

SUSTAINABILITY

New Perspectives and Opportunities



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Management & International Studies

Globalization TrendLab 2012

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Based on a conference organized by the Joseph H. Lauder Institute of Management & International Studies and the Penn Lauder Center for International Business Education and Research at the University of Pennsylvania, sponsored by Santander Universities, and distributed worldwide through the Knowledge@Wharton network.

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Executive Summary

While there is considerable debate as to the kinds of changes required to achieve it, the idea of sustainability has taken hold. Governments, companies, nonprofit organizations, grassroots groups, and the general public are immersed in wide-ranging discussions and activities to improve the use of the planet's resources so that future generations can enjoy them. Progress, however, has been limited, episodic, and incremental, at best. Ecological catastrophes continue to occur, and population and economic pressures pose formidable challenges.

This white paper pulls together the definitions of sustainability and the solutions proposed by a group of experts drawn from academia, business, government, think tanks, and nonprofit organizations. The focus is on framing the complex issues involved in sustainability in ways that are actionable and that address not just the non-sustainable aspects of human societies, but also contribute to creating a truly sustainable future. The specific areas of analysis include population dynamics, sustenance, energy, and pollution. The perspectives and roles of the government, academia, business, and nonprofit organizations are defined and compared.

The most important conclusions have to do with the need for a fundamental rethinking of our values, priorities, and norms of behavior. Policymaking must recognize that sustainability involves complex issues of distributive justice across population strata, generations, and geographies, and that it may require a fundamental reorientation of the role and structure of property rights. The tradeoffs between short-run economic growth and long-term sustainability need to be reconciled through market and regulatory mechanisms that reduce negative externalities without creating perverse effects. Sustainability policies should encourage investments in innovation rather than in production so that we fully take advantage of the opportunities offered by new technologies. Sustainability efforts must be based on sound and appropriate metrics, though without discouraging companies from factoring sustainability into their financial calculations. Corporations, nonprofits, and academics must inform, educate, and engage politicians and policymakers.

After five decades of sustainability debates and policymaking, the world is still lacking a comprehensive strategy that recognizes the complexity of the issues and tradeoffs involved. While setting ambitious goals to effect quantum change is desirable, policymaking needs to recognize that it is impossible to determine with precision all of the actions required to ensure sustainability. Thus, a self-adaptive approach based on trial-and-error and experimentation must be adopted.

Introduction

It is remarkably difficult to define sustainability in a way that is actionable. It is an expansive topic, given that one can apply the basic principle of sustainability to all areas of human activity, from energy to all manner of consumer products, and from agriculture to housing and urban planning. The stakes can be very high, especially concerning the issues of sustenance and global climate change. Uncertainty is an unavoidable feature of models assessing sustainable practices and policies because it is often hard to gauge their impact on such a complex and adaptive system as the intersection of the human and physical environment. Cultural values and norms are important because they affect people's preferences, relationships, and behavior toward the environment. Technology is critical because the only certainty is that we don't fully appreciate the complex impact of technologies in place today on the physical environment. Innovation of various kinds will radically alter the costs and benefits of various policy responses to environmental externalities. Action-oriented progress toward sustainability typically involves multiple actors with often incompatible assumptions about causal mechanisms as well as preferences as to goals and means. There are many economic, political, and ethical issues related to sustainability, especially given that the impact of our present business and other social practices extends deep into the future and affects generations of people who have not yet been born.

The growth in human population and in economic production and consumption since the dawn of industrialization has placed enormous pressure on Earth's resources. Over the last three decades, finding a balance between the sustainable development of human societies and the fragile ecosystem in which it unfolds has become one of the most important items on the global agenda. High energy prices, air and water pollution, and the specter of global climate change have attracted considerable attention from policymakers, business leaders, academics, grassroots activists, and the general public. Rapid economic growth and the rise of a new middle class of hundreds of millions of consumers in emerging economies has greatly augmented the urgency of tackling the issue of sustainability in all of its different manifestations so that improvements in standards of living are not threatened by growing environmental problems.

Broadly speaking, sustainability refers to making decisions and adopting courses of action about the use of natural resources that support life on the planet at the present time without placing onerous limitations on the availability of those resources in the future. Thomas Jefferson put it well in 1789: "Then I say the Earth belongs to each generation during its course, fully and in its right no generation can contract debts greater than may be paid during the course of its existence." The key idea, as the United Nations' Brundtland Commission on Environment and Development put it in 1987, is to "meet the current needs without destroying the ability of future generations to meet theirs."

The Club of Rome's *The Limits to Growth*, published in 1972, marks the beginning of the contemporary global debate about sustainability, a report assailed both from the right for its defeatism, and from the left for its elitism. A few months later, the oil embargo and price hike powerfully signaled the end of the era of cheap natural resources, and in 1979 the U.S. National Academy of Sciences linked greenhouse gases to global climate change. Starting in the 1970s, governments set up agencies to monitor and regulate environmental protection. The stage for the contemporary debate over sustainability had been set. "Sustainable activities have many definitions," notes Noam Lior, Professor of Engineering at the University of Pennsylvania. "But simply, they describe a logical process that takes carefully into account all relevant consequences within time

and space boundaries that are large enough to ensure satisfactory existence for us and other humans, and of our and their descendants.”

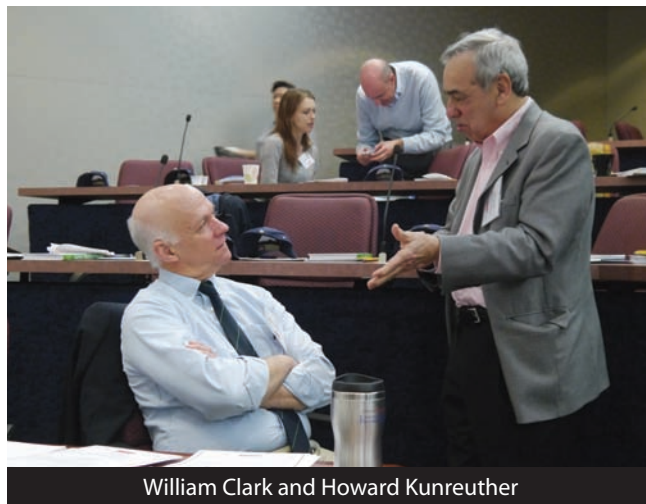
Disasters have also shaped debates about sustainability: the Santa Barbara oil spill of 1969, the Bhopal gas leak of 1984, the Exxon Valdez oil spill of 1989, and the nuclear accidents at Three Mile Island in 1979, Chernobyl in 1986, and Fukushima in 2011. Disasters are focusing events. “They have triggered a vast array of government and corporate responses,” notes Andrew Hoffman, a professor at the University of Michigan.

