



Earth, Inc.

Using Nature's Rules to Build Sustainable Profits

by Gregory Unruh

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Take-Aways

- Base your company's sustainability program on the "five rules of the biosphere."
- The first is "materials parsimony." Nature uses few materials, but it still innovates.
- The second is "power autonomy," which you can achieve by increasing the percentage of renewable energy your products utilize.
- The third is "value cycles," which promote recycling for efficiency and innovation.
- To create a value cycle, design products with embedded limits on energy and materials usage.
- The fourth is a "sustainable product platform," which exploits "economies of scale, scope and knowledge."
- The fifth is "function over form." The functional benefit a product provides is greater than the product itself.
- Use waste materials as inputs for manufacturing new products to enable vertically integrated recycling.
- Meet customer and government demands for manufacturer responsibility and accountability by taking a precautionary approach in your use of materials.
- Exploit environmentally sound "product platforms" by planning for sustainability.

Rating (10 is best)

Overall

9

Applicability

10

Innovation

8

Style

6

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Relevance

What You Will Learn

In this Abstract, you will learn: 1) What are the five “biosphere rules” and why they matter, 2) How to profit by designing products for recycling and 3) What new “value cycle” factors you should consider in designing “product platforms.”

Recommendation

Sustainability? Gregory Unruh says plan for it, “embed it and forget it!” Unruh codifies five rules that nature follows for efficient productivity in the biosphere and illustrates how these rules can work for business. He explains how to rethink “product platforms” and how to maximize the benefits of waste streams. *getAbstract* recommends this quick read for inspiration on finding your company’s next surge in profits: earnings based on ecologically sustainable practices. As a bonus, these rules also boost your triple bottom line.

Abstract

“Rules of the Biosphere”

Companies can incrementally adopt five “biosphere rules” to imbed environmentalism in their corporate culture. Companies that are already ecologically aware can use them to move forward. These rules can function as autonomous concepts, but each rule nourishes and buttresses the others as the major aspects of an “integrated sustainable business system.”

Rule One: “Materials Parsimony”

Be stingy with the variety of items that go into your products. Emphasize sustainable reuse. Nature uses four fundamental inputs – carbon, hydrogen, oxygen and nitrogen, which scientists refer to collectively as “CHON” – as the basis for all its products, adding additional elements to create unique qualities. Utilizing only these four materials, nature innovates constantly across an astounding range of life forms and functions.

In parallel fashion, businesses that stick to a restricted set of raw materials can “precycle” and “premeditate” to avoid waste and environmental toxicity. Sustainability requires planning, as well as understanding the cost of your materials in both financial outlay and environmental impact. Determining which of the items you use in manufacturing might be environmentally harmful is not easy, but it is crucial. In the past 30 years, the U.S. Environmental Protection Agency (EPA) has restricted the use of only 9 out of 32,559 new industrial chemicals. The result is widespread deployment of a multitude of compounds whose ultimate effects on people and the planet remain unknown and largely unpredicted.

For instance, preliminary findings that bisphenol A (BPA) may have serious, harmful bioaccumulative side effects caused Nalgene – a manufacturer whose water bottles included BPA – to remove its product from the marketplace at staggering cost. Nalgene’s managers could have waited for further results, or they could have blamed the chemical’s manufacturer for its lack of due diligence, but they knew that adverse news

“Everything we see is made of recycled stardust.”

“Nature ensures that its system of production, consumption and decomposition survives and thrives, but it is neutral about the continuation of any individual player or species.”

“The average person harbors over 140 industrial chemicals in his or her body, all of which were invented in the past 75 years.”

“Of the over 100,000 chemicals in use in Europe, only 3,000 had been tested, and of these, 800 were known to cause cancer or birth defects.”

“Energy is more a political commodity than an economic one...Nuclear and solar technologies are creations of government policy, not entrepreneurial risk taking.”

“In many cases, remanufacturing a product costs 40% to 65% less than producing it new.”

about BPA would adhere to their brand. Similarly, when 3M executives discovered that a chemical that had been ubiquitous in some of their products for the past 50 years had been found in trace amounts in humans across the world and in polar bears, they acted decisively. Though the findings did not demonstrate any adverse effects, 3M stopped making those products.

