

Design for the Triple Top Line: New Tools for Sustainable Commerce

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The triple bottom line has been, and remains, a useful tool for integrating sustainability into the business agenda. Balancing traditional economic goals with social and environmental concerns, it has created a new measure of corporate performance. A business strategy focused solely on the bottom line, however, can obscure opportunities to pursue innovation and create value in the design process. New tools for sustainable design can refocus product development from a process aimed at limiting end of pipe liabilities to one geared to creating safe, quality products right from the start.

This new design perspective creates *triple top line* growth: products that *enhance* the well being of nature and culture while generating economic value. Design for the triple top line follows the laws of nature to give industry the tools to develop systems that safely generate prosperity. In these new human systems, materials become food for the soil or flow back to industry forever. Value and quality are embodied in products, processes and facilities so ecologically intelligently designed, they leave footprints to delight in rather than lament. When the principles of ecologically intelligent design are widely applied both nature and commerce can thrive and grow. © 2002 Published by Elsevier Science Inc.

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As the concept of sustainability takes root in corporate culture, many business leaders today are discovering what it means to measure performance against the triple bottom line. This triad of concerns – economic growth, environmental protection and social equity – was once considered an impractical, blue-sky ethic. Yet today it has begun to define both long-term strategy and everyday practice for leading manufacturing corporations all over the world.

Business people typically begin their commitment to sustainability with a clear understanding of their economic goals – a sense of purpose that comes from having built an

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enterprise that creates wealth and provides jobs – and a belief that they would like to “do better by the environment”. Often, sustainable business practices generated from this perspective tend to be resource efficiency measures or “end-of-pipe” initiatives that meet the triple bottom line by minimizing the impacts of industry. These are important first steps toward identifying problems, but ultimately they are strategies for managing negative effects – an agenda built on trying to be “less bad”.

But is being less bad being good?

We don't think so. Minimizing the impact of industry might slow down ecological destruction; an efficient use of resources might keep the engines of commerce running a few more years. But waste reduction and other palliatives aim for mere sustainability, which is, after all, a minimum condition for survival – hardly an inspiring prospect.

We are pursuing something entirely different. It's a strategy of change that sees today's innovations as the first steps in a transition from the maintenance of an aging system to the creation of a new one. Rather than trying to limit economic growth or reduce the impact of industry, we are creating the foundation of a system in which products and industrial processes are so intelligently designed they don't need to be regulated. Instead, they create wholly positive effects, a large and beneficial ecological footprint. We might call this new world of commerce *sus-*

taining rather than sustainable, which suggests to us a more fulfilling agenda than the maintenance of a damaging system. Why choose a meager, limiting diet when we can create real sustenance with designs as safe, nutritious and productive as those nature gives us?

Creating a sustaining industrial system calls for a new definition of quality in product, process and facility design. From our perspective, quality is embodied in designs that allow industry to *enhance* the well being of nature and culture while generating economic value. Pursuing these positive aspirations at every level of commerce anchors intelligent, sustaining design deep within corporate business strategy. And when good design drives the business agenda, the path toward sustainability turns from trying to be “less bad” to identifying new opportunities to generate a wide spectrum of value. If one approaches the design process asking, “How can I grow prosperity, celebrate my community, and enhance the health of all species?” the results are likely to be far more positive and enriching than those gained by using less material to make an existing product or measuring its performance against a bottom line standard.

We could call this change of perspective a shift from the triple bottom line to *the triple top line*. The triple bottom line, a concept developed by John Elkington, has been, and remains, a useful tool for integrating sustainability into the business agenda. Balancing traditional economic goals with social and environmental concerns, in language that works in the boardroom, it has created a new measure of corporate performance. Unfortunately, in ways Elkington did not intend, the triple bottom line often becomes a measure of the degree to which a company has minimized a liability. The concept of the triple top line moves accountability to the beginning of the design process, assigning value to a multiplicity of economic, ecological and social questions that enhance product value.

When asked upfront, these questions can drive intelligent product development and lead to design decisions that yield positive effects rather than limited liabilities.

