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Searching for Sustainability: No Quick Fix

By John R. Ehrenfeld

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In the face of alarming environmental and social imbalances, the growing push for sustainability has given hope to many thoughtful practitioners. But John Ehrenfeld, a leader in the emerging field of industrial ecology, questions the conventional approach to "sustainable development." Creating true sustainability, he argues, requires radical solutions, not quick fixes. The process begins by examining our own behaviors and assumptions regarding consumption, personal satisfaction, and technology. Here, in the first in a series of articles on this crucial topic, Ehrenfeld suggests ways to achieve a deeper vision of sustainability.

— *Paul M. Cohen, Senior Editor*

Management literature abounds with articles making a business case for "sustainability." Business pundits trumpet the great opportunity for enterprises to find the few places they profitably can bundle social goods into their markets.[1] Socially responsible investing has become the latest mechanism to use the power of the market, in this case the financial markets, to punish the "bad" guys and reward those firms that are doing the "right" thing. One problem with all of these practices is that they have little or nothing to do with creating true sustainability. In most cases, they will only temporarily slow down the process of environmental degradation and global social inequity. In short, the best that most businesses today can claim is that they're doing less harm than they might. But halting the environmental degradation and growing social inequity between the world's haves and have-nots will require fundamental change in the way that businesses and societies work.

How will this come about? I don't claim to know the answer. But in the pages that follow I will outline some emerging tools and opportunities that may hasten that change. I'll also describe what I believe are the limits of our current approaches to sustainability, and propose an alternative perspective that addresses underlying causes rather than temporary relief of the symptoms of our problems. I will conclude by offering a new strategic framework for guiding our personal, social, and economic decision making.

Current Approaches to Sustainability: Solution or Avoidance?

The publication of the 1987 Brundtland Report[2] popularized the concept of sustainable development, which it defined as development that "meets the needs of the present without compromising the ability for future generations to meet their own needs." Five years after publication of the report, the largest assemblage of global leaders in modern history met in Rio de Janeiro to ink an agreement to implement the report's many concepts and practical approaches. Rio

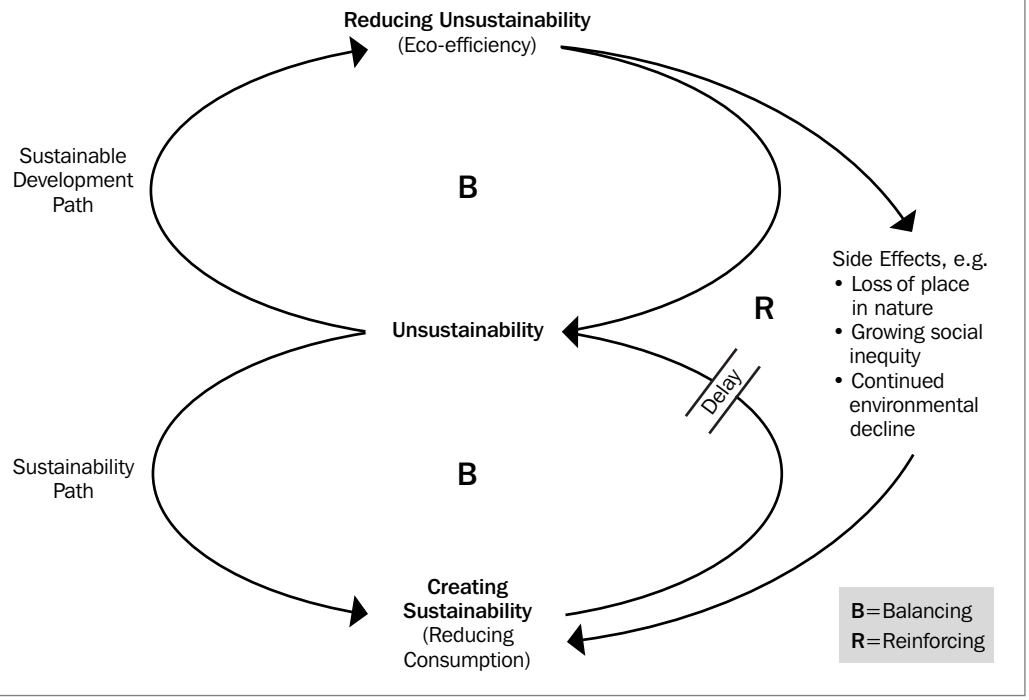
represented a major shift away from a narrow focus on environmental issues and toward a balance that also included the social and economic. Soon thereafter the idea of the triple bottom line – economy, environment, and social equity – was promoted as a metric by which businesses could measure their contribution to sustainable development.[3] Global business followed with the notion of eco-efficiency – basically, a promise to deliver more value to the customer at lower environmental cost.

