

Resilience in a Hotter World

*Extreme weather and rising demand
for resources call for a fundamentally
new strategy.*

by Andrew Winston



Andrew Winston is an environmental strategy adviser and the author of *The Big Pivot: Radically Practical Strategies for a Hotter, Scarcer, and More Open World* (Harvard Business Review Press, 2014).



Wild weather is taking a toll on people and businesses around the globe.

In late 2011 devastating floods struck Thailand, upending supply chains. With suppliers of critical auto parts knocked out, the production of Toyota, Honda, and other carmakers fell by hundreds of thousands of vehicles (and Toyota took an earnings hit of \$1.5 billion). In October 2012, when Hurricane Sandy flooded New York, a Con Edison electric substation exploded, plunging lower Manhattan into nearly four days of darkness. The record-setting 14-foot storm surge cost the utility more than \$500 million—and New York businesses a total of \$6 billion. A year later, Typhoon Haiyan, reportedly the most powerful storm to ever make landfall, ravaged the Philippines, killing more than 6,000 people and causing an estimated \$14 billion in damage.

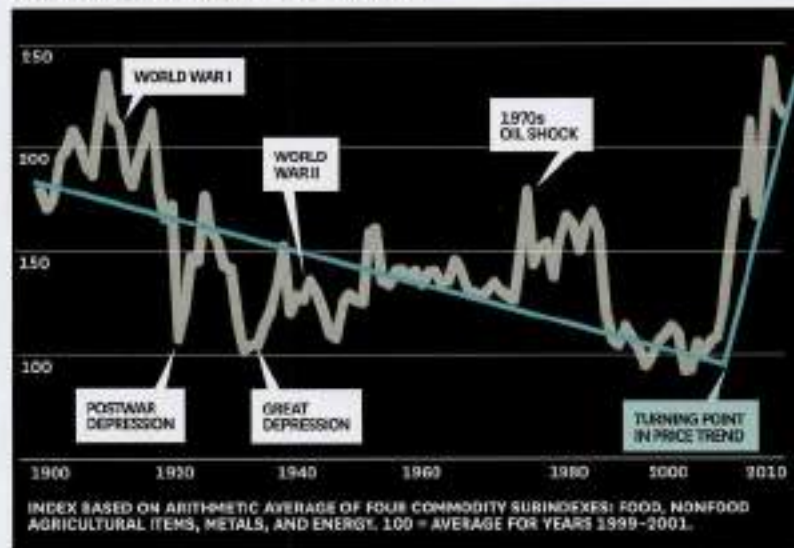
It's impossible to pin any one weather event on climate change, but the scientific consensus is that as the planet gets hotter, the frequency and severity of destructive weather will only increase. Along with—and often because of—these weather patterns, we're seeing increases in the prices of most commodities that business and society rely on. This is a sharp reversal of the trend toward lower prices that occurred during the past century. (See the exhibit "Soaring Commodity Prices.") Major storms, droughts, and floods are cutting the supply of some renewable commodities, such as crops and clean water. Nonrenewable resources, such as oil and some metals, are also becoming scarcer. The world won't run out of them immediately, but easily obtained, cheaper stores of them are dwindling. Meanwhile, growing populations and new wealth, particularly in China, are driving up demand for all commodities. This recently happened with cotton. As a consequence, prices for it rose 300% over one two-year period, forcing apparel makers and retailers to choose between passing along the costs to consumers, which would reduce sales, or keeping prices steady and taking a direct hit to margins.

Though companies today face many global-scale challenges—from destabilizing demographic shifts to the threat of financial system collapse—extreme weather caused by climate change and increasing limits on resources are both having an unprecedented impact, threatening corporate profits and global prosperity. These "megachallenges" will require companies to fundamentally rethink their strategies and tactics.

To manage them, all parts of society—government and public institutions, the private sector, and citizens—must act in concert. But business, with its financial and material resources and unique innovativeness and talent, must lead the way.

SOARING COMMODITY PRICES

A McKinsey Global Institute analysis shows that over the past decade, commodity price increases have erased a century of price declines. Resource prices will always be highly volatile, with significant short-term dips, but in the long run rising prices appear to be the new norm.



Idea in Brief

THE CHALLENGE

Global climate change and increasing constraints on resources will require companies to fundamentally rethink their strategies, operations, and business philosophy in order to create new value and thrive.

