
THE HIDDEN PRICE OF WHAT WE BUY

A while ago I made an impulse buy: a small, bright yellow wooden racing car, with a green ball for the driver's head and four black discs pasted on its sides for wheels. The toy cost just 99 cents. I bought it for my eighteen-month-old grandson, who I thought would love it.

After I came home with that little wooden racer, I happened to read that because lead in paint makes colors (particularly yellow and red) look brighter and last longer—and costs less than alternatives—cheaper toys are more likely to contain it. Then I came across a news item reporting that a test of twelve hundred toys taken from the shelves of stores—including the chain where I bought that car—revealed a large percentage contained various levels of lead.

I have no idea if the sparkling yellow paint on this toy car har-

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bors lead or not—but I am dead certain that once it was in the hands of my grandson his mouth would be the first place it would go. Now, months later, that toy car still sits atop my desk; I never gave it to my grandson.

Our world of material abundance comes with a hidden price tag. We cannot see the extent to which the things we buy and use daily have other kinds of costs—their toll on the planet, on consumer health, and on the people whose labor provides us our comforts and necessities. We go through our daily life awash in a sea of things we buy, use, and throw away, waste, or save. Each of those things has its own history and its own future, backstories and endings largely hidden from our eyes, a web of impacts left along the way from the initial extraction or concoction of its ingredients, during its manufacture and transport, through the subtle consequences of its use in our homes and workplaces, to the day we dispose of it. And yet these unseen impacts of all that stuff may be their most important aspect.

Our manufacturing technologies and the chemistry they deploy were largely chosen in a more innocent time, one when shoppers and industrial engineers alike had the luxury of paying little or no attention to the adverse impacts of what was made. Instead they were understandably pleased by the benefits: electricity generated by burning coal, with enough to last for centuries; cheap and malleable plastics made from a seemingly endless sea of petroleum; a treasure chest of synthetic chemical compounds; cheap lead powder to add luster and life to paints. They were oblivious to the costs of these well-meaning choices to our planet and its people.

Though the composition and impacts of things we buy and use

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daily are for the most part the outcome of decisions made long ago, they still determine daily practice in manufacturing design and industrial chemistry—and end up in our homes, schools, hospitals, and workplaces. The material legacy left to us by the once wonder-inducing inventions of the industrial age that ran through the twentieth century has made life immeasurably more convenient than the life our great-grandparents knew. Ingenious combinations of molecules, never before seen in nature, concoct a stream of everyday miracles. As utilized in yesterday's business environment, today's industrial chemicals and processes make utter sense, but all too many make little sense going forward. Consumers and businesses alike can no longer afford to leave invisible decisions about those chemicals and processes—and their ecological consequences—unexamined.

In my past work I've explored what it means to be intelligent about our emotions and, more recently, about our social lives. Here I look into the sense in which we can, together, become more intelligent about the ecological impacts of how we live—and how ecological intelligence, combined with marketplace transparency, can create a mechanism for positive change.

In the interest of full disclosure, when it comes to ecological intelligence I am as clueless as most of us. But in researching and writing this book I've been fortunate enough to stumble upon a virtual network of people—executives and scientists alike—who excel in one or another subset of the skills we urgently need to build the human store of shared ecological intelligence, and to let that knowledge guide our decisions in better directions. In sketching the possibilities of this vision I've drawn on my background as a psychologist and science journalist to delve into the world of

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commerce and manufacturing, and to explore cutting-edge ideas in fields like neuroeconomics and information science, and particularly an emerging discipline, industrial ecology.

This journey continues one I began more than two decades ago, when I wrote in a book on self-deception that our habits of consumption on a worldwide scale are creating an ecological deficit at a rate unparalleled in history, as I put it, “simply by our heedlessness of the links between the decisions we make daily—for instance to buy this item rather than that—and the toll those decisions have.”

Back then I imagined that one day we would somehow be able to gauge with accuracy the ecological damage from a given act of manufacturing or the packaging, shipping, and disposal of a given product and sum it up in some handy unit. Knowing that metric about a TV set or box of aluminum foil, I reasoned, we could take more responsibility for the impact on the planet of our individual choices. But I ran out of steam, conceding “there is no such information available, and even the most ecologically concerned among us do not really know the net effect on the planet of how we live. And so our obliviousness lets us slip into a grand self-deception that the small and large decisions in our material lives are of no great consequence.”