These and other measures that followed the Brundtland Report have certainly helped reduce the *pace* of unsustainability, but the absolute magnitude of the problems on a global scale has increased. Some economists argue that raising efficiency has exacerbated the situation by generating more wealth – and more consumption – in the economies of affluent nations. Few companies or institutions have addressed one of the root causes of unsustainability – our addiction to consumption (see Figure 1). Rather, virtually all suggestions by the powerful institutions of the modern world for solving the sustainability challenge are based on quick technological fixes, including eco-efficiency[4] (see sidebar, "Confronting Technology"). It is a classic case of *shifting the burden*[5] – focusing on the symptoms rather than attacking a problem at the roots. The underlying condition often reasserts itself in even more-confounding ways; as a result, our capacity to change is undermined by the illusion that we are addressing our problems, when in fact we are not.

True Sustainability – A New Game

Achieving positive results requires drastic action. We need to shift from our reductionist, problem-solving mode to one that is driven by a vision of a sustainable future we all share. We need to reflect carefully on our current state of affairs and replace ineffective ways of thinking and acting.[6] The distance between the vision I will present and our current reality is vast; it is important that we do not let the gulf become overwhelming.

Figure 1: The Addictive Nature of Consumption



Most attempts to reduce unsustainability have simply shifted the burden and drawn attention away from the root causes of the problem – our addiction to consumption.

Confronting Technology: The Great Enabler

As the driving force of modern society, technology has become the chief means of achieving most of our business, social, or personal objectives. I believe that technology is also one of the great enablers of our addiction to consumption. It shapes the tools and artifacts we use as well as the cultural mindset that produces unsustainable behavioral patterns. In a culture addicted to consumption, technology is our cocaine, and unless we admit this and learn to kick the habit, we're unlikely to change our ways.

Beyond its direct environmental impact, technology also has secondary effects on the environment and our relationship to it. To understand the world, we must stand outside of it, according to Descartes and other Enlightenment thinkers. Inexorably, this characteristic stance of modern science has eroded our sense of being as a part of nature. Technology brings with it a worldview that sees everything "out there" as having value only or predominantly through its functional, instrumental purposes. But this modern way of being is a trap in that, in our striving for satisfaction, it stifles the qualitative characteristics of what it is to be human. (Erich Fromm has argued persuasively that we have moved from a "being" mode of life to a "having" mode of life.[7] In the latter, our identity and self-worth become conflated with all the material objects we acquire in our attempts to find satisfaction.) Dignity, authenticity, and autonomy give way to instrumentality and consumption. In short, we have lost our sense of what it is to be human.

Finally, technology has a tertiary effect on our culture. The late philosopher Hans Jonas has argued that modern technology renders ethical action and responsibility problematic.[8] The moral consequences of human action, in the times when notions about responsibility were shaped, always showed up proximately to the action. Responsibility could be defined in practical terms as avoiding harm. But as never before, technological activities – such as pesticide use, industrial emissions, or long-range weapons – show up in spatially or temporally remote, unanticipated, and profound ways. Until individuals and businesses recognize and act to avoid the deeper impacts of their actions – for instance, the climatological effects of their automobile and industrial emissions – deep change will be impossible.

Almost completely missing from the problem-oriented activities of today is a clear notion of what sustainability is. "Sustainable development" is simply an extrapolation of the past, except that we intend to be more efficient and fair in going about our business. It is only about process with no visionary end in sight.

I define sustainability as *the possibility that human and other forms of life will flourish on the Earth forever*.[9] It's important to examine two key words in that definition. *Possibility* is about bringing forth something we desire so as to create a new reality. Possibility enables humans to visualize and strive for a future that is not available to them in the present. Ortega y Gasset captured the essence of possibility when he said, "Life is a series of collisions with the future; it is not the sum of what we have been, but what we yearn to be."

"It is difficult to desire what one cannot imagine as a possibility."

Flourish brings life to this definition of sustainability and is the threshold through which people can create their own image of what their world would be. Every culture and every age has conjured up images and sounds of flourishing. In our own time, the visage of smiling, happy infants may be an iconic example from nearly any culture on the globe. But all too few of us live in circumstances where those precious moments can be evoked again and again. Doesn't the above definition suggest something quite different than does the notion of sustainable development? In the Brundtland version, sustainability appears in the form of an adjective. The noun is still *development*. In this new form, sustainability becomes the noun, the subject, the focus – quite a difference, especially because we have become accustomed to thinking about development as continuous growth. Sustainability and unsustainability are not just two sides of the same coin. They are categorically different. Unsustainability is measurable; it can be managed and incrementally reduced. But sustainability – the possibility of flourishing in the future – is aspirational. As Amartya Sen, the economics Nobelist said, "It is difficult to desire what one cannot imagine as a possibility."