“Disasters are tragedies, but they help us wake up,” notes John Elkington, who contributed to the

debate over sustainability the concept of the “triple bottom line.” Hoffman argues that we should think about “sustainability as part of a progression of social and cultural change that has gone through a process of punctuated equilibrium, with disruptive disasters triggering new waves of sustainability thought and practice. In the 1960s, a series of environmental disasters led to the first debates about sustainability, then focused strictly on environmental issues,” says Hoffman. “Then regulators stepped in and that put the issue on the radar screen of companies. Things quieted down until Chernobyl and Exxon Valdez. This opened up a second phase during which corporations realized that they could strategize, they could redesign products and processes to cope with the challenges of sustainability.” In the meantime, the world also successfully dealt with global threats such as the depletion of the ozone layer, but new challenges emerged related to climate change, water scarcity, and biodiversity, a third phase that takes us right to the present time.

The field of sustainability has become over the years more complex, “with more actors, more countries, and more ideologies involved,” notes William Clark, a professor at Harvard’s Kennedy School of Government. It has become a fluid system without stable structures or alliances among actors and interest groups. Different ideologies color the debates and the proposals for action. Competition among different strands of liberal-democratic ideology, state capitalism, Third-World alternative views, and moderate versus radical environmentalism, to name but a few, makes debate and, especially, consensus-building quite difficult.

While we can define and measure the use of natural resources, energy requirements and biodiversity, sustainability is much more than just that. “Sustainability represents a challenge to our culture and our institutions,” says Hoffman. “First, a challenge to our values: How are we going to live our lives? Re-defining this is not easy and will create a value clash. Second, sustainability involves a redefinition of the role of the corporation in society, the role of government, the role of grassroots movements, and the role of consumers.” Adam Werbach, responsible for sustainability initiatives at Saatchi & Saatchi, a global advertising firm, sums it up by saying that “there are four dimensions to sustainability, namely, social, economic, environmental, and cultural.” These dimensions are necessarily interconnected, but frequently the debate is focused on one, or at most two of these different aspects.



William Clark and Howard Kunreuther

The social dimension to sustainability is especially important. “Sustainability is about legitimacy of the sociopolitical system,” argues Jack Goldstone, a professor at the School of Public Policy at George Mason University. Thus, issues of distributive justice within and across generations are of paramount importance. The consumption of natural resources and the impact of pollution, for instance, raise issues of fairness, given that in contemporary societies there are considerable inequalities in terms of the availability of energy and natural resources like clean water to different strata of the population and to people in different countries.

Social and economic disparities across countries make the international dimension to sustainability as important as the global one. We all agree that many environmental challenges are global in nature, and they require global action. But the international aspect is also important, especially when it comes to defining what sustainability is. “We need to see and understand sustainability from the point of view of developing countries,” says Katherine Sierra, a senior fellow at the Brookings Institution and a former senior executive at the World Bank. “Policymakers there think their first obligation is to generate growth so as to improve standards of living.” Emerging and developing economies account for 85 percent of the world’s population, and more than half of the total consumption of steel, copper, oil, and retail sales. “The rise of the middle class in the Chinas and the Brazils of the world creates new expectations and aspirations, with implications for sustainability,” notes Sierra. Thus, “sustainable growth is the key concept to keep in mind.” Goldstone agrees. “Who is going to create the incentives for developing countries to grow in a sustainable way? Is it developed governments, multinational corporations?”

“Sustainability has become very popular, but that does not guarantee success or making the right choices.” Moreover, Hoffman explains, “there’s also fatigue. People get tired of hearing about sustainability.” Interest in sustainability ebbs and flows, losing momentum during times of economic malaise and becoming more salient in the wake of an environmental disaster. “The debate over climate change, for instance, has become a big cultural process, almost like the Renaissance, the Reformation or similar world-historical events.” Major legislative changes often follow major disasters, although the problem of climate change may provide a dangerous potential exception in which disasters will begin to occur only once it is too late to mitigate them. Then a lock-in effect seems to entrench out-of-date or highly inefficient regulations that become politically impervious to learning and incremental recommendations for reform.

The aspirational characteristic of sustainability, in both developed and developing countries, should invite us to reflect on definitions of sustainability that are incomplete or less comprehensive than what’s needed to truly address the challenges facing human societies. “Promoting sustainability is not the same as reducing non-sustainability,” observes Hoffman, quoting John Ehrenfeld. And it is true that most of the policies and big initiatives implemented over the last two decades are about the latter, not the former. The key engine driving efforts at the reduction of non-sustainability is the marketplace. Companies redesign products and services in response to market signals and political pressures, notes Hoffman. Sustainability has indeed become a competitive field in which companies, consumers, governments, and grassroots groups compete for defining what sustainability is, and what actions need to be undertaken. Many people ask themselves whether they want large companies like Walmart to define what constitutes a sustainable company or product in the absence of a clear consensus of what exactly sustainability means. ■

Population

The most fundamental challenge for sustainability is the number of people on the planet. We all need water, food, and energy,” observes Hania Zlotnik, former director of the United Nations Population Division. “The projections are not encouraging. By 2050, there may be just over 9 billion human beings living on Earth, but keeping population growth to that level requires substantial reductions of fertility in low-income countries. If those reductions are slower than projected or fail to materialize another billion or two might be added to the 9.3 billion projected for mid-century. In recent time, the population has been adding billions at ever shorter intervals. The world population reached 3 billion in 1960, 4 billion in 1974, and 5 billion in 1987. The sixth billion was reached late in 1998 and just 13 years later, late in 2011, the population attained 7 billion. Continuing to add billions at such short intervals would severely challenge any efforts made to attain sustainability. “Yet many governments of countries where the population is still growing fast don’t think they have a population problem. They think they have other more pressing problems to worry about and have failed to invest enough in expanding access to family planning so that all people have the means to have no more than the children they want,” Zlotnik notes.

Goldstone calls attention to the projected spatial redistribution of the population. According to United Nations projections, by the end of the twenty-first century Africa could account for 35 percent of the world’s population, up from 15 percent today, while Europe’s share could decline from 11 percent currently to 7 percent. Asia will continue to be the most populous continent. Even with the declines of fertility projected under the medium projection variant produced by the United Nations, by 2100 Nigeria could be home to 750 million people, Tanzania to 325 million, and the Democratic Republic of Congo to 220 million, meaning that their populations could increase by

factors of 5, 4 and 7, respectively. Meanwhile, India’s population could reach 1.6 billion, while China’s is projected to peak at about 1.4 billion and then decline to less than a billion by the end of the century. These few examples indicate that population growth remains a challenge for a significant number of countries, many of which have low incomes and high levels of poverty. Even attaining the reductions of population growth projected by the United Nations demands considerable investment in health, education and improvements in the status of women.