All those years ago I had never heard of industrial ecology, the discipline that routinely does the very impact analyses I dreamed of. Industrial ecology exists at the cusp where chemistry, physics, and engineering meet ecology, and integrates those fields to quantify the impacts on nature of manmade things. Back when I was wishing for this field to exist, that still-obscure discipline was just gathering itself. In the 1990s a working group of the National

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Academy of Engineering spawned the field, and the very first issue of the *Journal of Industrial Ecology* appeared in 1997, well over a decade after I had wished for its existence.

Industrial ecology had its roots in the insight that industrial systems parallel natural ones in many ways: the streams of manufactured stuff running between companies, extracted from the earth and emitted in new combinations, can be measured in terms of inputs and outputs regulated by a metabolism of sorts. In this sense industry, too, can be seen as a kind of ecosystem, one that has profound effects on every other ecological system. The field includes topics as diverse as estimating CO₂ emissions from every industrial process or analyzing the global flow of phosphorus, to how electronic tagging might streamline the recycling of garbage and the ecological consequences of a boom in fancy bathrooms in Denmark.

I see industrial ecologists—along with those at the cutting edge of fields like environmental health—as the vanguard of a dawning awareness, one that may well add a crucial missing piece in our collective efforts to protect our planet and its people. Imagine what might happen if the knowledge now sequestered among specialists like industrial ecologists were made available to the rest of us: taught to kids in school, easily accessible on the Web, boiled down into evaluations of the things we buy and do, and summarized as we were about to make a purchase.

Whether we are a single consumer, an organization's purchasing agent, or an executive managing a brand, if we knew the hidden impacts of what we buy, sell, or make with the precision of an industrial ecologist, we could become shapers of a more positive future by making our decisions better align with our values.

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All the methods for making that data known to us are already in the pipeline. As this vital knowledge arrives in our hands, we will enter an era of what I call *radical transparency*.

Radical transparency converts the chains that link every product and its multiple impacts—carbon footprints, chemicals of concern, treatment of workers, and the like—into systematic forces that count in sales. Radical transparency leverages a coming generation of tech applications, where software manipulates massive collections of data and displays them as a simple readout for making decisions. Once we know the true impacts of our shopping choices, we can use that information to accelerate incremental changes for the better.

To be sure, we already have a mélange of eco-labels based on high-quality data assessing pockets of products. But the next wave in ecological transparency will be far more radical—more inclusive and detailed—and come in a flood. To make that mass of information usable, radical transparency must reveal what has been hidden from us in ways far more comprehensive and better organized than the sometimes haphazard product ratings we have now. With the right, targeted data, a continuous cascade of consumer-driven shifts would ripple through the world of commerce, from the most distant factory to the neighborhood power grid, opening a new front in the battle for market share.

Radical transparency will introduce an openness about the consequences of the things we make, sell, buy, and discard that goes beyond the current comfort zones of most businesses. It will reshape the marketing environment to ensure a better reception for the enormous variety of greener, cleaner technologies and products now in the pipeline—creating a far greater incentive for us all to make the switch to them.

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Such full ecological disclosure presents an untried economic path: applying to the ecological impacts of the things we buy the high standards for transparency required, say, in financial statements. It would hand shoppers information for their choices akin to what stock analysts apply in weighing the profits and losses of companies. It would give senior management greater clarity in carrying out their company's mandates to be more socially responsible and sustainable, as well as anticipate where markets will shift.

This book tracks my personal journey into this realm, beginning with my speaking to industrial ecologists about the enormous complexity in making even the simplest product, and about this new science that tracks the environmental, health, and social impacts at every step. Then I explore the reasons this information remains largely concealed from us, and why the remedy lies in boosting our ecological intelligence, a collective understanding of hidden ecological impacts and the resolve to improve them.

I show how we could boost our ecological intelligence by making this data on impacts available to shoppers—and visit the inventors of a technology about to make such radical transparency a reality. Next, I look at evidence suggesting how this could shift market share to a point where companies would see more clearly the competitive advantage in ecological improvements far wider-ranging than what is typical now. I examine a case in point: controversies about industrial chemicals, as viewed through the lens of brain researchers examining purchase decisions, reveal why consumers' emotional reactions to products' ecological impacts can matter for sales.

