came from talking informally. "One of the auto industry suppliers said, 'I get to talk to other car people all the time. Where else will I get the chance to work with people from Hewlett-Packard, Harley-Davidson, and Nike?'" For a few great months, it seemed as if Michael Braungart's visionary future could become a reality; talk could reshape the world.

Roadblocks to Nirvana

Today, almost three years later, the effort is still under way, but momentum has slowed and goals have been scaled back. Nike, for instance, still participates in the broad materials pooling consortium, but its primary participant, Project Manager Vanessa Margolis, now focuses much of her effort on a separate leather tannery assessment initiative across the footwear industry — an initiative inspired, in part, by her experience in the materials pooling group. "Braungart's conceptual idea of materials pooling led to a false set of expectations," says Ms. Margolis. "In reality, when we step back and look at what we accomplished, it's good stuff. But we haven't achieved what the visionaries called nirvana."

One fundamental roadblock, typical of many cross-organizational collaborations, was the differences among the companies themselves. This showed up most dramatically in the group working on hexavalent chromium. Pratt & Whitney and Sikorsky needed functionality; stainless steel was potentially acceptable. But Harley-Davidson needed beautiful, rust-resistant chrome for the kind of visible engine components that could endure exposure to a beach full of salt spray and emerge gleaming in the sun. If they couldn't keep hexavalent, they'd have to find another kind of chrome. And Ford was part of the USCar consortium, which announced a decision to switch to trivalent chromium, a material approved by European regulations. All these differences eroded the group's potential collective purchasing clout.

There were similar incompatibilities in sourcing leather — which must be very soft for automotive seats, hard for motorcycle seats and jackets, and waterproof for shoes. "We were looking for an environmental attribute or preference that might be shared by the different leathers and production processes that we all sourced," says Ms. Margolis. "But we never defined what this attribute or preference might be. It's the kind of design problem that probably nobody would choose on their own."

Getting cooperation from suppliers was also unexpectedly difficult. Having agreed to canvass their suppliers for details about materials, many of the corporate members returned empty-

handed. Some suppliers apparently suspected that this was just another tactic to squeeze down prices. Other suppliers had never kept track of their materials' environmental pedigree — the detailed history of its previous uses (if it was recycled), its contact with contaminants, or its exact chemical makeup. And then suppliers had their own constraints; John Delfausse's electronics supplier, for example, discovered that it did not have the contractual right to pass on the polypropylene to Aveda.

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Another problem was the lack of formal sponsorship that participants had from their own companies. Materials engineers, in particular, had trouble getting their time and expenses authorized when many urgent needs demanded their attention at home. Harley's Hugh Valley remembers a technical specialist from a Harley supplier complaining to him about research he'd requested: "I'm doing this without a charge code."

Consortium members talked openly about all these issues, but there was another, more hidden factor limiting the growth of the consortium: the discomfort members felt about sharing information with competitors. Ford quietly balked at inviting Toyota; Harley at Honda (even if participation were limited to Honda's automotive, non-motorcycle branch); and Nike at Reebok or Adidas. At Aveda, which has spearheaded some industry-wide recycling projects (such as one for aluminum), Mr. Delfausse said he would need to think twice before sharing broader materials information with non-EstŽe Lauder cosmetics companies. Suppliers were also skittish about competition, which put the whole project in a sort of catch-22, because participating companies feared they could be vulnerable to antitrust charges if no competing suppliers were present, but they were unable to compel competing suppliers to join.

Although members were always conscious of U.S. federal antitrust laws, those laws specifically focus on price-fixing; there hasn't been an actual federal case related to materials pooling since at least the early 1980s. The real threat is more visceral. It's hard enough to talk openly and honestly with people from other industries about the differences, say, between shoe leather and car-seat leather; to reinvent industrial society and eliminate all potential toxins would require almost unimaginable openness. Manufacturers and suppliers alike would have to entrust competitors with some of their most carefully held secrets.

Making Progress

For this reason, conversations in the Materials Pooling Project often took on the precise and labored formulations that you might expect at high-tech standards-setting meetings (which, in a way, these gatherings were). At one SoL meeting, Ford product development team member Sibel Koyluoglu showed an intricate flowchart she had created to track the multiple conversations required to reconcile the needs and priorities of her own company — design specs from her team, the marketing department's concerns about brand image, and the engineering group's multiple schedules — with the needs and priorities of the other companies in the consortium.

"We weren't just tackling Ford's system," she recalls, "but all the system interactions that you see as you take this on as a group. For example, the technical talk about chrome specifications led us to talk about the motives customers have in buying our products. We had to understand the requirements of our products and then work our way back through the material standards and the material chain to reach the point at which we would find commonality." Though sometimes difficult to maintain, these are also the kinds of conversations that lead to moments of genuine accomplishment: Starting out to reduce the solvents used in a welding process, one might end up redesigning the process so no solvents at all are needed.

Most environmental problems transcend corporate, industrial-sector, and political boundaries, and thus a whole-systems orientation is required to deal with them. As with many other cross-boundary endeavors, the project's momentum depends on the enthusiasm of its participants, which in turn depends on the increased ability it gives them to manage all sorts of cross-industry and cross-platform endeavors in the future.

And the implications go beyond this one project. Corporate environmentalists like Michael Braungart and William McDonough are calling for nothing less than an in-depth revolution in industrial infrastructure. Generating financial results is hard enough, but translating this kind of ideal into day-to-day practice requires a highly sophisticated degree of managerial competence. Many companies have this level of competence, but they don't often exercise it, in part because they don't give themselves permission to take the kinds of risks that corporate environmentalism requires. And there's also a longer time horizon involved. Some observers might argue that the Materials Pooling Project is a failure because it hasn't yet realized its promise. But initiatives that require so much collaborative experimentation and learning, particularly when more than a dozen companies are involved, can reasonably take months or years to show tangible results.

Maybe the Braungartian future, in which all industrial waste output becomes an input somewhere else and all materials are free of hidden toxins, is worth pursuing precisely because it's so comprehensive. In a world where energy and materials technology breakthroughs are seemingly on the horizon, with nanotechnology close behind and global climate change looming as a potential threat, the Materials Pooling Project provides a useful way to learn to deal with the next round of challenges. The obstacles aren't primarily technological; they stem from the natural reluctance that corporate people have to participate.

That's ultimately the question facing CEOs like Lord John Browne, Jeffrey Immelt, and Carlos Ghosn. To what extent will their endorsement of a new environmental ethic include new ways of working with competitors and other companies? What kinds of permission and sponsorship and commitment will leaders of environmentally responsive companies give collaborative initiatives, even when those initiatives threaten their competitive advantage and autonomy? And if they permit their engineers to engage in unprecedented forms of collaboration, will they ultimately make their companies stronger? Or weaker? Although initiatives like the Materials Pooling Project show how difficult these questions are to answer, they also show how important it will be to answer them well.

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