THE STRATEGY

Firms must embrace a new vision by fighting short-termism, basing goals on science, and pursuing radical innovation; they must place a value on natural capital (such as clean air and water) and redefine how they measure ROI; and they must engage in new forms of collaboration with governments, NGOs, peers and competitors, and customers.

THE RESULT

These strategies will create more resilient companies that can manage, and profit from, extreme volatility. They will also help companies address society's largest challenges and create a more prosperous world for all.

PIVOT STRATEGY

A New Framework

I've spent more than a decade studying and advising many of the world's largest companies, exploring how they deal with environmental and social pressures. So far, I've seen companies pursue mostly incremental improvements in environmental performance with easily justified projects that deliver quick paybacks, such as energy-efficiency initiatives. It's time to move beyond such table stakes, however. An extreme world calls for extreme change.

Companies in the vanguard are beginning to make what I call "the big pivot." This represents a profound change in strategy, operations, and business philosophy that will make organizations more resilient and help them create new value in a hotter, resource-scarce world. As I'll discuss in detail, pivoting requires companies to take radically different approaches to how they craft their vision, define value, and form partnerships. (See the chart "The Big Pivot Strategies.")

Companies that embrace pivot strategies will be better able to thrive in the face of extreme, unpredictable "black swan" events, such as rapid shifts in input availability or record storms like Hurricane Sandy and Typhoon Haiyan. The one thing we know for sure is that such events will happen. And as the uncertainty expert Nassim Taleb argues in his book *Antifragile*, the best systems help organizations not only survive the unpredictable but get stronger.

By making dramatic improvements in operational efficiency and cuts in material and energy use, waste, and carbon emissions, companies become much more flexible and, possibly, antifragile. This discipline increases a firm's *cost and risk resilience*: Companies that rely on fewer resources will be more competitive in a world of declining availability and higher prices. Organizations that minimize energy use and generate their own power from renewable

sources can operate more reliably if the electrical grid falters. An executive at Walmart, for instance, has pointed out that the retailer's commitment to increase its already sizable use of onsite renewable energy 600% by 2020 will help keep its "stores up and running no matter how bad the weather is or who else might be shut down."

Pivoting also increases what I call *revenue resilience*, providing protection against volatility in demand. As all customers begin to deal with climate change and resource scarcity, their expectations will change. By adapting and innovating to fulfill customers' new needs, companies can ensure that sales remain steady or increase. Businesses that create products and services for a cleaner, more "circular" economy—one that virtually eliminates waste and keeps precious resources in productive use indefinitely—will tap into a massive, growing market. As customers strengthen their own resilience by lowering their costs, risks, and resource dependency, multi-trillion-dollar markets in construction, energy, consumer products, transportation, and other sectors will all be in play.

Companies that understand how climate change and resource scarcity affect their full value chain—from raw materials to product recycling—will be better positioned to maintain or grow market share. They also will be able to address society's largest challenges and build a more prosperous world for all.

That said, the big pivot is not about philanthropy or citizenship. There's deep self-interest in recognizing that, as many have said, business cannot succeed on a planet that fails. And it's simply good business to fill market needs by addressing the risks humanity faces.

The following framework can help companies improve performance, increase resilience, and advance the common good—which they benefit from as well. In total, these strategies help companies



About the Spotlight Artist

Each month we illustrate our Spotlight package with a series of works from an accomplished artist. The lively and cerebral creations of these photographers, painters, and installation artists are meant to infuse our pages with additional energy and intelligence to amplify what are often complex and abstract concepts.

This month we feature the work of Julie Dodd, a British sculptor and installation artist. She says she uses her work "as a platform to reflect my concerns of our consumption and environmental responsibility." Dodd, who works primarily with paper, much of it recycled, also says her pieces are "inspired by the patterns and shapes found in nature." More of her work can be seen at juliedoddmoonfruit.com.

pivot from maximizing short-term earnings first (while treating environmental and social challenges as niche issues), to operating in a way that makes tackling the world's biggest problems the first priority and then leverages the tools of capitalism—like markets and competition—to do so profitably.

Most of these approaches aren't easy, but they also aren't impossible or naive. Many companies are undertaking them today.

VISION

Asking Heretical Questions

Companies need to have a clear vision of how climate change and resource scarcity will affect their prospects and their ability to reach long-term goals. This vision should take into account the best environmental data available. (See the sidebar "Use Science to Set Aggressive Goals.") Pegging goals to hard science will force companies to take a longer view.

