

Reflections

The SoL Journal
on Knowledge, Learning, and Change



IBERDROLA RENEWABLES

FEATURE ARTICLES

The Role of the Corporation in Supporting Local Development

Muhammad Yunus

Serving the Underserved: Progressive Energy Solutions Through a Sustainable Business Model

Roberto Bocca and Prema Gopalan

Matrix Sales University

Eric Mellet, Philippe Pierre,
Béatrice Quasnik

BOOK EXCERPTS

The Necessary Revolution

Peter Senge, Bryan Smith,
Nina Kruschwitz, Joe Laur,
Sara Schley

Limits to Growth

Donella Meadows, Jorgen Randers,
Dennis Meadows

Published by The Society for Organizational Learning
reflections.solonline.org

ISSN 1524-1734

PUBLISHER'S NOTE 9.2



C. Sherry Immediato

Where do “we” end and “they” begin? No matter how good we believe we may be at thinking systemically, it’s hard to resist the habit of categorizing others as irrelevant, alarming, or just incomprehensibly different.

I’m sure you’ve had days when even those you know and care about most suddenly seem like strangers, and the ranks of “them” appear vast – surely not part of your system. In his classic work, *I and Thou* (1923, English 1937), Martin Buber posed a more intimate way to appreciate the distinction. He suggested that we can experience ourselves as separate from the world (I-it) or as an inseparable part of it (I-thou), with the expected consequences. His most striking examples challenge our belief that the I-thou relationship is limited only to those we know well. I’m sure you’ve had that experience, too: there is a flash of deep connection and commonality with what first appeared foreign. Buber documented the value of each perspective and our capacity to choose our experience.

In this issue of *Reflections*, we are fortunate to have a number of illustrations of new partnerships that emerged when action was taken from the perspective that there’s only “us” and there’s no “away.” (If you would like to see a short artistic rendition of this, I highly recommend this video: <http://www.globalcommunity.org/flash/wombat.shtml>.) I encourage you to read this issue with attention to the connections between action and the state of being they reinforce. In some cases, deeply held beliefs inspired action; in others a more naïve curiosity about “the other” opened up new possibilities.

As a community, we were fortunate to have a tangible experience of “Bridging the Gulf” between “us” and “them” last April when about 400 people from around the world convened in Oman at SoL’s 3rd Global Forum. At the Forum, Nobel Prize winner Muhammad Yunus,

the founder of Grameen Bank, joined a diverse panel of SoL members from across sectors and around the world to look at the ways in which business can be reframed in order to help the poor. Taking a true systems perspective, Muhammad Yunus related the story behind Grameen Bank and shared his concept of “social business.” Moderated by social researcher Laurent Marbacher, the panel also explored the idea of what human beings are capable of doing for local development, as well as how systems can enhance our capacities so that they can flourish. That conversation is summarized here as “The Role of the Corporation in Supporting Local Development.”

One of the most well-attended sessions at SoL’s Forum in Oman was a presentation by Roberto Bocca, then director of Emerging Consumer Markets for BP Alternative Energy, and Prema Gopalan, the founder and executive director of Swayam Shikshan Prayog (Self Education for Empowerment, or SSP), a non-governmental organization (NGO) in India. In “Serving the Underserved: Progressive Energy Solutions through a Sustainable Business Model” we learn how their organizations partnered to look at solving the problem of bringing clean energy to some of India’s poorest people. This took the form of creating a market together for an innovative, affordable cooking stove that uses pellets made of agricultural waste for fuel.

How do you justify investing in people who are not even your employees? An “intelligent” organization is one that makes systematic use of the intelligence of all its players in order to become ever more efficient. Based on an empirical study carried out over three years, “Matrix Sales University: A New Model for Learning” traces the development of Matrix Sales University (MSU), which is part of the L’Oréal organization. Eric Mellet, Philippe Pierre, and Béatrice Quasnik outline the factors of MSU’s success and the difficulties of developing a learning organization with concrete operational aims working across organizational boundaries.

We close the issue with two book excerpts – both chosen with the intention of challenging us to deepen our ability to think and act systemically. From *The Necessary Revolution: How Individuals and Organizations are Working Together to Create a Sustainable World* by Peter Senge, Bryan Smith, Nina Kruschwitz, Joe Laur, and Sara Schley, we look at “How We Got Into This Predicament.” Something important has happened in the last stage of the industrial era that sets it apart from the past: Globalization has brought a level of interdependence between nations and regions that never existed before, along with truly global problems that also have no precedent. This excerpt explains “how we got here” and lays out the case for urgency in radically shifting the kind of thinking that has made the industrial era so successful, and so disastrous.