When designing a new textile line, for example, we asked how an upholstery fabric could replenish nature, totally eliminate waste, and provide a safe working environment for the employees of a textile mill. The result was a beautiful fabric created with ingredients so safe it filtered the water running through the mill during production, making regulations and health concerns obsolete. After its useful commercial life as an upholstery fabric, the material can be composted and used to restore soil – the trimmings from the mill, in fact, become mulch for the local garden club. Distributed by an international textile design firm, the fabric has been a splendid success. No waste. No liabilities. Lower costs. Higher margins. In short, only assets and positive effects.

The triple top line doesn't obviate the need for triple bottom line accounting. Keeping close track of the bottom line is indispensable: You won't achieve sustainability unless you stay in business. In practice, however, triple bottom line accounting tends to focus on economic concerns, with ecological or social benefits sometimes considered as an afterthought. Lost in this scenario are rich opportunities to transform triple bottom line analysis into a strategic design tool generating new business opportunities and triple top line growth.

Understanding Values with the Fractal Triangle

In our work with corporate clients such as Ford Motor Company, Nike, Herman Miller and BASF we have found that a visual tool, a fractal triangle, helps us apply triple top line thinking throughout the design process. Typically, meeting the triple bottom line is seen as a balancing act, a series of compromises between competing interests played out in product and process design. The key

insights offered by the fractal triangle turn this notion on its head: Intelligent design, rather than balancing economy, ecology and equity can employ their dynamic interplay to generate value (see Figure 1).

The fractal triangle, first of all, reminds us that every product, whether or not it is designed with environmental health in mind, is produced and used in an interconnected world. This is the fundamental insight of ecology and the reason why the famous triad of sustainable development is on the table in the first place. But our value systems often obscure that fact; most of us still in some way identify with one of the prevailing ideologies of the 20th century.

Capitalism, even in a social market economy, identifies value almost exclusively in the economic realm. Yet products designed for economic gain have an enormous impact on the social and ecological world as well. The environmental groups and regulatory agencies that have emerged in response to the unintended consequences of industry tend to identify value primarily in preserving environmental health. Social movements that see economic aims as threatening are inclined to value the pursuit of equity most highly.

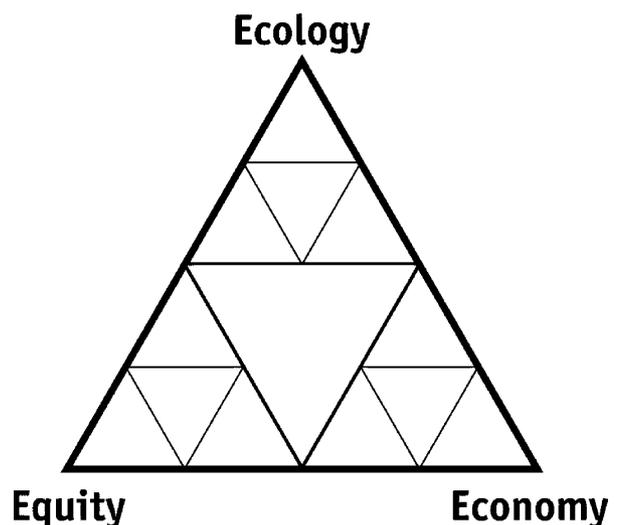


Figure 1

Tools for Sustainable Design

Each of these schools of thought – capitalism, socialism, ecologism – was inspired by a genuine desire to improve the human condition. But taken to extremes – reduced to isms – the stances they inspired can neglect factors crucial to long-term success. Even ecological concern, stretched to an ism, can neglect social, cultural, and economic interests to the detriment of the whole system. In short, holding one of these concerns as *the* ultimate goal often puts economy, ecology and equity at cross-purposes. So does measuring your performance by how well you are managing the bottom line liabilities that arise from these seemingly conflicting interests.

Triple top line thinkers, rather than trying to limit the influence of one or the other of these value systems, discover opportunities in honoring the needs of all three. In an infinitely interconnected world, they see rich relationships rather than inherent conflicts, much the way an ecologist sees infinitely complex and productive natural communities where others see “nature, tooth and claw”.