Climate change and resource constraints do affect companies in the short term, of course, but proactively tackling them in earnest (rather than just responding to their impact) is not a quarterly exercise. Innovation and adaptation are long-term activities, and maintaining a three-month horizon inhibits the creativity and investment needed to build resilience. Company leaders need to challenge Wall Street orthodoxy, as Unilever CEO Paul Polman has, resisting pressure to provide quarterly guidance, so they can focus on building real value over years, not months.

To confront short-termism—or develop any sound long-term strategy, for that matter—you must ask what I call "heretical questions." These challenge the way things are normally done within any function and at any scale, from the firm's business model down to specific operations. Consider a now famous example involving logistics. Some years ago at delivery giant UPS, a manager asked an unorthodox question: "Can we cut fuel costs by avoiding left turns?" Today, like many of its peers with large fleets, UPS uses routing technologies and strategies, including skipping those left turns, to reduce miles driven and wasteful idling, saving 8.4 million gallons of fuel a year.

Heretical questions have also helped companies reimagine how they make products to reduce reliance

on key resources. At Adidas and Nike, innovators asked whether it would be possible to dye clothes—a very water-intensive process—without using any water. Both companies have identified technologies that accomplish that goal. At Kimberly-Clark, the heretical question was "Do paper towel and toilet paper rolls really need cardboard tubes?" As part of its \$100 million Scott Naturals brand, the company has since developed tubeless rolls.

Larger heresies can create greater value. Some companies, for example, are pursuing "reverse innovation," which turns conventional product development on its head. To meet the needs of emerging markets, these firms create low-cost products that require less material or use less energy than Western-economy versions do—and then introduce them to developed markets. GE came out with one such innovation, a portable electrocardiograph for the Indian and Chinese markets, and then sold it in the United States for 80% less than similar products.

Organizations need to encourage heretical questions at operational and product levels and beyond, going so far as to challenge business models and basic assumptions about economic growth. Patagonia, for example, has famously asked, "Can we help our customers learn to buy only what they really need?" (See the sidebar "Growth in a World of Scarcity.")

The innovation that results from heretical questions builds more-resilient companies. If water becomes scarce, Adidas and Nike factories using waterless technologies can still operate.

Higher pulp prices will not affect the cost structure of Kimberly-Clark's tubeless products as much as rival offerings'. Companies that reverse-innovate more-affordable products that consume fewer resources can compete more effectively in all global markets.

It's easy to say, "Be heretical," but the kind of innovation that tackles megachallenges doesn't follow from asking any question that pushes the envelope. The right questions will underscore the unique pressures of a hotter, resource-scarce world and address processes, strategies, or business models. Could we operate without using water or emitting carbon, or help our customers do the same? How can we turn our product into a service

THE BIG PIVOT STRATEGIES

To be resilient, companies must transform their strategies in three ways: They must rethink their vision, embracing radical innovation and a long-term mind-set; redefine their valuation methods to account for unpriced costs and benefits; and pursue new kinds of partnerships to achieve goals beyond the reach of individual firms.



Use Science to Set Aggressive Goals

Scientists have solid estimates of how much planet-warming carbon humans can emit into the atmosphere before the average global temperature increase hits a critical threshold of two degrees Celsius, beyond which the repercussions from climate change may be devastating to the economy and humanity.

Using those numbers, accounting giant PwC has calculated that the world must reduce total carbon intensity—the carbon emitted per dollar of GDP—by 6% a year until 2100. At that rate, intensity reductions will outpace growth in energy demand enough to lower total absolute carbon emissions. In a similar study (which was based on work from McKinsey) WWF, the international NGO, recommended a 3% annual reduction in absolute total emissions. Investing in energy efficiency and rooftop solar to meet that goal would produce a net present value of up to \$780 billion in the United States alone, the study said.

Some companies have set goals explicitly based on these science-based calculations. In the mid-2000s, Ford Motor

established targets for its product development portfolio—involving a mix of engine-efficiency improvements, new fuels, and hybrid and electric vehicles—to ensure that the company's vehicles would help prevent the world from going over the global-warming threshold. Toshiba has set goals to improve product energy and material efficiency 10-fold by 2050, a target in line with the most important climate recommendation from the scientific community—cutting global carbon emissions 80% to 90% by midcentury.