In short, creating sustainability is not the same as reducing unsustainability.

Sustainability by Design

Nevertheless, it makes sense to remove the causes of unsustainability. That is the underlying rationale for technological innovation, social revolution, psychotherapy, environmental legislation, and other change efforts. But these solutions usually build on past experience, in ways that maximize our preferences or ameliorate current problems. There is little *possibility* in this way of being; like a well-programmed computer, we always come up with the same answer given the same set of inputs.

Fortunately, there is another road to sustainability. But it comes in a very different model of individual and social action. This way conceives a world that brings *flourishing* into our everyday activities instead of one that sees life as a series of problems to overcome. Design creates something that did not exist before. It is what great artists, writers, musicians, teachers, and political or social leaders do: they bring their future visions into being. They make metaphorical jumps that allow them to transcend the limits of commonplace rationality.

Flourishing will come only if we pay close attention to three critical domains that have been dimmed in our consciousness by the forces of modernity:

- our sense of our place in the natural world – the natural domain;
- our sense of ourselves as human beings – the human domain; and
- our sense of doing the right thing – the ethical domain.

These three aspects of sustainability allow us to reframe the triple bottom line outlined by the Brundtland Report (see sidebar, "Reframing the Triple Bottom Line"). They can form the framework for the redesign of tools, infrastructure, and social institutions, and enable us to transform living from its unsustainable path to one that brings the vision of flourishing "down to Earth." All of which can increase the likelihood that our designs will work the way we intend them to and also help us identify the causes of our problems.

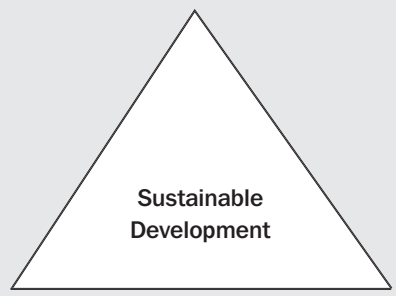
Building the Real Business Case for Sustainability

The change required means starting at the deep-rooted structure that drives business culture. It is encouraging that many leading practitioners in the organizational learning community,

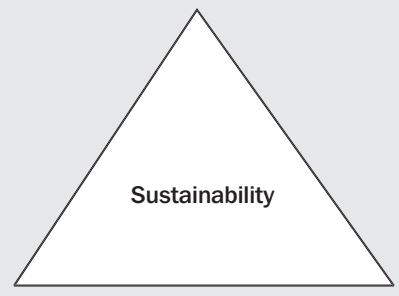
Reframing the Triple Bottom Line

To achieve true sustainability, business should shift from ameliorative strategies based on the Brundtland strategic triangle to new strategies based on the radical sustainability triad.

The Brundtland (Sustainable Development) Triangle



The Radical Sustainability Triad



I replace the term environment with natural because it connotes the holistic-systems sense of the world in which we live. Likewise, it is important to look beyond economics if we are to turn attention to the human. Economics is important in understanding the metabolism of human societies, just as ecology is important in the case of natural living systems. But as a normative model, economics does not provide a roadmap for sustainability.

Finally, I believe the equity apex must give way to the more deeply rooted ethical. This encompasses collective concerns like equity or justice, as well as classic moral notions like responsibility. Neoclassical theory claims that free markets are the most efficient means of maximizing satisfaction, given an initial distribution of wealth, but says nothing about the morality of that initial distribution. It always takes some extra-market intervention to shift the distribution. Government policies in liberal, democratic states generally have been that instrument. Business as an institution has focused on creating the rules for maximizing profits rather than taking a stand on distributional or intergenerational equity.

Clearly business cannot redress equity failures all by itself. This institution, like most others in free–market–dominated economies, focuses first on efficiency. But the current emerging notion of corporate social responsibility is an encouraging sign that business may be starting to work on its ethical processes.

within and outside of firms, are focusing on sustainability as an objective, but they are largely limiting their efforts to what can be done within the boundary of the firm. They overlook the fact that every worker arrives at the office or plant from a home within a community within a larger society, and imports the elements of the larger cultural structure. In the case of sustainability, this means that change within the firm must be built on change in the larger society outside of nominal company boundaries. The work of change agents inside and outside of firms is going much too slowly to overtake the magnitude of unsustainability. The growing magnitude is due, I believe, to a failure to recognize that sustainability rests on a system much larger than the firm.