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Furthermore, “urbanization is occurring at the same time at an even higher pace,” says Goldstone. Sometime between 2005 and 2010 the world had for the first time in history more people living in cities than in the countryside. By 2050, the United Nations projects that more than two-thirds will. By 2025 the projections show that there could be 9 cities with more than 20 million inhabitants each, up from just one (Tokyo) in 2000, and additional 18 cities with more than 10 million inhabitants each. “When people move to cities, they consume more food, more energy, more of everything,” says Mauro Guillén, Director of the Lauder Institute and a professor at the Wharton School. “They also change their lifestyle and their diet, they become sedentary, they become overweight and even



Mauro Guillén

development assistance will not be enough, especially given current budgetary pressures in Europe and the United States. Private equity won't be enough either," she says. "Portfolio investment is volatile, and won't be sufficient. Institutional investor pools need large projects, and most project finance in developing countries is small. One solution is funds of funds. We need to be innovative, to come up with new financial instruments."

There is broad agreement among experts that achieving sustainability in contemporary society requires a reduction of fertility, that is, of the average number of children women have. For population numbers to stabilize eventually, each woman has to have, on average, a daughter who survives to the age of reproduction. To achieve that in low-mortality populations, an average fertility of about 2.1 children per woman suffices. Today, 42 percent of the world population live in countries where fertility is below that level so that their populations are expected to decline slowly in the future. Another 40 percent live in countries where fertility is still at or above one daughter per woman but where fertility has been declining and is already moderate. Further reductions of fertility in those countries are likely. Greater uncertainty surrounds future fertility trends among the 18 percent of the population who lives in countries that still maintain high fertility, which are generally also low-income countries and many of which have experienced long periods of instability. Reducing fertility in those settings is a challenge. However, we know that about a quarter of all married women in those countries would want to delay their next pregnancy or stop having children altogether but are not using contraception. Providing the services they need to adopt contraception would go a long way in improving their lives and ensuring that fertility reductions ensue. "People don't have fewer children out of concerns for sustainability," says

obese." We are only beginning to grasp the implications of these changes. "For the first time in human history," he continues, "we now have more people suffering from obesity, about one billion, than from hunger."

The growth in the number of cities and the expansion of existing cities require huge investments in infrastructure. Each week 1.3 million people move to a city. New transportation, water, sewage, food delivery, and educational systems need to be built. The challenges associated with urban growth are phenomenal, but so are the opportunities. Investments in mass transit and efficient housing can make a difference. The challenges will be, according to Michele de Nevers of the Center for Global Development, much greater in existing cities with high growth rates than in newly planned urban centers.

The fact that the global geography of demographic and economic growth is shifting rapidly presents a window into effective policy action. "There's an opportunity to build the new infrastructure in a sustainable way, avoiding the mistakes of the past," says de Nevers, who worked at the World Bank for nearly thirty years, "but doing so will cost more." Making emerging and developing economies climate-friendly will cost hundreds of billions of dollars. "Local resources are limited, and official

Zlotnik. “They are motivated by other considerations, such as their well-being and that of their families. Women don’t want to have a baby every year or two. They have a right to have the means to choose their desired number of children and realize those desires. Empowering women is key, especially by ensuring that they have access to effective family planning methods.” The good news is that financing the family planning services needed to reach the women who want contraception but are still not using it may require just 7 billion additional dollars devoted annually to family planning (in 2008 US dollars), a tiny sum compared to the trillions that need to be spent building new infrastructure in the developing world over the next two or three decades. “It’s important to empower women in tribal and patriarchal societies,” says Goldstone. We can make much progress in that direction.

A key debate concerning family planning relates to what is most effective, namely to wait for socioeconomic development to reduce fertility or to develop the right services in order to expand access to modern contraceptive methods. “It’s not true that family-planning programs don’t work without development,” argues Zlotnik. “Bangladesh is a case in point: a country that, despite its low-income status, has managed to reduce fertility substantially by adopting a proactive outreach program to bring services to women in their homes and communities. Such outreach is essential. It is not sufficient to make

contraceptive supplies available only through distant health centers.” In most African, Middle-Eastern and South Asian countries where fertility remains high, waiting for economic growth and the expansion of educational opportunities to provide incentives for women and men to change their reproductive preferences will likely delay the transition to lower fertility and reduce the options to pursue sustainable development. Given the added benefits that the practice of family planning brings in terms of improving the health of mothers and children, it is cost-effective to invest in suitable services while wider development objectives are pursued.

As important as they might be, the growth and spatial distribution of the population does not fully account for the sustainability pressures expected in the future. “I’m not concerned about the number of people per se. Let’s hope fertility comes down as incomes and women’s education rise,” says Goldstone. “My primary concern is that today we have 1.5 billion middle-class consumers, of which 1 billion live in developed countries, but their number may increase to 4.5 billion in the next few decades, most of whom will live in the developing world. A world with 4.5 billion well-off consumers will pose many sustainability challenges.”

Dealing with sustainability pressures in emerging and developing countries, however, will require adaptation and adjustment not just in those parts



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of the world experiencing rapid demographic and economic growth but also in developed economies. “The U.S. sets the standard as to what the middle class in other countries aspires to: nice automobiles, big homes, manicured lawns, and so on,” says Marianne Fay, the Chief Economist of the Sustainable Development Department at the World Bank. “Thus, the U.S. is very important as a role model.” One needs only to think about the implications of having 500 million people in China and 500 million people in India behaving like American consumers to realize the fundamental challenges facing the planet over the next few decades. In other words, developed countries must also set an example. A complicating factor is that “the baby-boomers are now moving from being producers to being primarily consumers,” says Goldstone. “There is a competition going on between young people in the developed and developing worlds, and in the developed world between retirees and young people.” Sustainability efforts and outcomes will be affected by the expected demographic and socio-economic shifts.

“Asymmetric information, principal-agent problems, free riding, behavioral issues, cognitive biases, discount rates, uncertainty, they all deter sustainability efforts ex ante,” observes Andrew King, a professor at the Tuck School of Business at Dartmouth College. “And there are also ex post problems, because sustainability efforts may save people money and therefore increase the capacity to consume.”

Expanding populations and aspirations will require massive investments. “The United Nations estimates that the financing gap for low-income countries to reach their development goals by 2015 would take about \$76 billion a year. And this figure is expected to rise to \$135 billion a year by 2015,” observes de Nevers. “A recent World Bank report on infrastructure needs in Africa estimated that the incremental financing needs for infrastructure investment are about \$93 billion a year. And this amount is additional to investment from domestic resources amounting to about \$5 trillion a year that is already ongoing.” ■

Sustenance: Food and Water

Population growth, urbanization, and changes in lifestyles require a rethinking of our approach to sustenance, to the procurement of food and water. Agriculture “is not practised sustainably,” notes Marco Ferroni, of the Syngenta Foundation for Sustainable Agriculture. This sector of the economy changes quickly as countries develop. “As a share of GDP, agriculture falls very quickly with economic growth. Employment in agriculture as a share of total employment falls more slowly,” he says. “Productivity in agriculture evolves in very different ways depending on the country. Productivity growth is fundamental for sustainability in all of its dimensions, including stewardship of natural resources, ensuring adequate supplies of food, feed and fibre, and bolstering rural incomes so that over the long run countries can evolve from a situation of divergence to one of convergence of incomes in agriculture and the non-agricultural part of the economy.”