This concept is embodied in the fractal triangle. Representing the ecology of human concerns, it shows how ecology, economy and equity anchor a spectrum of value, and how, at any level of scrutiny, each design decision has an impact on all three (see

Figure 2). As we plan a product or system, we move around the fractal inquiring how a new design can generate value in each category. Again, the goal is not to balance competing perspectives but to optimize and *maximize* value in all areas of the triangle through intelligent design. Often, we discover our most fruitful insights where design decisions create a kind of friction in the zones where values overlap. Returning to the ecological metaphor, we might call these areas *ecotones*, the boundaries between natural communities notable for their rich diversity of species. In the fractal, the ecotones are ripe with business opportunities.

When applying the fractal triangle to our own projects, we begin asking questions in the extreme, lower-right corner, which represents the Economy/Economy sector. Here we are in the realm of extremely pure capitalism and the questions we ask would certainly include, Can I make my product or provide my service at a profit? We tell our commercial clients that if the answer is no, don't do it. As we see it, the goal of an effective company is to stay in business as it transforms, providing shareholder value as it discovers ways to generate positive social and environmental effects.

Moving to the Economy/Equity sector, we consider questions of profitability and fair-

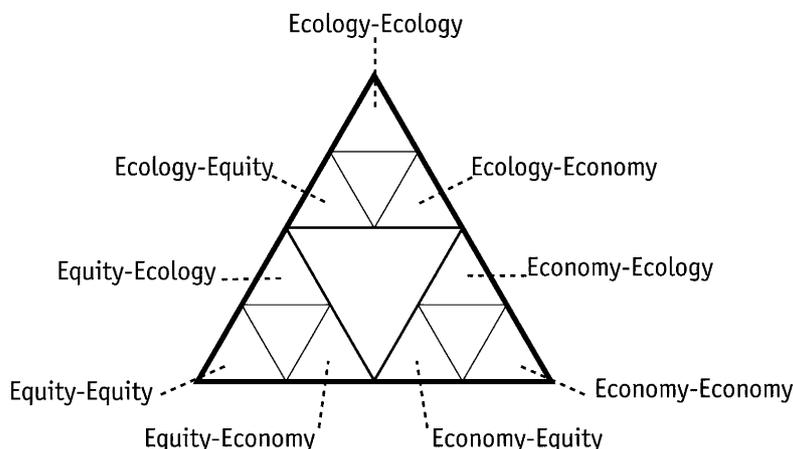


Figure 2

ness. Are the employees producing a promising product earning a living wage? As we continue on to Equity/Economy, our focus shifts more towards fairness – we begin to see Economy through the lens of Equity. Here we might ask, Are men and women being paid the same for the same work? Are we finding new ways to honor everyone involved, regardless of race, sex, nationality or religion? In the extreme Equity corner, the questions are purely social: Will the new factory improve the quality of life of all stakeholders?

In the Ecology corner of the Equity sector, the emphasis shifts again; Equity is still in the foreground, but Ecology has entered the picture. The questions arising at this intersection of values might explore the ways in which a product, such as the ecologically sound upholstery fabric, could enhance the health of employees and customers. Continuing to Ecology/Equity, we consider questions of safety or fairness in relation to the entire ecosystem: Will our product contribute to the health of the watershed?

In the pure Ecology sector: Are we obeying nature's laws? Creating habitat? In this realm we try to imagine how humans can be "tools for nature". Shifting to Ecology/Economy, commerce reenters the picture: Is our ecological strategy economically viable? Will it enable us to use resources effectively? Finally, we come to Economy/Ecology, where we encounter many questions that relate to the triple bottom line. Here the inquiry tends to focus on efficiency: Will our production process use resources efficiently? Will it reduce waste?

Each of these questions presents an opportunity for creating value. Together, they signal the possibility of acting with positive intentions across a wide spectrum of human concerns. Such intentions introduce a new standard of product quality, performance and success.

A New Design Standard

One of the most refreshing benefits of using the fractal triangle is the way in which it shifts

the focus of the design process from negative value judgments to questions of quality. It draws attention to the fundamental question of design: What is my intention?

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As we survey the landscape of 21st century industry, we see a system that generates a host of *unintended* consequences – the pollution, waste, and ecological destruction we are all too familiar with. Most of these conditions are not the result of a grand, carefully conceived plan; they are the signals of flawed design. And they are everywhere. The systems we inherited from the Industrial Revolution are built on a ubiquitous, cradle-to-grave manufacturing model that generates products designed for a one-way trip the landfill. In fact, as much as 90 percent of the materials used to create today's products are cast off as waste, much of it toxic.