Under the United States’ “joint and several liability” laws, the government can hold companies responsible at any stage along the value chain for the clean-up required due to a toxic substance in their products. Therefore, manufacturers must consider mediation and recycling from the earliest design stages and throughout manufacture.

Companies and governments now implement “green screening” to avoid using potentially hazardous materials. This process has fomented a dramatic reduction in the number of materials once considered safe. Limiting the “materials palette” at the manufacturing stage makes dealing with product and process waste much easier. For example, the Swedish clothing manufacturer H&M compiled a green screen that lists the toxic chemicals that textile manufacturers commonly use. H&M then prohibited its suppliers from utilizing those compounds. Other companies do their own chemical testing or rely on a screening protocol developed by McDonough Braungart Design Consultants.

The European Commission established a “REACH Directive” outlining the “registration, evaluation, authorization and restriction of chemicals” used in the European Union. The directive requires manufacturers to prove that the materials in their products are safe. The European Commission estimates that Europe will save 10 times the cost of implementing these protocols in the currency of better consumer health and lower health care costs. The United Nations seeks to apply this standard worldwide. Despite the outcry of industrial trade groups, efforts are under way to adopt some of the commission’s principles in the U.S.

Understanding the nature of your company’s chemicals requires sharing information and building trust. Suppliers must understand that your goal is not to renegotiate their price-points, but to manufacture more environmentally friendly products.

Rule Two: “Power Autonomy”

Use less energy in manufacturing, create products that use less energy, and design both processes and products to run on renewable energy sources. In nature, the sun provides an initial external source for energy. Plants and animals have inherent biological processes that utilize energy in a variety of formats and store it for later use. Embedding “energy autonomy” in your manufacturing mirrors this natural process. Benefits include reducing power and compliance costs, streamlining processing, improving ecological friendliness, passing energy savings on to your customers and positioning your business to use renewable energy. This strategy provides flexibility in the increasingly volatile, increasingly regulated energy market.

Meeting the goal of power autonomy requires designing processes in advance – and along the way – to be more energy efficient. The best tactic is to “think green” during the planning process. For instance, Texas Instruments drastically reduced the costs of a new manufacturing plant by designing it for energy efficiency. The company realized sufficient savings to build the plant in Dallas rather than abroad, thus keeping jobs in the United States.

“As a company expands its product platform, it needs to manage the whole product system.”

“The added costs of vertical integration are balanced by the learning gains.”

“Designers and engineers need to stop asking, ‘What materials can I use for this product?’ and start asking, ‘How can I design this product with my existing materials palette and processing technologies?’”

“Materials account for 70% of the cost of building a product. By recovering materials and components at a fraction of the new price, shallow-loop cycling can dramatically reduce costs.”

Dow Chemical, 3M, United Parcel Service (UPS) and Xerox instituted employee-driven programs to improve their manufacturing processes, reduce waste and streamline efficiency, delivering millions in savings. Rethinking materials and procedures proves even more profitable when you reuse waste products as industrial input. To establish a pivotal metric for assessing your cost controls and ecological efficiency, learn how much energy it takes to recycle your basic materials. For example, the XO laptop produced by MIT Professor Nicholas Negroponte’s One Laptop per Child group pushes the envelope for dramatically reduced energy consumption. The laptop’s innovative screen design requires 80% less energy than most screens. Users can generate power with a hand crank, foot pedal or pull-cord. With its minimal energy requirements, the XO brings the digital revolution to countries with unreliable energy infrastructures – or none at all.

Rule Three: “Value Cycles”

When products reach the end of their useful life, recycle their materials into new products. To this end, businesses must reconceive the traditional “value chain” into a “value cycle,” and design for profitable recycling. Using recycled aluminum, steel, paper, glass and, in many cases, plastic is cheaper than buying original materials. Implementing a “parsimonious materials palette,” recovering waste materials for reuse as manufacturing supplies and streamlining energy use maximizes the value cycle at the “product level.”