If business as an institution – the most powerful one on the globe – truly cares about sustainability, then it must begin to move outside of its boundaries, and interact with society at large, where change at the cultural level needs to come forth.

The most important change must come at the level of deep-seated societal structure and mindset. For example, my colleague Tom Gladwin, University of Michigan Professor of Sustainable Enterprise, has classified some 20 unsustainable characteristics that underlie social and individual activities in modern industrial societies.[10] (See Table 1.)

Table 1: Elements of an Unsustainable Paradigm

Cognitive	Worldview	Contemporary Norms	Psychological
Reductionist	Atomistic	Efficiency	Repression
Proximity	Mechanistic	Quantitative	Denial
Simplicity	Anthropocentric	Secularism	Projection
Certainty	Rationalistic	Narcissism	Rationalization
Discrepancy	Individualistic	Techno-optimism	Insulation

This table is constructed from information in the figure "Sources of Unsustainable Thinking" (Gladwin, Newburry, et al. in Bazerman, Messick, and Wade-Benzoni 1997, 239).

Some of the items on Gladwin's list, like "proximity" (our tendency to perceive only what is close at hand), or "discrepancy" (our need to be jarred by our senses), refer to our cognitive structure and the way we perceive the world. Others, like "individualistic," reflect the cultural worldview that started with the Enlightenment. Sociologists refer to these kinds of characteristics as features of the paradigm by which we live our lives. The third set of characteristics reflects contemporary norms. For instance, our compulsion to quantify the world around us is tied to our need to be in control. And last, Gladwin points to a set of psychological ways we defend ourselves from anxiety. In the context of unsustainability, the anxiety springs from a sense that as individuals we lack the competence to produce happiness, or that the satisfaction we seek is always just beyond our means to produce it. Denial is the single element most illustrative of our current dilemma; others include "repression" and "rationalization."

Contrast Gladwin's portrayal of the unsustainable mind of today with that in his alternative, sustainable set. (See Table 2.) I believe the two sets of cultural traits provide a conceptual roadmap for where we are, and where we must go if we are to achieve our espoused goal of sustainability.

To achieve true sustainability, I believe we must follow two parallel paths. First, we must change the paradigms that guide our business and environmental thinking. This process requires replacing the elements of an unsustainable social paradigm with a new set of culture-shaping beliefs and norms. Second, we must directly question the role of technology and

develop ways to produce new means for satisfying the needs of both human and nature. Our artifacts need to be designed to support conscious choice and reflective competence rather than to induce blind consumption. They should produce long-lasting human satisfaction so that addiction to consumption will abate. We will be able to flourish simply by living life as we encounter it.

A Tool for Change: Industrial Ecology

One tool for changing our relationship to technology is the emergent field of industrial ecology. In its simplest form, industrial ecology suggests that societies built around principles derived from ecosystem properties and dynamics might be sustainable in the same sense that ecosystems are. For instance, the closed-loop webs in an ecosystem take little out of their surroundings and put back little as wastes. They naturally recycle almost all materials used in

Table 2: Elements of an Sustainable Paradigm

Cognitive	**Worldview**	**Contemporary Norms**	**Psychological**
Interconnected	Holistic	Equity/Justice	Remembrance
Distance	Organic	Qualitative	Avowal
Complexity	Eco-centric	Spiritualism	Internalization
Uncertainty	Intuitive	Altruism	Accurateness
Graduality	Communitarian	Techno-skepticism	Sensitization

This table is constructed from information in the figure "Moving Towards Sustainable Thinking" (Gladwin, Newburry, et al. in Bazerman, Messick, and Wade-Benzoni 1997, 262).

their metabolism. But though materials recirculate in ecosystems, they generally make only one pass through human systems. Thus, one application of industrial ecology is the development of lifecycle analysis tools and the design and management of products and services from a comprehensive lifecycle perspective – from extraction of raw materials to disposal of used products. This approach yields a better understanding of the relationships between socioeconomic features of modern societies and their material and energy metabolism. For example, many of the products we use, from car parts to computer printers, would be designed to be reused through recycling and remanufacturing.

Beyond the analytic tools, industrial ecology provides a new set of beliefs and norms, also based on ecosystems, at least in a metaphorical sense. Ecosystems are seen as complex, self-organizing, open systems out of which integrity, flourishing, resilience, or adaptability emerge as properties of the systems as wholes. In both human and natural systems, sustainability is an outcome of relationships among the parts. However, the notions of interdependence and interconnectedness inherent in natural systems are very different from our current cultural norms. We almost worship independence and autonomy as social norms. The idea of competitive markets implies a predator-prey relationship among producing firms. Ecosystems have predator-prey aspects to be sure, but they also display many forms of mutualism and symbiosis.