Awareness of agriculture as a crucial sector underpinning sustainability grew after 2006 when the world witnessed a period of sharp increases in food prices. The reasons for this (and generally an intensification of price volatility) include short-term explanations such as weather disruptions, export restrictions by some important grain producing countries, biofuel production, market speculation, the weakness of the dollar, and historically low stocks, notes Ferroni. The weakness of the dollar, the currency in which many commodities are priced in global markets, has put upward pressure on the prices of foodstuffs and oil. Biofuel production has skyrocketed from 20 billion liters of ethanol in 2000 to nearly 90 billion in 2010. The U.S. is the largest producer, accounting for about half of the total, most of it from corn, which is “the wrong crop to use for ethanol production,” according to Ferroni. Brazil’s strategy of reducing oil dependence by transforming sugarcane into ethanol has many environmental, employment, and technological benefits, although

it may displace other crops from the State of São Paulo closer to the Amazon region.

“But the fundamental long-term, structural problem is that we are not producing enough food,” argues Ferroni. “Demand is growing at an unprecedented level and we are witnessing a near-Malthusian moment because agricultural production is not keeping pace with the combined effects of population and wealth growth. This also means that we do not have the slack, or resilience, to absorb supply disruptions due to natural

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disasters or global warming without price rises.” The solutions required to overcome the problem are not necessarily new. “We need what is nowadays often referred to as sustainable intensification. This starts with cutting waste in agriculture. We waste water, land, and (in many locations) fertilizers,” says Ferroni. According to him, in the last 100 years five sources of progress have transformed agriculture: genetic improvement, soil fertility solutions, agro chemistry, mechanization, and management. We need to continue leveraging those factors as we seek to overcome the looming food crisis sustainably.

In terms of the future geography of agriculture, the two big frontiers are Sub-Saharan Africa and Latin

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America, where most of the uncultivated land suitable for agricultural use lies. Only 11 percent of the planet’s land area is suitable for agricultural use. Urban agriculture has also been proposed as a sustainable way of meeting the growing needs of the cities. However, “urban agriculture is a niche,” asserts Goldstone. “We need to pursue all promising paths toward sustainable global agriculture.” Ferroni concurs, adding that “urban agriculture is one of those paths that can allow for creative additions to food security in the urban environment, even though it is not expected to play a major role in feeding the planet.”

Consumer behavior must also be part of the debate about the sustainability of food systems as the world’s population approaches the eighth billion, cities grow, and more people attain middle-class status around the world. The lifestyle and dietary changes associated with these trends generally induce “increased demand for animal proteins, which in turn means more production of grains for feed as opposed to food,” observes Ferroni. The consequences are noteworthy. “Consumers in Lagos or Mombasa are competing for food

supplies with those in Shanghai and Mumbai,” adds Goldstone. Most importantly, animal proteins are energy-intensive to produce, and cattle-rearing and the associated land use changes account for a growing share of carbon emissions.

Water has also become a key issue in sustainability, due to the rapid increase in demand for industrial, agricultural, and residential use. Given that 70 percent of human water consumption is for agricultural purposes, food production systems are the key area for improvement. “A major challenge will be to remove subsidized water prices for agricultural use in many parts of the world, since subsidies discourage conservation,” says Guillén. Urbanization complicates the water problem. In its *Towards Green Growth*, the OECD estimated that almost 4 billion people—nearly half of the world’s projected population in 2030—are likely to live in areas with serious water shortages by 2030. “Today, about 900 million people lack access to safe water supplies and people in slums often pay five to ten times more for their water than do the wealthy people in the same cities,” says de Nevers. “About 1.2 billion people lack sanitation facilities.” ■

Energy

While agriculture and water are certainly central, “energy is the critical issue in sustainability. We need to address energy production and consumption practices, if we are to address sustainability,” says Pratima Bansal, a professor at the Richard Ivey School of Business of the University of Western Ontario in Canada. At stake are such momentous issues as availability, price, and risk. Primary energy sources differ from one another in terms of whether they are renewable or not, the degree to which they pollute or contribute to carbon emissions, how expensive it is to deal with the waste generated during their production or transformation, and the geography of both production and consumption.

Much of the discussion about energy focuses on fossil fuels. They are not renewable, producing and burning them pollutes, they make a huge contribution to carbon emissions, and a large proportion of the reserves are located in politically unstable countries. Industrialized human societies, however, have become highly dependent on coal for electricity generation and oil for transportation.

One key country in the quest for energy sustainability is China. It is the world’s largest producer of coal and the fifth-largest of oil. Still, it imports huge quantities of oil, so much that it is the second-largest importer of oil, after the U.S. It changed to a net importer in 2009. China also is the country that is adding installed capacity for wind and solar power generation the fastest. The International Energy Agency projects that by 2035 China will account for half of the incremental demand for coal in the world, and one third of the incremental demand for oil.

“Energy security and environmental impact are serious problems in China,” says Ying Fan, a member of the Chinese Academy of Sciences. “China needs to use coal, but it can do so more efficiently and cleanly.” Given that coal is the most plentiful of the fossil fuels and the technology for coal-fired power plants is efficient, much progress towards reducing pollution and carbon emissions can be accomplished if the U.S., Europe, China, and India use coal more cleanly. Unfortunately, “there is no such thing as clean coal,” says Thomas Lyon, a professor at the University of Michigan. “Coal accounts for about 25 percent of primary

energy consumption, and for 40 percent of carbon emissions. It’s difficult, almost impossible, to address climate change without confronting the issue of coal.” Coal is as environmentally problematic an industry as one can get, from extraction all the way to combustion. “In my dreams, the U.S. and China engage in a joint program to use coal in a much cleaner way,” hopes Lyon. “We all agree that international cooperation is essential,” says Fan. China is investing heavily in renewables, planting trees, and trying to bring pollution under



Ying Fan, Ed Morse and Thomas Lyon

control. But its foremost priority is to keep economic growth going at a modest growth rate so that more people can be lifted out of poverty, which is another necessary concern of sustainability.

One viable solution is to shift to natural gas, which is cleaner to burn. Another is to further develop technology that converts coal into a gas before it is burnt, which makes it much easier to capture carbon emissions. Or one can burn the coal with oxygen alone, by removing nitrogen from the combustion chamber. “After combustion, one can capture and sequester the carbon emissions, but the investment to retrofit the power plants and to transport the emitted carbon is substantial,” notes Lyon. “Unfortunately, using algae to reduce carbon emissions is hard because the technology is not yet scalable.”

Besides coal-fired plants, there are many other areas of concern. A very significant source of environmental pollution, health problems, and carbon emissions in developing countries is the use of charcoal for cooking or heating, notes de Nevers. It is a practice that also contributes to deforestation. “The key challenge is to provide households with an affordable source of energy where there is no electrification,” notes Guillén. “For instance, in rural areas of Madagascar, entrepreneurs are introducing small biomass burners suitable for cooking and heating.” The main challenge is to make them available to widely dispersed rural populations. Another area ripe for improvement is transportation by truck. According

“Renewables like wind and solar tend to be intermittent, so we will always need a backup, and it may not be clean.”