Environmentalists and business leaders sensitive to this legacy have tried to limit the consequences of industrial production by retrofitting the systems of industry to reduce their harm. The sustainable development agenda, for example, typically aims to reduce, re-use and recycle, creating "more goods and services while using ever-less resources and producing less waste and pollution".

As well-meaning as these goals may be, they don't change the fundamental design of industrial production. They fine-tune the engines of industry, diluting pollution and slowing the loss of natural resources without examining the design flaws at their source. The system remains based on a cradle-to-grave model. In fact, these reforms take for granted – institutionalize, even – the antagonism between nature and industry. The result:

business strategies built on restricting industry and curtailing growth, an unappealing compromise based on the limitations of a century-old industrial model. This is a commercial cul de sac, the dead end created by an intention to be less bad.

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An entirely different intention, embodied by a strategy we call Cradle to Cradle Design™, offers a compelling alternative. Cradle to Cradle Design rejects the assumption that the natural world is inevitably destroyed by human industry, or that excessive demand for goods and services is the ultimate and inevitable cause of environmental ills. Industrial design is flawed because its foundations developed in a world in which few understood or appreciated the interconnectedness of people and nature, the relationship between economy and ecology, or the principles of the earth's natural systems.

Today, with our ever-growing knowledge of the living earth – with ecological intelligence – design can reflect a new spirit. Cradle to Cradle Design incorporates this new awareness at every level of human endeavor. Its principles are modeled on natural systems, the perpetual flows of energy and nutrients that support the earth's biodiversity. Its intention: to apply the intelligence and effectiveness of these systems to product and process design, so that commerce can grow prosperity, celebrate cultural diversity and enhance the health of all species.

From an industrial design perspective this means developing materials, products, supply chains, and manufacturing processes that replace industry's cradle-to-grave manufacturing model. In its place: systems modeled on nature's cradle-to-cradle cycles, in which

one organism's waste becomes food for another. When designers apply this principle – *waste equals food* – to product conception and material flows management, they can begin to create goods and services that flow effectively within closed-loop systems, providing after each useful life either nourishment for nature or high quality materials for new products. Ultimately, we think Cradle-to-Cradle Design can lay the foundation for a transition from products designed for a one-way trip to the landfill to industrial systems that restore nature, eliminate the concept of waste, and create enduring wealth and social value – human industry as a regenerative force.

The Fractal at Work: Designing New Facilities

This is not just wishful thinking. The Fractal Triangle moves these concerns to the top line in the minds of designers. In projects underway today we have been using the fractal in the design process, looking in each sector for ways to generate positive effects. Inquiries such as these inherently spark an explosion of creativity, yielding projects that produce new value in ways that would never have been imagined when approached from a purely economic perspective.

Consider, for example, the restoration of Ford Motor Company's Rouge River plant in Dearborn, Michigan. Built between 1917 and 1925, the Rouge is one of the world's largest industrial sites. Once an enormously productive complex of blast furnaces, stamping mills, warehouses and assembly buildings capable of producing automobiles from raw materials, the plant fell into disrepair late in the 20th century. The aging facilities were rusting and out of date and decades of manufacturing had taken a toll on the soil and water.

In May 1999, Ford decided to invest \$2 billion over 20 years to transform the Rouge into an icon of 21st century industry. Led by then chairman William Clay Ford, Jr., the company

committed to not only rebuilding the complex but to restoring it to a healthy, life-supporting place. Here was a blue chip company with a sharp focus on the bottom line taking a step toward something truly new and inspiring. Could inspired innovation and profits co-exist?

Well, yes. Using the Fractal Triangle as a design tool, we worked with Ford's executives, engineers, and designers to begin to explore innovative ways of creating shareholder value. Rather than using economic metrics to try to *reconcile* apparent conflicts between environmental concerns and the bottom line, the company began to ask triple top line questions. Innovations would still need to be good for profits, but Ford's leaders began to explore how profits could be maximized by design decisions that also maximized social and ecological value.