In “Limits to Growth: Tools for the Transition to Sustainability” (from *Limits to Growth: The 30-Year Update* by Donella Meadows, Jorgen Randers, Dennis L. Meadows, we have guidance for action – the kind that reinforces a systemic point of view. In 1972, these three scientists from MIT created a computer model that analyzed global resource consumption and production. Their results – published in the bestseller *Limits to Growth* –

shocked the world and created stirring conversation about global “overshoot,” or resource use beyond the carrying capacity of the planet. In this classic update, published thirty years later, they lay out five tools that will be necessary for our survival over the long term: visioning, truth-telling, learning, networking, and loving. Just as they concluded almost 40 years ago, the innovations we require are not technical, but social.

I recently saw a charming bumper sticker that advised: “make love, not carbon.” With so much uncertainty about how we can be effective, such simple advice was welcome. Maybe we should all change our plans for the evening! More importantly, I hope we can take some lessons into action from the stories shared here about the immense value that can be created from “loving” some part of the system that is normally excluded. Then we can head home smiling because we know it’s true: “Systems thinkers make better lovers!” Now don’t forget to read the issue...

With affection,


Publisher

FEATURE 9.2

The Role of the Corporation in Supporting Local Development

BY MUHAMMAD YUNUS

At SoL's Global Forum held in Oman last year, Nobel Prize winner Muhammad Yunus, the founder of Grameen Bank, joined Roberto Bocca, director of emerging consumer markets at BP Alternative Energy; Lynne Dovey, director of strategic planning at the Ministry of Economic Development in New Zealand; Shaikh Saleh Al-Turki, the chairman of the Jeddah Chamber of Commerce and Industry, and Omar Shaban, director of operations at Cisco NetVersity to look at the ways in which business can be modeled in order to help the poor. Muhammad Yunus related the story behind Grameen Bank and shared his concept of "social business." Moderated by social researcher Laurent Marbacher, the panel also explored the idea of what human beings are capable of doing for local development, as well as how systems can enhance these capacities so that they can flourish.



Muhammad Yunus

Muhammad Yunus:

I was not thinking of creating a bank for poor people when the Grameen idea came to me. The idea had to do with the circumstances in which I found myself. I came back to Bangladesh in 1972, when it became an independent country. It was a devastated country, and I came back from the United States to participate in rebuilding the nation. I started teaching economics at Chittagong University. As the economy slid down sharply, we had a terrible famine in 1974. I was teaching elegant theories of economics while seeing people dying of hunger outside the classroom. I saw that what I was teaching meant nothing to those who were dying, and I thought that as a human being, I should see if I could be of some use.

People were taking loans from loan sharks, and were getting exploited. I went around with a student to make a list of people who were borrowing from loan sharks. When my list was complete, we had 42 names, and the total loan was \$27. I was shocked by the smallness of the figure. All I had to do was give \$27 to these 42 people so they could return the money to the loan sharks and be free.

Another question then came to my mind. If I can make so many people so happy with such a small amount of money, why should I not do more? I wanted to do more. The idea to connect the bank located on the campus with the people who live next door came up. I suggested to the bank manager that he should lend money to the poor people. He said, "No way! A bank cannot lend money to poor people." Our debate went on for several weeks, and then he said, "Why don't you go to the senior people? I cannot do such a thing. There is no use arguing with me." So I talked to the senior officials, but everybody told me the same thing. After several months of running around, I offered myself as a guarantor. That is how it all began.



Whenever I needed some rules in my work, I just looked at how conventional banks operate. Once I learned about their procedures, I did the opposite. Conventional banks are always looking for people who have lots of money and wealth, in order to lend more and make more money. We reversed that principle. To Grameen, the less you have, the more attractive you are. If you have nothing, you have the highest priority.

We also dismissed the whole idea of collateral. We dismissed lawyers. We do not have guarantees. Conventional banks focus on men; we focused on women. They look for the rich men; we look for the poor women. Conventional banks are owned by rich men, and we reversed that too. Grameen Bank is owned by poor women. What is amazing is that the system works.

People pay back. Why do they pay back? Because it makes sense to them. Because for the first time, they are getting an opportunity that they never had.

Moderator: Omar, would you tell us about your experience? What programs are you working on?