– Noam Lior



Michael Lenox

to Citigroup’s Edward Morse, “switching from diesel engines to natural gas would vastly reduce emissions and pollution,” especially in developing countries that rely extensively on this mode of transporting merchandise.

Wind and solar technologies hold great promise, but they still account for less than one percent of total primary energy consumption, and about 3 percent of total electricity generation in the world. “Solar installations are up, and cost is down,” says Gary Survis of Geoscape Solar, a regional solar integrator. But incentives play a key role in driving demand as evidenced by the recent slowdowns in the Italian and German markets as incentives have been eased. Yet, technology and competition have allowed prices of solar panels to decline by double-digit rates in the past few years. “How does solar stack up against other technologies? Grid parity is around the corner, and in some areas of the U.S. it has already been achieved. Solar is even starting to compare well to coal and nuclear,” argues Survis.

Lior sounds a note of caution pointing out that “renewables like wind and solar tend to be intermittent, so we will always need a backup, and it may not be clean.” Relying on hydroelectric power can also be risky, especially given the ever

more frequent weather disruptions and the predictions about global warming. “The perfect energy source does not exist. We must make compromises,” admits Survis.

Compromises essentially involve calculating policy mixes that can cope with the complexities of providing cheap, clean, and reliable energy to an expanding, increasingly middle-class global population. And they also involve motivating investors to participate. “There is continuing interest on the part of investors in the renewables sector,” says Michael Lenox, a professor at the Darden School of the University of Virginia. “The cost of renewables is coming down.” This is thanks to innovation. “There are substantial increases in patenting related to renewables, especially solar.” The U.S., Japan, Germany, and the Scandinavian countries are leading the way. “However, the correlation between innovation and the adoption of renewables is weak,” according to Lenox. China or India are deploying the technologies massively, but not innovating as much as other countries. “But if China becomes the largest producer of renewables, they will have a strong base to innovate,” notes de Nevers. “We need to differentiate among innovation, manufacturing, and adoption of renewable technologies,” says Lenox. Germany plays a pivotal role as a maker of the machines that are used to make the solar and wind power equipment.

“Commercial viability is key,” says the International Finance Corporation’s Reyaz Ahmad. “Finance is the art of the possible.” Given the uncertainty and the peculiarities of investments in renewables, one appropriate financing model is that of private equity. “Private equity investors understand risk, and they bundle capital with expertise,” says Ahmad. “In developing countries,

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possible.”

– Reyaz Ahmad

the cost of renewables is not the binding constraint. It’s the financing,” says Fay. “And 1.3 billion people don’t have access to electricity. The investment needs are vast and diverse. Cost recovery is a huge challenge. I worry the PE community may get cold feet after a while. It is not Facebook,” notes Lenox. “It’s also important to prevent political twists and turns about subsidies from discouraging investors. They need to have a long-term view of the renewables sector.” Energy subsidies have been introduced to reduce negative externalities, but they are “subject to the vagaries of the political process, turned off and on again, uncertain, often perverse,” notes Witold Henisz, a professor at the Wharton School. Howard Kunreuther, also a Wharton professor and co-director of its Risk Management and Decision Processes Center, argues that greater attention should be paid to providing the appropriate incentives for firms to enter into long-term contracting arrangements for environmentally beneficial investments. And there are other problems when it comes to designing effective incentive systems. “The rapid fluctuations in oil and gas prices make it very difficult to find and implement effective ways for curbing energy demand and related emissions, and for supplying the needed energy from alternative sources such as renewable and nuclear,” notes Lior. ■

Corporate Responses

The vast and yet subtle tradeoffs that human societies face when dealing with the environment cannot possibly be addressed without the collaboration of corporations. The political scientist Charles Lindblom famously proclaimed that the “structural power of business” is a major factor shaping policy preferences and outcomes in both developed and developing countries. “The most powerful force in society is business,” echoes Hoffman. “But business does not have a single voice,” notes Ethan Kapstein. “And businesses don’t operate in a vacuum, they exist in a policy context,” adds Michele de Nevers. These complexities add to the conundrum about the best way to achieve sustainability in an industrialized world in which profits—and jobs—are also at stake.

Businesses are most of the time reluctant to implement sustainability initiatives because of the signals they get from the buyers of their goods and services. Very few consumers are willing to pay more for a cleaner, greener, more sustainable product. “Consumers are generally unwilling to sacrifice price or functionality. Studies of consumers’ willingness to buy sustainable products are mired by social desirability bias and often overestimate it,” says N. Craig Smith, a professor at INSEAD. “Self-enhancement can make a difference, though,” he adds. “Most people have multiple motives, and there is tremendous heterogeneity and complexity in consumer preferences when it comes to sustainable consumption.” Another issue to keep in mind is that consumers “often know little about companies’ initiatives in the area of corporate social responsibility (CSR), but what little they do know might influence their purchase decisions. Certainly, empirical research we have been conducting at INSEAD suggests that there is a robust CSR-halo effect. Consumers may well make a judgment of overall corporate sustainability performance on the basis of limited information about corporate practices.”



N. Craig Smith

Companies can make a huge difference on sustainability, but there is a limit as to what they can do. “Sustainable consumption is highly contingent on consumer support for it, what the company is doing to promote it, and what the message is,” says Smith. Companies cannot go too far too fast. They need to bring consumers along with them. Change has been incremental for now, and companies need to change faster, emulating the examples of Nike, IKEA, and Walmart, which have overhauled their supply chains informed by principles of sustainability.

Some experts point out that business efforts to promote sustainability still fall far short of what is needed to effect meaningful change. “Most actions are by publicly listed firms, but they represent a small proportion of the business landscape worldwide, especially outside the United States,” observes Hoffman. “Most corporations don’t understand how to sort through the various definitions of sustainability. What they want is a simple narrative, a simple story to justify to their shareholders and to society the sustainability-related actions they take,” says Rochlin. Companies appoint “Chief Sustainability Officers,” which

represents an inflation in the title given that such positions are rarely comparable in power and influence to the Chief Financial Officer or the Chief Operating Officer, let alone the Chief Executive Officer. “There are useful corporate environmental actions aimed at reducing pollution, expanding recycling, or curbing carbon emissions, for instance, and companies have become more sophisticated, but they are not enough and don’t amount to an overall, comprehensive strategy.”

One specific way in which “companies can make a difference is if they rethink their global supply chains to take sustainability into consideration,” says Rochlin. “They should also move decisively in the area of carbon emissions.” Companies also play a role in global governance and initiatives; they can be very important. “But companies are typically more comfortable taking relatively specific and incremental approaches to sustainability,” notes Rochlin.