In both human and natural systems, sustainability is an outcome of relationship among the parts.

Replacing the Old Paradigm

Thinking with a different set of beliefs and norms more aligned with sustainability should bring about new practices over time. A comparison of Gladwin's two tables finds that the concepts of industrial ecology counter many of the unsustainable elements: interconnectedness in opposition to reductionist, complexity in opposition to simplicity, and so on.

Executives often say that they cannot unilaterally embrace sustainable practices, even as they claim that they would like to. Why then not change the rules of the game they play, taking a lesson in cooperation from industrial ecology? Together, powerful forces in industry can change the nature of competitive strategy; in today's political economy, firms create their own groundrules through their influence on governments. Why not change the way profit is calculated at the level of the firm, and how gross domestic product (GDP) is measured at the societal level? For example, an environmental group, Redefining Progress,[11] has developed an alternative to the conventional GDP called the Genuine Progress Indicator (GPI). Rather than add the costs of crime, pollution, family breakdown, and other societal "bads," this metric subtracts those costs from the aggregate index. According to the GPI, aggregate well-being in the U.S. leveled off in the 1970s. Similarly, the social costs of polluting or depleting a natural resource could be treated as a company's internal costs of doing business, rather than allowing firms to externalize these real costs to society.

Businesspeople complain about unpredictability in the regulatory environment, claiming, "just tell us what the rules are and we will learn to play and win in a new game." But when push comes to shove, this claim rings hollow as judged by persistent obstructionism to new forms of environmental and financial regulations designed to promote sustainability. If the world's leading firms would create a coalition to change the formulas used by the financial markets to determine success and to influence government and independent agencies to

change the rules, a new sustainability win-win game is possible. The World Business Council for Sustainable Development (WBCSD)[12] is a coalition of approximately 170 leading international firms dedicated to promoting sustainable development. Imagine the impact if the WBSCD called for such a move – pushing for true sustainability rather than settling for eco-efficiency.

Table 3: Reframing the Way We Design Our Artifacts

Current Practice	**Sustainable Design**
Industrial design	Design of functional objects
Product design	Creation of material culture
Specialization	Improvisation
Conventional	Uncertain, uncomfortable
Professional	Amateur, dilettante
Specific	Holistic, integrative
Instrumental	Intrinsic
Problem-solving	Experimenting
Solutions	Possibilities
A priori design	Contingent design

This table was originally titled "Reframing Our Perspective for Sustainable Design" (Walker 2002,9).

Industrial ecology offers alternatives to many (though by no means all) of the unsustainable elements in the table. In addition, a shift from the so-called "sound science" stance to a more precautionary process would reduce the potential for unintended but unsustainable outcomes. Today, the approach is the opposite of precautionary: businesses claim they should be able to put anything into the market that cannot be *proven* to be harmful, even given the uncertainties of the methods available for such proof. Techno-skepticism – examining innovation with a critical eye – is another form of precaution. This orientation should not be confused with wholesale opposition to technological change. Technology is here to stay, but we need to create procedures to examine its impacts before releasing new technology into the marketplaces of the world.

Dealing with the unsustainable psychological elements of our addiction is very challenging. There are no quick fixes. But it is possible to design the technology of daily living to produce authentic satisfaction – the sort not driven by manufactured wants or needs – and

consequently reduce the level of existential anxiety. New design philosophies and techniques have great potential to reverse the current trend and begin to produce authenticity and other characteristics of flourishing – beauty and durability, for example. In a recent article, Professor Stuart Walker at the University of Calgary presented an alternate way of designing products for sustainability. Similar to Gladwin's plea for a new set of cultural beliefs, Walker's thesis argues for a new system for sustainable design (see Table 3).[13]

Apart from products that have been designed for remanufacturing and recycling (like Xerox's line of digital office machines), examples of such a new way of designing are virtually absent from the market. That is not to say that such tools do not come into existence. Ivan Illich calls artifacts (and institutions) that produce authentic human satisfaction "convivial tools." An example he uses is the conventional telephone system, which allows "the user to express his meaning in action."

Don't settle for simply reducing unsustainability.

During a yearlong residency in the Sustainable [Industrial] Design Group at the Technical University of Delft, I was introduced to research (being done in the Netherlands) aimed at designing artifacts that could guide ethical behavior. The core of this work is that humans and artifacts interact in ways unforeseen in typical design procedures. Taking some liberties with their work, I would say that this scheme considers the use of an artifact as a type of conversation between the actor and the object, each with a script telling the other what is expected.