These companies have been the most explicit about connecting goals to science, but many others have set aggressive targets, too. My research team has collected the environmental and social goals of the world's largest companies

(and has made them available at www.pivotgoals.com). More than a quarter of the Fortune Global 200 companies have carbon emission or energy reduction targets that would meet the recommended pace of change in intensity (PwC's numbers) or absolute emissions (WWF's).

One group of companies—including Apple, BMW, Deutsche Bahn, Honda, Nestlé, P&G, Unilever, and Walmart—ultimately aim to be powered entirely by renewable energy. Two more have set specific target dates: IKEA (2020) and Lego (2018). A second group, including AT&T, GE, Lloyds Bank, Saint-Gobain, and Volkswagen, plan to reduce energy intensity in operations by 25% to 75%, depending on the target year. Diageo North America has already beaten its

target and slashed its operational emissions by 75%. Such efforts help increase companies' resilience to energy and carbon costs.

A third group of companies, mostly in tech, are building revenue resilience by shrinking the energy footprint of their products, which satisfies customers seeking to reduce their own energy use, carbon impact, and costs. Sony plans to cut per-product energy consumption by 30% from 2008 to 2015, and by 2020 Intel plans to make its computer and data center products 25 times more efficient than they were in 2010.

Though these goals are just for carbon and energy, other kinds of environmental metrics and goals matter as well. If you have water-dependent operations in a dry region, for example, the size of the local watershed determines your ability to stay up and running. Water goals for you, your peers, the community, and the region all need to be based on that reality.

and drastically cut its physical footprint? Can we recycle or recapture 100% of our products after their use? Could our business have an entirely positive impact and be regenerative?

VALUATION

Making Better Investment Decisions

Businesses are efficient at allocating resources. Managers regularly decide where to invest human, financial, and capital assets to reap the highest returns, using well-known tools, such as measures of return on investment. Those tools help organizations maximize whatever they value most—usually earnings.

But the tools are only as good as the information that goes into them. The calculations require estimating both inputs and outputs. Many things that can create (or destroy) value either don't have

a price or are not included in the calculations. These items fall into two buckets: (1) what economists call externalities, or benefits or costs incurred outside the company, and (2) everything else that indirectly drives profits and value within the company but cannot be measured easily.

Externalities include pollution and damage to natural resources on the negative side of the ledger, and everything a company does for society but doesn't get paid for, like job and wealth creation, on the positive side. At the same time, nature provides society and business many services that go unpriced in the marketplace, including clean air and water, a relatively stable climate, plants and animals to use for food and medicine, and much more. These assets are called natural capital, and businesses mostly ignore their value.

Growth in a World of Scarcity

When resources are finite, never-ending growth is impossible. So how can companies pursue growth while acknowledging the need for a reduced footprint overall? Five innovation approaches offer guidance:

Make your current products the lowest-impact options in the market and steal share aggressively from competitors.

Develop more sustainable products or services that reduce customers' footprints in categories you're currently not playing in.

Develop services that replace products or greatly reduce their material impact. For automakers, investing in the car-sharing business is a disrupt-before-being-disrupted strategy, which is why Ford, GM, and others have done it.

"Decouple" the growth of the business from its use of resources and its emissions. Though Nestlé has expanded its production volume by over 50% since 2000, most of its environmental impacts, from water use to greenhouse gas emissions, are down in absolute terms.

Create "regenerative" offerings that improve the health of customers and the planet. Aicoa, for example, makes building panels that clean smog, while Europe's largest home improvement retailer, Kingfisher, has a mission of becoming "net positive" and helping customers build homes that generate more energy than they use.

Basic economics predicts that when the value of a resource is unmeasured, businesses will systematically underinvest in protecting it. Or worse, when a valuable resource costs nothing, it will be consumed aggressively and can abruptly become scarce. Consider the way the global economy is using the atmosphere as a free carbon dump. It's promising, however, that companies like Dow Chemical and Puma are now attempting, along with partners such as the Nature Conservancy, Trucost, and PwC, to assess how natural systems create value for their businesses. Those efforts will help the companies prepare for (or avoid) the day when natural inputs become scarce or are priced in the market, most likely by governments.

But for now it's hard for most firms to justify spending time and money managing externalities. More pertinent to day-to-day operations are the indirect and unpriced value creators (or destroyers), often given the shorthand "intangibles." Woefully underappreciated, these include the ability to attract and retain talent; support from the community and the license to operate from society; reduced risk and enhanced resilience; customer loyalty; and all brand equity. A firm's environmental and social performance can enhance or diminish all these assets. And while they're mainly off the books, they now account for the majority of corporate market capitalizations.