A key part of encouraging more businesses to make contributions to sustainability is to provide them with a rationale that goes beyond philanthropy or social responsibility. “Sustainability represents a market shift and in the face of a market shift firms innovate,” notes Hoffman. “To ask ‘does it pay to be green?’ is the same as asking ‘does it pay to innovate?’ That’s a nonsensical question. It depends on who does it, what they do,

when they do it and how they do it.” Smith, for his part, asks, “Should a company be doing anything in sustainability for which there’s no business case?” Werbach responds: “No, a company such as Walmart, for instance, should only do it if it helps them as a company.”

“The pressure certainly doesn’t come from the customer,” says Andrew Spicer, a professor at the Moore School of Business at the University of South Carolina. “Firms like Walmart engage in sustainability because they can obtain efficiency gains.” While it is true that “they want to engage stakeholders, and they want to do the right thing,” there must be some business case.

An interesting industry in which to examine efforts at sustainability is mining. David Brereton, from the Center for Social Responsibility in Mining at the University of Queensland, notes that global mining companies are now making investments of up to 10 billion dollars that have the potential of transforming regions, even countries. The timeframes for large mining projects range between 15 and 40+ years. A legacy of ecological disasters in the industry has made it more difficult for companies to obtain future licenses. Scrutiny of the industry’s social performance (how it manages its impacts, who benefits from its presence) is also increasing. Thus, there is a strong business case to be made in favor of improving sustainability efforts in the sector. The larger multinationals,



David Brereton, Victoria Johnson, N. Craig Smith, Andrew Spicer, and Thomas Donaldson

“Sustainability is an issue linked to organizational identity. Sustainability is an issue that disrupts the status quo within the organization, it is politically contentious.”

– Victoria Johnson

in particular, have responded by strengthening internal governance processes, modifying mining practices, improving how they engage with stakeholders, and collaborating in the development of industry codes of practice. However, there is still considerable variability within the sector; most state-owned mining companies and the majority of smaller mining operations are yet to sign on to this change agenda. Even amongst the purported “leaders” in the industry, there remains considerable scope for improvement. For example, the industry’s overall energy footprint is increasing and there is a growing rehabilitation backlog.

Ultimately, “sustainability is an issue linked to organizational identity,” observes Victoria Johnson, a professor at the University of Michigan. “Sustainability is an issue that disrupts the status quo within the organization, it is politically contentious.” Initiatives in sustainability can “change the mission of the organization,” she asserts. Her research on botanical gardens shows that even organizations that are supposed to embrace sustainability as part of their core mission have difficulty adjusting to shifts in societal demands in this area.

Many organizations go through distinct phases when it comes to their response to sustainability, according to Werbach: rejection, non-responsiveness, compliance, efficiency, strategic proactivity, and sustaining incorporation. Companies are subject to inertia, and their governance structure and incentives are rarely aligned with sustainability. “The managerial worldview is all about growth without regard to sustainability,” notes David Ellerman, a professor at the University of California, Riverside. “Tackling the environmental problems of the twenty-first century will require a change in the structure of ownership towards less absentee ownership and more local ownership.” Other experts, short of calling for such a transformation of business structures and governance, acknowledge that little has been accomplished to date. “Business is not moving far enough, fast enough,” says Werbach. “What we’re doing is not nearly enough to address the ecological problems we are facing.” “We’re in sort of a lag space and the challenge is scaling the changes that have taken place in the corporate world and putting them more on an exponential path, and a more deliberate path that can take us where we need to be by 2020, not 2050,” adds Rochlin. ■

The Nonprofit Sector

As important as business is in society, when it comes to sustainability, nonprofit organizations have played and continue to play a pivotal role as whistleblowers and pressure groups. They have brought issues to the national and global agendas. They engage in advocacy. They are also major providers of services and organizers of activities, especially in the areas of recycling, biodiversity, and building and urban planning. But it is also important to note that their power and influence fluctuates as a function of public opinion. “NGOs could lose the leverage once public opinion shifts and public opinion will shift,” notes Hoffman.

Nonprofits are heavily involved in the policy process, though according to experts not always in the most effective way. “I remember many years ago Greenpeace saying that when they discovered the power of targeting brands, it was like discovering gunpowder,” notes Elkington. The challenge that they face today, asks Geof Rochester of The Nature Conservancy is “what should they do” with this powerful and, at times, frightening weapon? “First, coordinate better,” says Hoffman. “They do not agree on fundamentals. When they walk up Capitol Hill, they display division and infighting.” He cited the failure of proposed national climate change legislation in the United States, and the split between “bright green” and “dark green” nonprofit groups about it, as a case in point. Nonprofits can play an important role in bringing government and business to the table. “Coalition building is very important, spanning the

private, public and nonprofit sectors,” argues Rochlin.

Nonprofits can also be innovators in their own right. “We can learn from nonprofit organizations about their efforts to be sustainable,” says Johnson. For instance, the Sustainable Sites Initiative has produced norms and standards to make buildings and facilities more friendly to the environment, a lesson potentially applicable beyond the nonprofit sector.

Another area of growth and influence is that of social entrepreneurship. “How can we encourage social entrepreneurs to help with sustainability issues?” asks Valeria Budinich, founder of Full Economic Citizenship Initiative, which is part of Ashoka, the world’s largest social entrepreneurship network. “Increasingly, these entrepreneurs recognize that their power lies not in scaling up and replicating the organizational structures of large companies but rather in connecting the knowledge and manpower of the communities in collaborations with existing companies,” she says.



Front: David Brereton, Dorota Rucinska
Middle: Tima Bansal, Andrew Spicer, Emilo Olías-Ruiz
Back: Javier López-Galiacho Perona, Angel Peiro-Signes

These entrepreneurs are helping companies see the scale of the market opportunity that exists but is not yet coming to them. They are reducing the costs associated with market entry and helping the companies transform their product offerings to appeal to underserved customers. “In one affordable housing project in Ahmedabad in India, this form of collaboration led to over 500 design changes made by the low income clients themselves, changes that increased the attractiveness of the apartment units and either

reduced or failed to increase costs,” notes Budinich. Through business/social partnerships such as these we can address not only the shortage of housing in India estimated at 25 million units but more broadly, include the roughly two-thirds of the world’s citizens who are currently operating outside the market economy. Such opportunity frames offer a compelling positive narrative around which to re-organize the otherwise potentially somber debate on sustainability. ■

Narratives of Sustainability

In his book, *Our Choice*, Al Gore wrote that “we have at our fingertips all of the tools we need to solve the climate crisis. The only missing ingredient is collective will.” Given the multiplicity of actors, goals, preferences, values, and norms regarding sustainability, it is imperative to formulate an effective narrative extolling its critical importance that serves as a catalyst for action. “This places the burden on the rest of us,” says Kunreuther.

Narratives are a powerful way to focus the attention on the issues and the tools to address them. “But we need to educate the public because in spite of all of the scientific reports on climate change, in the U.S. about 57 percent of the population believes that human activity is affecting the climate,” a proportion that may have increased slightly over the last few months,” notes Hoffman. “Or do we need to worry about this? Does the broader public really matter? If we develop needed technologies, then public opinion will follow, so should we worry about trying to convince the American public?” Ultimately, one of the big question marks about the future of sustainability is whether the public will lead change by exercising pressure and altering behavior, or whether it will be crucial to make a big effort to educate the public as to the high stakes involved in sustainability.