A researcher at the University of Twente, Jaap Jelsma, points to an example found in the Netherlands – a water-conserving toilet using a two-button actuating mechanism.[14] The smaller of the buttons is used after urination and the larger button otherwise. The prescriptive influence comes from the requirement that the user must make a decision every time. If the design is effective, the user will follow the script built into the artifact by the designer; in this case the message is to conserve water. I believe that such new approaches to product design can change the relationship between consumers and product-and-service providers, and, if that process is carefully constructed and open to examination, can strengthen all three points of the new triad. If design is regarded as a long conversation (between the designer, the consumer, and nature) out of which designs evolve, I believe that the objects that emerge will be much more satisfying and induce ethical, reflective interactions between the user and the object. Industrial ecology can supply the voice of nature in the conversation, speaking about closed cycles, avoidance of metabolic poisons, and other features of sustainable ecosystems.

Choosing Sustainability: A New Strategic Framework

The opportunities for business to create sustainability are indeed immense, but so is the possibility of continuing in the same, business-as-usual pattern, even as we apparently make headway with eco-efficiency, lifecycle management, and other strategies arising under the rubric of sustainable development. Each enterprise has a choice about which way to go. This article has presented a strong case for taking up the cause of radical sustainability. It is radical, but not extreme. It brings us back to our roots – the meaning of the very origin of "radical" – and is the natural way to go. If we take that position, we can perhaps begin to see that modernity, with its unsustainable structure, is the extreme paradigm. It has brought us wonders, but wonders that do not treat the heart and soul of our species.

By now many of you must be wondering, "where are the examples of success" that always show up in articles like this. I purposefully have avoided doing this. The basis for the sustainability strategy is that radical new institutions and forms of technology must rise from a new

paradigm. And, although the business literature is full of worthy efforts to improve corporate practices, virtually all have arisen in the context of reducing unsustainability. Efforts to build on these examples continue to be critically important. But the radical, perhaps simple, changes needed are yet to come forth and will not until sustainability is established as a vision.

That vision can become a reality as a result of many steps that we can take together. Six steps, in particular, suggest the outlines for a truly sustainable future:

1. Acknowledge that you and your firm are likely addicted to unsustainable practices, and follow that by accepting the radical definition of sustainability. Don't settle for simply reducing unsustainability.

2. Change your thinking from seeing your enterprise as an independent, autonomous entity to one embedded in a complex living network. We are all interconnected; the idea of an isolated "sustainable firm" found so often in the business strategy world is an oxymoron. Collaboration with your peers and other producers can change the rules of the game you play to a truly win-win context. And changing the design process to involve stakeholders of all sorts expands collaboration to a much wider set of players whose knowledge of the world can greatly enhance the conventional rationality of a firm.

3. Implement the sustainability triad, using the natural, human, and ethical dimensions as the framework for an organizational and technological (products and services) change process. Replace the Brundtland strategy triangle and the triple bottom line.

4. Follow the principles of industrial ecology or other programs built on these principles, such as Natural Capitalism, The Natural Step, Cradle to Cradle, et al.[15] This will lead you toward addressing an important subset of the paradigmatic elements in the tables, all of which are grounded in ecological properties that include, for example, holism and interconnectedness.

5. Start thinking of design as more than a purely technical exercise to find the most efficient way to satisfy two sets of fundamentally contradictory objectives – those of the firm and the financial world, and those of the consumers and other stakeholders. Revise the

concept of design from a technical, analytic process to a dialogic conversation involving all the players. This can refer to design of artifacts and to the design of human structures as well. Get used to the added time and resources that will be needed for this change.

6. Finally, commit to the actions that emerge from the design step and move on.

Industrial societies, and our planet, are at a turning point. Few people believe that what has served as "best practice" for the past 200 years will serve for another 200. The deeply rooted notions of progress that have been with us since Bacon and Descartes have outlived their effectiveness and now are a central part of our addiction to modernity. It is up to us, individually and collectively, to take the first steps to sobriety.

Endnotes

1 Forest Reinhardt, "Market Failure and the Environmental Policies of Firms," *Journal of Industrial Ecology 3*(1) (1999): 9–21.

2 Named for Norwegian Prime Minister Gro Harlem Brundtland, who chaired the U.N.-appointed World Commission on Environment and Development, the report was published commercially as *Our Common Future,* G. Brundtland, ed. (Oxford, UK: Oxford University Press, 1987).

3 John Elkington, *Cannibals with Forks: The Triple Bottom Line of 21st Century Business* (Gabriola Island, BC, Canada: New Society Publishers, Limited, 1998).