Because ROI tools calculate only the returns that companies can easily put a number on (typically, cash payoffs), they discourage investments in things that create harder-to-measure, indirect benefits. Take capital outlays for onsite renewable energy projects that may not deliver a payback fast enough to meet internal hurdle rates. These initiatives won't get funded, and companies will forfeit all the cost-resiliency benefits of reducing dependence on expensive fuels or on the grid. Traditional

tools also overlook indirect costs. Consider a natural capital example: Dredging and developing coastal wetlands makes sense as a real estate investment, but only because the flood protection that the lands provide is priced at zero. Their loss undermines resiliency by making all coastal assets, from refineries to homes, more vulnerable to extreme weather. If that cost were valued, it would greatly reduce the ROI of developing the land.

Companies need methods to gauge the value of the longer-term and indirect benefits of investment decisions. Such tools are now being adapted from industries that place bets further out, like pharmaceuticals and utilities, and applied to environmental and social initiatives. While these methods are evolving, managers can still modify how ROI is currently calculated to better reflect value that is unmeasured but that they know is not zero.

Some companies, such as 3M, IKEA, and Intel, simply lower the hurdle rate for investments in areas like pollution prevention, renewable energy, and green buildings. Others dedicate a portion of the capital expense budget to green investments: Johnson & Johnson allocates \$40 million annually solely to energy and greenhouse-gas-reduction projects.

Another method, which GE and Diversey (the cleaning products division of Sealed Air) have used, is to create a portfolio of efficiency projects. Some initiatives, such as energy-related projects, are quick wins and easily meet the internal hurdle rate, while others take longer to pay off. But in aggregate, the projects meet the hurdle rate. It's similar to a basket of equities in your 401(k)—your account may beat the market, but not every stock you own will.

Finally, some companies are getting ahead of the regulators and putting prices on the unvalued themselves. According to the *New York Times*, the Carbon

Disclosure Project recently reported that 29 of the world's biggest companies are incorporating prices on carbon emissions into their long-term financial plans. Most use so-called "shadow prices," which exist only in spreadsheets, to estimate investment returns over time in a world where carbon will cost real money. Anticipating that carbon will be priced at some point, these companies are helping managers see the risks inherent in long-term investments—like coal plants—that may suddenly become much less valuable or turn into liabilities. A small subset of the 29 companies, including Microsoft and Disney, even charge their divisions real fees for every ton of carbon emitted by their operations. They then invest the collected funds in energy-efficiency or carefully selected carbon offset projects, like reforestation.

None of these methods for valuing hard-to-measure benefits is surprising. Companies have long made significant investments without an exact ROI calculation in areas such as R&D and marketing and when entering new regions. What's new is that this mind-set is being applied to initiatives that address environmental and social challenges—projects that have always faced harsh internal scrutiny.

PARTNERS

Collaborating in Radical New Ways

Vast problems that reside firmly in the commons—such as global climate change and regional water shortages—demand large-scale solutions beyond the capabilities of any single company. They call for partnerships among three major kinds of stakeholders: governments, peers and competitors, and customers.

To spur governments into action, companies need to get off the sidelines (or even the opposing team) and lobby for policies like carbon pricing, higher energy-efficiency standards, and massive public-private investments in green infrastructure. Such lobbying is about both the common good and competitive advantage—if you make the most-efficient products and services, for example, higher standards or a price on carbon can be good for you. And promoting clean-economy investment helps the many sectors that build and finance energy, transportation, water, and other types of infrastructure.

Because governments are often frozen, companies must lead the change. One relatively new approach is to create standards for suppliers that go beyond government requirements, a kind of "de facto" regulation. Walmart, for example, will require suppliers to report publicly on the use of 10 toxic

chemicals in their products in 2015 and phase them out soon after. HP recently challenged its suppliers to reduce their manufacturing and transportation-related carbon emissions by 20%.

Companies must tackle problems together—and even work with their fiercest competitors. Take the companies collaborating to change how food and beverages are kept cold. Current refrigerants are mainly chemicals in the hydrofluorocarbon family—which happen to be dangerous greenhouse gases, thousands of times more potent than carbon dioxide. Coca-Cola has teamed up with its suppliers

At Adidas and Nike, innovators asked whether it would be possible to dye clothes without using water.

to find substitutes, is investing in new technologies, and has helped lead a coalition including the Consumer Goods Forum, Greenpeace, Unilever, and even archrival PepsiCo.