Omar Shaban: From Cisco's perspective, you can carry out social responsibility by improving,

developing, or transforming the educational systems worldwide. Among the things Cisco does:

1. Business as usual. We have products that run the Internet, build networks, connect to people, and connect to organizations, companies, and governments. Partnering with the Hungarian government worked for us in connecting more than 3,000 schools. It enables them to share information such as grades and curricula.
2. E-learning. Through e-learning, we introduce another method of learning, and give school-children a tool for research.
3. The Cisco Network Academies. In the pyramid set-up of the Academies, the bottom two-thirds of the academies are workers whose skill sets we elevate. We also develop the top one-third of the pyramid, who are the future leaders in government and business. This past year in Saudi Arabia, we hired the top ten percent of graduates. We hired 40 students and brought them in for a year of training. The results have been incredible.

Solving the Problem of Regressive Energy

Moderator: Roberto is also leading a project that includes working with those near the bottom of the pyramid. Would you share your experience?



Roberto Bocca: At the end of 2004, BP started looking at the bottom of the pyramid, which refers to those who use regressive energy. Regressive energy is energy that is unhealthy and unsafe. More than three billion people around the world use regressive energy, and 1.6 million people die every year of respiratory diseases and indirect pollution, mostly by burning regressive fuel. It presented a business opportunity to us.

We worked with a local non-governmental organization (NGO) to understand how we could solve the issue of regressive energy. The team lived in the village, ate with the consumers, and tried to understand what the need was. The first need that came up, in terms of energy, was cooking. We started thinking about the villagers as emerging consumers. Our mission was to develop a product and an energy solution to fit their needs that could also be cleaner, safer, and affordable.

It was not an easy task, especially when you want to do it as a business. The work is not about charity. It is about creating a business. And so we developed a solution, a cooking stove developed with the technology in India. We used agricultural wastes in the form of pellets, as the fuel for the stove.

Profit maximization is the goal of the business: the more profit you make, the more everybody benefits. I feel uncomfortable with that concept, because the theoreticians behind it interpret human beings too narrowly.

NGOs became one of our distribution channels. We are their service provider, while they distribute the product. After three and a half years in India, more than 200,000 people have bought our solution, which is a good sign that it is a sustainable model. Of this, over 20 percent come from the NGO channel.

Social Business and the Limits of Charity

Muhammad Yunus: There is only one definition of business in the capitalist system: to make money. There is no other interpretation of that concept. Profit maximization is the goal of the business: the more profit you make, the more everybody benefits. I feel uncomfortable with that concept, because the theoreticians behind it interpret human beings too narrowly. They have created this artificial human being who is one-dimensional. All his enjoyment comes from one source,

which is making money. But real people are multi-dimensional human beings. Not only do they enjoy making money, they also enjoy giving away money. They enjoy touching other people's lives and making a difference in the world. Economics does not admit that.

My proposition is that in order to justify the totality of the human being, we need to create another kind of business. Social business is the business of doing good to others. It is a non-loss, non-dividend company with a social objective. Social business also refers to any profit-making business owned by poor people.

We created social businesses of several kinds. Grameen-Dannon Company is a joint venture company that produces yogurt. Our objective is to reach millions of malnourished, poor children in Bangladesh. We are putting all the micronutrients they need in the yogurt and then selling it at the cheapest possible price.

The charity dollar has only one life. You can use it only once; it goes and never comes back. As part of a social business, a non-loss company, the dollar never stops.

Beside social business, the only alternative that we have to help others is through charity. We could have conceived of the yogurt venture as a gift to the children, and it could have become a charitable program. However, there are several differences between the charitable program and a social business. One particular difference is that the charity dollar has only one life. You can use it only once; it goes and never comes back. As part of a social business, a non-loss company, the dollar never stops. The social business dollar has endless life. You create an institution so it can grow and can change direction.

Now, if all the children are already fully nourished, you do not need to give them any more of that special yogurt; you can move on to something else. You can continue to produce other products that will address other aspects of health. The company is dedicated to a social goal, so you can continue that social goal without running out of money, and that is a more powerful concept.

Moderator: Sheik Saleh, does what Professor Yunus is saying resonates with your own experience?

Shaikh Saleh Al-Turki: It does. Over the last 12 years I have worked with charities, and I can tell you there are no success stories; you always feel that you are going nowhere. The poor get poorer and the more money you spend helping them, the more are asking for support.