4 This assertion is not to dismiss groups that seek rapprochement between science and spirituality as a precondition to sustainability. The key is the word "powerful." Those who stress the criticality of the spiritual are still much in the shadows of mainstream Western society.

5 Peter Senge, Charlotte Roberts, et al. *The Fifth Discipline Handbook* (New York: Doubleday, 1994), 135ff.

6 This model of changing behavior to avoid the traps of the past is fundamental to many schools of organizational and personal transformation and change, for example, see Peter Senge, *The Fifth Discipline* (New York: Doubleday, 1990).

7 Erich Fromm, *To Have or To Be?* (New York: Harper & Row, 1976).

8 Hans Jonas. *The Imperative of Responsibility: In Search of an Ethics for the Technological Age* (Chicago: University of Chicago Press, 1984).

9 See also SoL's Sustainability Consortium at *www.solonline.org/public_pages/comm_SustainabilityConsortiumCore/*.

10 Thomas Gladwin, William E. Newburry, et al., "Why is the Northern Elite Mind Biased Against Community, the Environment, and a Sustainable Future," in *Environment, Ethics, and Behavior: The Psychology of Environmental Valuation and Degradation,* M. H. Bazerman, D. M. Messick, and K. A. Wade-Benzoni (San Francisco: The New Lexington Press, 1997): 234–274.

11 See *http://www.rprogress.org*.

12 See *http://www.wbcsd.ch*.

13 Stuart Walker, "A Journey in Design: An Exploration of Perspectives for Sustainability" *Journal of Sustainable Product Design* (2002): 3–10.

14 Jaap Jelsma, "Design of Behaviour Steering Technology" Proceedings of the 2000 International Summer Academy on Technology Studies, Graz, Austria, July 9–14, 2000. Available at *http://www.ifz.tu-graz.ac.at/sumacad/sumacad_proc00.html*.

15 See: *www.natcap.org*; *www.naturalstep.org*; and *www.mbdc.com/c2c_home.htm*.

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John R. Ehrenfeld is executive director of the International Society for Industrial Ecology and the former director of MIT's Program on Technology, Business, and Environment. He teaches worldwide, and contributes to SoL's Sustainability Consortium. In October 1999, the World Resources Institute honored him with a lifetime achievement award.
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Commentary

By Gregory Roscoe

Gregory Roscoe

The title of John Ehrenfeld's paper says it all – "Searching for Sustainability: No Quick Fix"! The take-away for me is that as a society we have continued to focus on emerging and glaring *symptoms* of non-sustainability. To make a societal paradigm shift toward the *aspirations* of sustainability "will require a cultural transformation" – no quick fix.

One revealing point Ehrenfeld made was the contrast between sustainable development and (radical) sustainability. Sustainable development focuses on economic growth with reduction of negative environmental consequences. He characterizes it as a more thoughtful "extrapolation of the past." To be sure, the reduction of negative environmental consequences is not without merit. Having worked for the Environmental Protection Agency (EPA), I have a first-hand appreciation for how problem-mitigation-based strategies can make monumental strides in advancing environmental quality. The U.S. has an outstanding track record of identifying environmental problems and addressing them. Thirty years ago, our rivers were catching fire; that doesn't happen today!

As agency policy became more sophisticated, we even allowed ourselves to think about how to continue to develop economically while minimizing the impacts of that growth (sustainable development). For example, the EPA and its state partners have invested in the development of Environmental Management Systems (EMS), in the promotion of life-cycle analysis in product development, and in environmental leadership programs as adjuncts to their regulatory agendas. Regulators have begun taking broader, sector-based approaches to environmental issues, and systems thinking is working its way into strategic planning. For example, the EPA New England office has a long history of working with the metal finishing sector. Taking a multimedia and sector-wide view of compliance was a huge strategic step forward. After investing significant energy into its compliance efforts, EPA also incorporated broader, collaborative strategies – most recently encouraging corporate entities to "green their supply chain." As part of this effort, corporate sponsors require commitments from their vendors to adopt EMS and to produce "greener" products.

Nevertheless, Ehrenfeld is right – minimizing non-sustainability is not the flip side of sustainability. As he said: "sustainability – the possibility of flourishing in the future – is aspirational." It will require a cultural shift. This leads to one of the most fundamental questions facing our federal and state environmental agencies: Will they be defined by the statutory and regulatory structures that are their current framework, or will they embrace the need to catalyze and facilitate the cultural change necessary for "radical" sustainability?