Triple top line thinking energized the company's decision-making process. Ford began to ask revolutionary questions: How can we make the Rouge a place we would allow our children to play? How do we design a manufacturing facility that creates prosperity and health for employees? What innovations will create habitat for native species? How do we create healthy soil? These are all positive, pro-active questions. They ask not how to "clean up" but how to create life-support systems.

The systems for storm water management on the site illustrate how designs that support life can create tremendous economic value. Expensive technical controls are a typical response to storm water regulations. Ford estimated that new pipes and treatment plants would cost up to \$48 million. If we had approached the flow of water on the Rouge site from a triple bottom line perspective, we might have tried to cut costs by using pipes made with less material, or by finding ways to treat water with fewer harmful chemicals. If we followed this path, we would

be trying to meet an environmental responsibility as efficiently as possible.

Instead, we tried to design a manufacturing facility that would create habitat, make oxygen, connect employees to their surroundings and invite the return of native species. The result is a day lit factory with 450,000 square-feet of roof covered with healthy topsoil and growing plants – a living roof. In concert with porous paving and a series of constructed wetlands and swales, the living roof will slow and filter stormwater run-off, obviating the need for expensive technical controls, and even regulations. All this with first cost savings of up to \$35 million, with the landscape thrown in for free.

This is the power of intelligent design

The Fractal at Work: Conceiving New Products

Designers can also apply the fractal triangle and triple top line thinking to the design of a single product – or even product packaging. Imagine that you are the CEO of an ice cream company. You sell an all-natural product you are very proud of. It brings pleasure to your customers while supporting the dairy farmers of your region, and it generates great profits, too. But you have a problem: after a recent outdoor event downtown, hundreds of wrappers from your popular ice cream sandwich littered the city parks. You did the right thing when you sent out a crew to clean up the mess, but clearly, that's not something you want to do for the long-term. You also realize, when forced to face this problem, that your packaging is also dyed with chemicals you'd never put in your ice cream. What to do?

If we were advising you, we'd suggest some triple top line thinking with the fractal triangle to try to generate an innovative solution. We would not ask how to reduce the chemicals in your packaging or how to work with the city on litter control. Instead, we'd wonder what kind of positive effects you hoped to create. Maybe you're interested in continuing

to provide the pleasure of a delicious sweet while offering a healthful package that creates new value for your community.

Working with the fractal, we might begin to see that ice cream packaging could be designed for biodegradability with new biopolymers and safe dyes. This light, healthful packaging could be economically produced. You might decide to provide added value by embedding the seeds of a native wildflower packaging designed to dissolve in a day after use – when children toss it on the ground they'd be planting seeds rather than discarding trash. Suddenly, your problem starts to become an asset: You're supporting the population of native plants; your customers are excited to be young "Johnny Appleseeds"; the city parks are blooming with colorful flowers; and your sales are through the roof. Not bad for packaging. Who knows, such a product could someday make "Adopt-a-Highway" programs obsolete.

Seeing the Future, Today

These examples begin to suggest some of the ways in which triple top line thinking and the fractal triangle create business opportunities. Applied throughout the design process, they introduce a new standard of quality, adding ecological intelligence, social justice, and the celebration of creativity to the typical design criteria of cost, performance, and aesthetics. Design driven by these positive aspirations could lay the foundation for a truly inspiring era in which we transform industry by remaking the way we make things.

We will do so, we believe, by engaging in a true partnership with nature. Expressed in designs that resonate with natural systems, this new partnership can take us beyond sustainability – a minimum condition for survival – toward commerce that celebrates our relationship with the living earth. We can build factories that inspire their inhabitants with sunlit spaces, fresh air, copious views of the outdoors, and cultural delights. We can cre-

ate fabrics that feed the soil, giving us pleasure as garments and as sources of nourishment for our gardens. We can tap into the flows of energy and nutrients in the natural world, designing astonishingly productive systems that create oxygen, accrue energy, filter water, and provide healthy habitats for people and nature.

As we have seen, designs such as these are generators of economic value too. When the principles that guide them are widely applied, at every level of industry, productivity and profits will no longer be at odds with the concerns of the commons. Instead, we will be living in a world of sustaining prosperity, a world in which both nature and commerce can thrive and grow.