“With sustainability, as with many other issues, there are winners and losers, and with sustainability policies the same holds true,” says Hoffman. “Business and consumers need to be given reasons and incentives to get things done. A compelling narrative is what’s needed to mobilize business into action,” he adds. “The Triple Bottom Line has been one such narrative,” says Rochlin in reference to Elkington’s famous term. There are various frames, such as “innovation,” “doing good,” “future generations,” and “sustainability” itself that can be helpful. Such frames are key because “there is a lot of explaining to do” as to why we want to promote sustainability, says Rochlin. “Shareholders, suppliers, employees, consumers need to be persuaded.” One step in this direction is Michael Porter’s concept of “creating shared value,” which is premised on the assumption that a firm’s competitiveness and the well-being of the surrounding community are interdependent.

Harvard Business School’s Rebecca Henderson observes that “there have been a number of attempts to persuade companies to engage in sustainable practices. We have the triple bottom line, we have a number of people trying to frame it in terms of risks, others trying to frame it in terms of innovation and the next great thing.” And she



David Ellerman, William Clark, Valeria Budinich and Steve Kobrin



Eric Orts

asks, “with business desperately looking for an overarching narrative about sustainability, why aren’t existing narratives enough?” Defining an effective narrative frame is tricky. “There’s been an attempt to redefine sustainability as ‘green growth,’” says Sierra. “But there’s also a backlash against that frame because it can be seen as a way to skirt one’s obligations towards the planet.” Many people would consider a call to sustainable action focused on clean growth as reasonable and effective. A forthcoming study from the Batten Institute at the Darden School at University of Virginia, for example, highlights the concentration of patents in clean technology in the United States and European Union, painting an optimistic link between clean growth and entrepreneurship and employment growth. Others, by contrast, see it as an excuse, as a watering down of initiatives to save the planet that they deem necessary and urgent. According to Sierra, some developing countries even see the narrative of sustainability as threatening to their efforts at promoting economic growth and as a disguise for conditionality.

A crucial aspect of any narrative about sustainability has to do with the choice between an approach based on bold commitments to

ambitious goals (such as the Kyoto Protocol) or a more incremental approach. Which is more effective? Which is more likely to be achieved? “Companies prefer incremental approaches,” observes Rochlin. “Environmental activists and thought leaders often seek breakthroughs.”

In surveys, most CEOs claim that they and their companies care about sustainability and are taking steps, however small, that make a difference. “They are deluding themselves,” says Elkington. “We need not incremental change but a *systemic transformation* applied over a *wide scope*, not a narrow scope, of problems. We must analyze problems, *digging deep* into them, and set *ambitious* targets for the *long term*.” These five emphasized aspects are part of the 5-D framework for addressing sustainability. “Oftentimes the problem is in our heads,” Elkington concludes.

“What would it take to get the sort of fervor associated with the anti-Apartheid movement in association with the sustainability movement?”

“We need not incremental change but a *systemic transformation* applied over a *wide scope*, not a narrow scope, of problems. We must analyze problems, *digging deep* into them, and set *ambitious* targets for the *long term*.”

– John Elkington

asks Jack Goldstone. In order for companies and other organizations to embrace sustainability, its implications must be felt by every employee. “What

“What would it take to get the sort of fervor associated with the anti-Apartheid movement in association with the sustainability movement?”

– Jack Goldstone

if we could make the local, natural setting more highly salient to employees in organizations that are not dedicated to environmental protection?” asks Johnson. Werbach, for his part, observes that one must set a “North Star Goal,” one that is “optimistic, aspirational, achievable in 5-15 years, actionable by every employee in the organization, connected to the company’s strengths, connected to the core of the company’s business, and infused with a purpose greater than just sustainability.” One illustration is P&G’s Coldwater Tide, which enabled people to forego hot water when doing the laundry. Elkington highlights the importance of a willingness to jump off a cliff without knowing how to fly for innovation.

One must be careful, however, not to get carried away, especially when the issues are so complex. “Kyoto was a disaster despite being labeled initially as a milestone,” says Eric Orts, a professor at the Wharton School who directs the Initiative for Global Environment Leadership. “And Copenhagen was billed as a failure, but it helped everyone come down to earth and become more realistic.” In his view, a multiplicity of bottom-up innovative practices championed by many sectors of society provide the only practical hope of making true progress in dealing with major long-term global challenges such as climate change. ■

Governance

As in the case of other items on the global agenda—such as financial regulation, poverty reduction, or collective security—sustainability cannot be accomplished without rethinking the governance mechanisms needed to underpin globally effective efforts. “Sustainable development on a large scale,” notes Lior, “must be planned and implemented to maintain the well-being of future generations, meaning that it has to extend far into the future and be global in scope. Long-term strategic planning is, however, fraught with difficulties, which presently often make it impossible. Such difficulties stem from plain economic reasons where the resources are deemed to be inadequate even for the immediate critical needs, from great uncertainties in future conditions and needs, and from political reasons such as politicians’ short-term focus.”

“We need better global governance for everything from education to energy, from migration to refugees,” says Goldstone. The issue of governance is becoming ever more urgent because “there is a shift in responsibility from governments to corporations,” notes de Nevers, “as the former lose ability to act due to their budgetary problems and the latter become more important in the economy.” Still, people think about the government as a key

actor when it comes to tackling large-scale problems. “Who will reconcile the multitude of interests represented by business and non-governmental actors?” asks Kapstein. “What incentives do governments have to advance the sustainability agenda?”

“Sustainability problems won’t be solved by markets alone, and they won’t be solved by one government alone. We need global action,” argues Steve Kobrin, a professor at the Wharton School. “But we have many different countries at different levels of development, pursuing different goals, and espousing different political ideologies.” As Nouriel Roubini and Ian Bremmer, the keynote speakers at our Global TrendLab 2011 conference noted, “we live in a G-zero world,” one in which the lack of clear leadership or agreement over key global issues is hampering the economic recovery.

“Multiplicity of players, different agendas, and varying strategies” can be a challenge, but also “an opportunity to do things differently,” says William Clark, a professor at the Kennedy School of Government, Harvard University. “Current arrangements to accomplish together what you can’t do alone in the field of sustainability are flawed, they are structurally misfit.” The reason is



Front row: John Elkington, Marton T. Markovits, Jitendra Singh; Second row: Andrew Hoffman, Rebecca Henderson



Valerie Budinich and Steve Kobrin

that “at its core it’s a command-and-control structure, and it presumes a common goal.” Most importantly, “there is a presumption that one can make progress by enlisting a sufficiently large number of countries. But each country has other agendas besides the one being negotiated. What we need is to assume that government is a complex, adaptive system.” Other experts agree. “Twenty years after Rio, and we still have the same regulatory structures,” observes Werbach. “How do we encourage policymakers to innovate?” The solutions? “The first is that one must put down barriers to the serious negative externalities,” says Clark. “The second is to encourage innovation and diffusion,” he continues. But there are several models of innovation too. “There’s the centralized model and the one that encourages local innovation.” One possibility, Orts suggested, is that new models of global international architecture might be envisioned, combining multinational firms, governments, and nonprofit organizations to address specific problems such as deforestation outside of the traditional and cumbersome process of international treaties.