Finally, I shift from the psychology of buyers to the strategies of sellers, and talk to a widening circle of businesspeople who are

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ahead of this coming wave and who already have changed the way they manage their company's supply chains to upgrade impacts, thus positioning their businesses to thrive in a radically transparent marketplace. These executives realize that at the emotional level, good business means good relationships, and that by demonstrating their ecological concern in these ways, they make their customers feel cared for, too. My mission here is to alert businesses to a coming wave, one that will wash over any company that markets a man-made product.

We hear much about helping the planet by changing what we *do*—bike, don't drive; use the new, energy-saving fluorescent bulbs; recycle our bottles; and other ready fixes. All such changes in ecological habits are laudable; if more of us made these efforts they would have great benefits.

But we can go further. The true impacts of what we *buy* have been ignored for the majority of goods. Surfacing the myriad hidden ecological impacts during a product's life cycle, from manufacturing to disposal of those bikes, bulbs, and bottles, as well as the rest of the materials in the room, opens a floodgate of effective action. Using a deeper understanding of the impacts of the things we use to guide our buying decisions can give us added leverage that ripples widely through the worlds of commerce and industry.

That opens the door to a vast opportunity for benefiting our future. For shoppers, this singular mechanism can add potent forcefulness to our collective will to protect the planet and its people from the unintended harms done by commerce. For business, this more powerful alignment of consumers' values with their purchasing choices will foster a hot new arena for competitive advantage—

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a financial opportunity sounder and more promising than our present-day “green” marketing. We may not be able to shop our way out of the current crisis, but radical transparency offers one more avenue to essential change.

We have been besieged by messages about the dire threats of global warming and toxins in everyday objects and demands that we must somehow change before it’s too late. One version of this litany is all too familiar: ever-warmer temperatures, fiercer hurricanes, fiery droughts, and rampant desertification in some places and relentless rains in others. Some predict escalating global scarcity of food and water within the next decade or so, or—with Hurricane Katrina in the Gulf of Mexico the harbinger—the evacuation of more cities around the globe because of environmental collapse.

Another chorus, growing stronger by the day, tells us that man-made chemicals in everyday items are slowly poisoning us and our children. This creeping toxicity goes far beyond lead in toys. These voices warn that compounds used to harden and soften plastics leach carcinogens into everything from IV bags in hospitals to water wings; chemical softeners in lipstick pose other dangers to health; our computer terminals off-gas one toxin, while their printers ooze a cloud of another. The manufactured world, it seems, is creating a chemical soup that is slowly polluting the ecosystem that is our body.

All such warnings implicate the same culprits: you and me. Human activity has become the main driver of this burgeoning crisis, one that gravely threatens, well, you and me.

We are collectively enmeshed in activities that inexorably endanger the ecological niche that houses human life. The continued momentum from our past actions will unfold over decades

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or centuries; toxic chemicals that permeate our water and soil, and the buildup of greenhouse gases, will take their toll for years to come.

That catastrophic scenario can readily lead to feelings of hopelessness, even despair. After all, how can any of us turn back the vast tsunami of human activity?

The sooner we can stop adding to that tidal wave, the less drastic the damages will be. And if we examine more carefully our part in fouling our niche on this planet, we can find points of leverage where simple, gradual changes might halt or even reverse our contribution to this cataclysm.

As individual shoppers we are trapped in making choices among an arbitrary range of product options, a range determined by the decisions of industrial engineers, chemists, and inventors of all stripes, at some distant remove in time and space. We have the illusion of choice, but only on the terms dictated by those invisible hands.

On the other hand, as we are able to make choices based on full information, power transfers from those who sell to those who buy, whether a mom at the local market, a purchasing agent for a vendor or institution, or a brand manager. We become the shapers of our destiny rather than passive victims. Just by going to the store, we will vote with our dollars.

By doing so we will create an entirely new competitive advantage for companies that offer the kinds of products our collective future needs. Those informed choices will shape new mandates for today's engineers, chemists, and inventors. I would argue that this market force will drive a demand for a wave of innovations, each of them an entrepreneurial opportunity. In this way, up-

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grading our ecological intelligence will prime a boom that will alter for the better the industrial processes used to make everything we buy. Global shocks like skyrocketing oil prices create a synergism with the search for ecological upgrades by radically shifting cost equations, boosting the urgency of finding advantageous alternatives.

As control of data shifts from sellers to buyers, companies would do well to prepare ahead for this informational sea change. The business rule of thumb in the last century—cheaper is better—is being supplemented by a new mantra for success: sustainable is better, healthier is better, and humane is better, too. Now we can know with greater precision how to implement that mantra.