The powerful idea taking hold here is "precompetitive" cooperation—that is, working together on issues of common concern while competing elsewhere. To succeed at this, companies must ask, "What are we really competing on? What truly differentiates our product from competitors?" Coke and Pepsi battle over taste, distribution networks, and marketing; no customer picks one over the other on the basis of how the vending machines work.

Because a new technology can be expensive until it gets up to scale, companies often mutually benefit from building the market together. Some large retailers, for example, share methods for reducing store energy use, in part to help drive demand for—and lower the costs of—new offerings like efficient lighting and building management systems. This same logic could apply to other environmental quests. I'm currently in the early stages of building an alliance of big energy buyers—what I call the Energy Pivot Coalition—that will purchase sizable quantities of renewable energy and clean technologies for their operations, including onsite solar power, localized "microgrids," and energy storage.

By committing to build the market for these technologies and take on some investments with longer payback periods, the members of the coalition could reap all the hard-to-measure benefits of a public, well-marketed move to renewables: very low and predictable variable energy costs, resilience to weather and grid outages, employee engagement

Experimentation lets the business harvest big upside gains from heretical innovations that disrupt markets, while risk avoidance keeps most of the business stable. In *Antifragile*, Taleb suggests putting 90% of an investment portfolio in low-risk cash and 10% in extremely risky bets that can pay off 10-fold or much more in volatile circumstances. Companies can do

An energy firm could protect itself against a rapid drop in demand by building capabilities for energy-efficiency services.

and inspiration, and customer loyalty and increased sales, among others. The coalition may also help utility partners make the biggest pivot of all—away from fossil fuels—by replacing lost revenue and profits from older, declining technologies.

Companies need to work with partners up and down their value chains, from suppliers to customers, to solve systemic problems. For most firms, the majority of their environmental footprint and social impact is not within their direct control but lies upstream with suppliers or downstream with customers using the product, as it does with cars burning fuel or with detergent (most of the life-cycle energy is used heating water to wash clothes). Some leading companies are starting to have tough conversations—directly in the B2B world or through marketing campaigns to inspire behavioral change among consumers—about how to work together to reduce consumption and lessen environmental impact.

Resilience, Trust, and Prosperity

In a volatile world, developing real resiliency—an ability not just to recover from hits but to avoid problems altogether—requires a concerted, focused effort. Companies that embrace building longer-lasting, more-sustainable enterprises will find themselves in some unusual, seemingly paradoxical, territory. The principles of resilient systems include diversity and redundancy (which go against lean, cost-cutting philosophies); speed and fast failure with careful calculation; and a near-religious avoidance of risk for the vast majority of the business, coupled with extreme risk taking with pilot programs or small parts of the enterprise. This last aspect is challenging but logical.

The same with product lines and businesses, launching new services that compete with the core product but profit them mightily if customer needs shift dramatically. An energy company, for example, could protect itself against rapid reductions in demand by building the capabilities to offer energy-efficiency services. That's antifragility.

The vision, valuation, and partner strategies I've described invoke many of these principles. In addition to cost and revenue resiliency, they will lead to what I call *brand resiliency*—deepening customer loyalty, improving your organization's position in the talent market, and engendering a greater trust among consumers, partners, and governments.

Such trust increases when you open up and demonstrate commitment and show how your organization walks the talk. But openness is no longer optional. New technologies and connectedness now put all of a company's activities under a magnifying glass. Customers increasingly expect ready access to information about the things they buy: How, where, and by whom are your products made? What's in them? What is their environmental and social impact? How the parts of your value chain operate—either with disregard for sustainability issues or with best practice leadership—is now linked tightly to your brand and business prospects.

Pivot strategies are not just a sound defense but a smart offense as well. And beyond the business advantages they enable, they're critical to our collective well-being. In a world with tighter resources and a volatile climate, a big pivot is an essential investment in the future of your company and the global commons. ☐

HBR Reprint R1404C

Copyright 2014 Harvard Business Publishing. All Rights Reserved. Additional restrictions may apply including the use of this content as assigned course material. Please consult your institution's librarian about any restrictions that might apply under the license with your institution. For more information and teaching resources from Harvard Business Publishing including Harvard Business School Cases, eLearning products, and business simulations please visit hbsp.harvard.edu.