The forces shaping the missions of our state and federal environmental agencies are complex, historical, and structural. Unfortunately, there will be an ongoing need for environmental regulation and enforcement. Though now an accepted part of the environmental agenda, the emergence of green performance initiatives like Performance Track and the broader, sector-based strategies such as EPA's College and

University Sector, Hospitals/Health Care and Metal Finishers was a departure from more traditional interpretations of mission. There were no statutory mandates to undertake these initiatives and early on there was internal debate about why these efforts were important and who was asking for them.

As we ponder a more sophisticated and radical notion of sustainability, concrete strategies well suited to regulatory personnel may well be elusive. The finite political lifespans of federal and state leadership present special challenges for long-term agendas like sustainability. Also, that agenda has not been helped by the indiscriminate use and "eye of the beholder" definition of the term. "Sustainability" has come to have little specific meaning and thus is currently limited as a beacon for policy makers. Given their finite resources, how will these agencies evaluate "bang for the buck" when sustainability efforts (however we define them) are compared with more traditional environmental agendas such as permitting or emissions trading?

These strategic conversations are happening in our regulatory agencies, but the expectations and path(s) for sustainability certainly are not clear. What is clear is that there are opportunities for leadership and involvement of these agencies. However, we cannot lay sole responsibility on their doorsteps if a true cultural change is to happen. EPA and state environmental agencies were originally organized to develop and execute crises responses to environmental problems. They have evolved to embrace strategies that promote sustainable development. The remaining challenge of radical sustainability is largely societal and cultural – an agenda larger than that of any government agency. The shift to radical sustainability will require a culture change by business leaders, communities, political leaders, and ourselves. There will be no quick fix.

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Commentary

By Bob Tierney

Bob Tierney

If, as a society, consumption is our problem and technology is our cocaine, then with John Ehrenfeld's analogy taken one step further, I work for one of society's major drug pushers! Pratt & Whitney and its parent company, United Technologies – providers of jet engines, air conditioning systems, and other industrial products and services – account for a full 1% of the world's CO_2 emissions. The current fuel efficiency of air travel is fairly good: at 500 miles per hour, an airline passenger can travel 100 miles on a single gallon of jet fuel, for example. Not bad – but the global demand for air travel is increasing so that, even with improved efficiency, the total amount of CO_2 from aviation is predicted to rise for many years to come. It may well be that "reducing unsustainability" is not enough. But when you're heading in the wrong direction you have to slow down before you can turn around.

It's important to note that Ehrenfeld is not saying that technology is bad. From my 25-year tenure in a large multinational firm, and as a student of sustainability, I see that technology can be a catalyst for unsustainable practices. But it can also be the enabler for achieving sustainability – it depends on how successful we are at integrating natural and human limits into the design equation.

This is easier said than done. Our company has been pursuing eco-efficiency since the early 1990s with much success. We have been rewarded for our successes with lower cost of goods sold and positive acknowledgments from government. Moving away from what has worked in the past and starting to recognize business and environmental costs that traditionally have been borne by society is a very difficult conversation to have with the CFO of any company. It happens only when people in an organization care enough about the future to take risks and find opportunities to apply their intentions. For instance, Pratt & Whitney's internal effort to develop more eco-friendly solutions took root as a marketable service only after the 9/11 attacks crippled our commercial aviation business.

The fact is, business practitioners must make the financial as well as the environmental and social case for change. For example, most of the products we make either consume fossil fuel directly or cause it to be consumed. Being eco-efficient with energy inputs reduces customer operating costs, and therefore, where development costs can be repaid with sufficient increased sales, investments will be made to improve this measure.

The internal conversation we are beginning to have now, with a focus on sustainability, is about the development of alternative fuels and the use of emission offsets. We also have analyzed the potential external costs with one of our products that has a design-to-retire lifetime of 50+ years. We have examined, for example, the impact that a carbon tax or more stringent regulation might have on our future business. We have not made the business case for the kinds of product design methods that Ehrenfeld describes, but we are beginning the conversations that will lead to this.

One method we have used to increase awareness is to focus on "unsustainable"

practices. With the burning of fossil fuels, we can speak about the limits of natural resources and the real impact of those limits on our businesses. For example, our jet engines are designed to last 50 years – but it is not at all certain that the fuel to run them will still be available in 2054. People in our company, and in many others, are now questioning their assumptions and beginning to design products for a very different world we see emerging in the future.

Has there been a great "Aha!" across the company? No. But there have been more conversations this year than last about what is the problem and what are the ranges of solutions. I put these conversations in the category of building capacity, and John Ehrenfeld's article provides a good framework for them. To be sure, some business practitioners will reject his argument out of hand. But in raising difficult questions and offering a framework for discussion, he is doing us a great service.

ABOUT THE AUTHOR

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