Manufacturers also can institute recycling at the “components level” with “shallow-loop” recycling and at the “materials level” with “deep-loop” recycling. In shallow-loop recycling, manufacturers refurbish or reuse product parts (such as toner cartridges). In Australia, Fuji Xerox implemented a program to recover and reuse its equipment components, drastically reducing the costs of importing new parts. Fuji Xerox also designed a tracking system to monitor product wear and allow clients to make precise predictions about product life cycle. By weight, less than 0.5% of Xerox products end up in landfills.

Deep-loop recycling requires using waste materials that break down easily. Steelcase remade its Think office chair using only eight materials, all biodegradable. The 100% recyclable chair is designed to “come apart with simple hand tools.” This redesign also reduced assembly time. Prioritizing the value cycle by making these kinds of changes also helps maintain customer relationships.

Rule Four: “Sustainable Product Platforms”

Use recycled material from end-of-use products to create new goods from the same platform. Design new offerings with this process in mind. The biosphere rules, particularly materials parsimony and power autonomy, are profitable tools in rethinking every business process.

Nature combines its basic CHON elements with transitional processes fueled by the sun. Many species emerge from this basic platform. In a vast “economy of scale,” nature invests in a single species “platform” and reproduces it. In an “economy of scope,” nature adapts a basic platform to specific challenges, as noted by Charles Darwin. Nature adds to its own “economy of knowledge” through DNA encoding by gathering and disseminating information about what works and what doesn’t. Companies can profitably mimic nature. Henry Ford – a master of exploiting economies of scale – efficiently replicated a single car, the Tin Lizzie. General Motors cut Ford’s market dominance by exploiting an economy of scope. In the 1920s, GM realized that customers wanted a variety of styles and offered multiple vehicles built on a single basic platform.

“But there is a challenge in encouraging a healthy materials market: It can potentially increase competition for waste material.”

“No company or product is an island.”

“Nature is the world’s most efficient market.”

In the 1990s, carpet companies sought ways to keep their products out of landfills. Shaw Industries’ solution, EcoWorx’s 100% recyclable industrial carpet tiles, met with greater than anticipated success. The firm leveraged that success to compete in residential broadloom carpeting. Building sustainable product platforms that exploit your investment in materials and processes will enable you to develop a value cycle that redefines innovation holistically. A well-developed platform adds value to your core business as its products change over time.

Once companies understand the value of their discards, they find incentives to retain ownership of their waste materials. As manufacturers vertically integrate all the stages of a product’s life cycle, they learn more ways to decrease their assembly time and reduce the amount of material they utilize – and the amount that they throw away.

Vertical integration is not always an option. A sustainable product platform might require forming a partnership. Outdoor equipment and clothing giant Patagonia created its Capilene line by collaborating with Teijin, a Japanese clothing manufacturer. Teijin’s recycling technology required Patagonia to design within a narrow waste materials palette. Patagonia developed its Common Threads program to maximize its products’ recycling potential.

Rule Five: “Function over Form”

The functional benefit a product provides is greater than the product itself. Customer satisfaction comes first, so design products accordingly while using recyclable materials.

Nature provides various services – pollination of plants by bees, for example – that are essential to maintaining the biosphere. These services supply the world with valuable sustenance and much more, assets that would cost, conservatively, more than \$33 trillion annually to replicate, if that were even possible. Bee colony collapse, for example, costs millions in lost pollinating services.

Most businesses have customer service agreements or warranties that they could adapt to support the development of a value cycle. Lifetime warranties not only reassure customers about product quality and your company’s integrity, they also ensure product returns. Selling functional value instead of an ever-increasing volume of products requires a different way of tracking sales. This method includes following “customer lifetime value” and redefining the consumer relationship beyond “once and done” transactions. Educating customers about cost benefits compared to the true costs of ownership smoothes the transition to a more purposeful relationship.

“Creative Destruction”

Darwin’s “evolve or perish” provides a reliable guideline for applying nature’s biosphere rules to business. Nature improves the function of the biosphere through replication, individuation and evolution, according to knowledge it gathers about optimizing survival. But nature also employs creative destruction – extinction – when a particular species cannot adapt efficiently to changing environs. Similarly, businesses must be “neutral” about individual products and instead look to maintain sustainable platforms.

About the Author

Gregory Unruh heads the Lincoln Center for Ethics in Global Management and teaches Corporate Ethics at the Thunderbird School of Global Management in Arizona.