In any event, collaboration among actors is essential to overcoming the stalemate. “At the beginning, I thought that we should get things

done in spite of the government,” recalls Ashoka’s Budinich. “Now I realize that there are different levels of government, and oftentimes collaborating locally with local government can make a difference.”

Governance of global sustainability problems needs to take into consideration a key fact about the sociopolitical context. “Complacency is actually a greater threat to sustainability than opposition to its agenda,” argues Clark. One implication is that mobilizing for action is perhaps more effective than fighting back the dissenters. Ellerman insists that there is a fundamental rift stifling progress. “On the one hand, we have the control model, whereby corporations, governments, and other actors need to get together and act. On the other, we could change the structure of corporate ownership since local owners are naturally motivated not to foul their own nest.”

The list of the governance problems surrounding sustainability goes on and on. “Who represents future generations?” asks Henisz. Politicians tend to have very short time horizons, and they tend to cater to the wants of narrow constituencies who happen to be swing voters. “How do we maintain freedom of choice, and at the same time move towards sustainability?” asks John Neiva, professor at Saint Joseph’s University. But one should not lose track of the accomplishments. “Progress has been made. The rules of the game, the terms of the

“Sustainability problems won’t be solved by markets alone, and they won’t be solved by one government alone. We need global action.”

– Steve Kobrin

debate, and the acceptable norms of behavior regarding sustainability have been fundamentally transformed over the last 25 years,” says Clark. “Sustainability is on the global agenda.” And that is no small achievement. “Patience is fundamental. It takes, according to Thomas Kuhn, at least 70 years for a paradigm to change,” observes Spicer.

A longer time horizon also helps in terms of pursuing a trial-and-error approach to sustainability, given how hard it is to get it right up front. Policymaking needs to be part of a self-regulating system that makes progress towards the desirable outcome. One solution is to engage in calculated policy experimentation with clear goals in mind. “In a complex, adaptive system such as environmental policy,” says Clark, “we must both discourage negative externalities through incentives and fines, and encourage innovation.” “Top-down regulation approaches presume that

one fully understands the problem and has the right solution to it,” says Henisz, agreeing with Clark. “Bottom-up solutions based on market principles assume that information signals and relative prices are clear and unambiguous, and that they lead to coordinated action.” Sustainability is such a complex and expansive topic that both kinds of approaches will be necessary. “It is not useful to frame the debate in terms of market versus regulation,” argues Henisz. “It’s better to chart a middle course that incorporates mechanisms for self-adaptation and policy change as circumstances, political coalitions, and technologies evolve.” At the end of the day, “the debate about sustainability is being cast in terms of proper role of the state and the corporation in defining the market,” observes Hoffman. ■

Towards a Sustainable Future

The challenges involved in ensuring the sustainability of human society are mind-boggling. We have discussed the importance of defining the nature and scope of sustainability, grasping the significance of demographic and economic transformations, ensuring the alignment of governments, businesses, and nonprofits, and creating an effective narrative to galvanize both worldwide and local efforts. Beyond these important points, we would like to advance the following desiderata for a sustainable future:

- True sustainability can be achieved only through a fundamental rethinking of our values, priorities, and norms of behavior. “Sustainability is a cultural phenomenon,” as Michigan’s Hoffman argues.
- Policymaking must recognize that sustainability involves complex issues of distributive justice across population strata, generations, and geographies. “Sustainability is a political issue,” as George Mason’s Goldstone observes.
- Sustainability may require a fundamental reorientation of the structure of property rights towards more local ownership, as UC Riverside’s Ellerman proposes.



Thomas Lyon

- Sustainability policies themselves need to be sustainable in the long run. As Citigroup’s Morse argues, “the most important thing to promote sustainability is to eliminate subsidies.”
- Sustainability policies should encourage investments in innovation rather than production. “We shouldn’t subsidize the deployment of renewable technologies on a massive scale before they are competitive,” says Wharton’s Guillén.
- Sustainability can be greatly advanced by the diminution or elimination of negative externalities. Unpopular measures such as taxes may be necessary in order to reduce socially undesirable behaviors. “Taxes may be better than cap and trade to reduce carbon emissions,” notes Wharton’s Orts.
- Sustainability efforts must be based on sound and appropriate metrics. “We need to redefine the relation between consumption and happiness. We need to develop a new metric, one that is different and broader than just GDP per capita” argues Harvard’s Clark. “We need to require green accounting more broadly,” says Michigan’s Lyon. We also need sustainability to “connect to net present value and return on investment,” argues Hoffman.
- Corporations, nonprofits, and academics must continue to “inform, educate, and engage the politicians and the policymakers,” says Penn’s Lior. “We need to find a balance between short-term exigencies and long-term concerns.”
- Solutions to the challenges posed by sustainability are most likely to be the result of an incremental process in a “market-like” space for information and innovation, policies and public reactions. “Uncertainty, complexity, punctuated equilibria, and above all the fact that the agents in the system are going to respond adaptively whatever we do. That’s going to create both new problems and opportunities for somebody else in the system of these multiple actors,” concludes Clark.

“We need to redefine the relation between consumption and happiness. We need to develop a new metric, one that is different and broader than just GDP per capita.”

– William Clark

The contemporary debate about sustainability is now at least half a century old. A new generation has been raised on the premise that something needs to be done if future generations are to enjoy the planet’s resources to the same extent as previous generations. The idea of sustainability now resonates with the values and priorities of a wide spectrum of the population. It is important to keep the momentum for change going, especially because many feel frustrated by the incremental, linear progress made to date. The power of the idea of sustainability should provide the conditions for more radical change in the ways in which we

produce, distribute, and consume goods and services, leading to a broad transformation in the relationship between humans and their environment as momentous as the one brought about by industrialization. Sustainability as a way of life on the planet will depend on how persuasively and intelligently we can invoke its core idea and how effectively we can elicit necessary changes consistent with it in order to overcome the tendency towards myopia focusing on the short-term crises and immediate conditions of the present rather than the long-term challenges of the future. ■

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Sustainability

New Perspectives and Opportunities

Sustainability has become a key topic of debate among policymakers, officials of advocacy organizations, business leaders, and the general public. In this white paper we analyze the main aspects of sustainability, from the environmental challenge to the quest for a sustainable supply of water and food. The importance of green business practices is also seen through the lens of what companies can and should do to contribute to sustainability in the light of how far consumers are willing to go to protect the planet from irreversible degradation. A central topic in the analysis is that of governance, that is, the institutions needed to encourage sustainability worldwide and to improve collaboration among governments, companies, and nonprofit organizations.

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