But all the programs we gave the poor families kept them poor. We decided to convert the chamber of commerce from a lobby for the big business communities to an advocate of social obligation for them. We concentrated on alleviating risks for small and medium-sized business companies. Most small business are scared of risks: they can go to jail for a very small amount of indebtedness, SR 3,000–SR 4,000 (\$1,000–\$2,000). Last year we got 130 small businessmen out of jail for such small amounts owed. They could have ruined their lives if we did not help them. Today we have a program that gives them technical training and financial support, and stands by them if they have legal issues.

Next, we realized that a lot of poor Saudi girls have no education, are not trained, and will end up on charity – unless we help them. So we created a program where training institutes go to major companies and promote hiring Saudi girls. If they succeed, these girls are trained at government cost and get jobs. Today we are hiring about a 100 girls every other month.

We also have a program now to train fishermen. Saudi fisherman in the Red Sea lost interest in fishing because it could not support them financially. So today the government provides boats, we give them training, and we are trying to raise their income per month from SR 1,500–SR 2,000 to SR 9,000. In Al-Kohima, where we had 50 fishermen, their per-month income jumped from SR 3,000 to SR 9,000.

Finally, we have a program for deaf girls who are handicapped. Textiles is a big business in Saudi Arabia. Through the Deaf Club of Jeddah, of which I am the chairman, we have hired 150 deaf girls, who would ordinarily have no future, to work in a workshop. We are training them now to become embroiderers and within six months they will be able to earn about \$1,000 a month, working at home or in a workshop.

These programs are much more important than charity. What Mr. Yunus is saying is right. Every dollar you spend on charity gives you nothing. Every dollar you spend on social programs gives you back at least 30 percent, if not 50 percent.

The Role of Good Government and Enablers

Moderator: We have heard from several business people. Now we will hear a government point of view. Lynne?

Lynne Dovey: Let me bring the perspective of good government. Good government has integrity, ethics, and standards. It must know what outcomes it wants. In New Zealand, I belong to a strategy team, and believe we must take the long view when thinking about outcomes for people. Provocatively, I ask “What is the vision for 50 years?” But in a recent seminar, a member of the circle said that he was thinking 500 years out. We need to be thinking about those seventh-generation voices. That is a prime responsibility of government.

The other thing I want to talk about is the role of government vis-à-vis business and vis-à-vis

the society. The traditional role of regulator is important. The government establishes the law and sets up the incentives for good business. The government can do lot of harm by having poor incentives.

All human beings are packed with all the entrepreneurial, creative, and innovative capacity they need to succeed. All human beings in the world have the same capacity and creativity.

But the role that I have become particularly interested in over the last ten years or so is the role of enabler. An enabler is a person who helps somebody achieve something. Enablers may be brokers of an arrangement, or simply influence. They work in cooperation with others. One of the things that I have been doing is working in multiple sectors – the health sector, social sector, and in our economic development ministry – to achieve outcomes for the people of New Zealand.

A couple of years ago we were privileged to have Peter Senge visit New Zealand, and we worked with a community in the Auckland region that was concerned about young people and violence. We got the NGOs and the grassroots community groups together. We shared with them the story of Roca, a non-profit organization in East Boston which helped the local government organizations and the city managers to cope with serious youth violence. The government organizations and the police said that they did not know how to handle youth violence, and Roca stepped in. In that case, the government stepped back, and it enabled Roca to step up. For me, that was a wonderful story about government enabling.

I shared the Roca story with a very diverse group. The chief of police asked me to come and share the Roca story with his staff. The word got out, and suddenly 125 people wanted to come, basically to

meet with each other. And so I became an enabler for that process. We managed to hold the police and some NGOs who were very angry with them – and vice versa – in the same room for half a day and have a conversation around common problems. That dialogue was a critical opportunity.

What is poverty really? If you look at these experiences, again and again, you come to the conclusion that poverty is not in the person. It is not created by the person who is poor. Poverty is created by the system.

The Power of Dialogue and Opportunity

Muhammad Yunus: One point that I have been raising again and again is the power of opportunity. Through Grameen Bank we constantly see, for example, a person who a few years back did not know anything, had never touched money. Now that person is changed completely, an enthusiastic entrepreneur. She is running an expanding business. All human beings are packed with all the entrepreneurial, creative, and innovative capacity they need to succeed. All human beings in the world have the same capacity and creativity.

We have been encouraging our borrowers to send their children to school. Their children are now in the colleges. Right now more than 21,000 students are in medical schools, engineering schools, and

universities. Occasionally, when I go to the villages and I see a mother who is still working in the Grameen Bank. She started 12 or 15 years ago with a tiny loan to raise chickens, and gradually improved her life and bought a car. She now has several cars, and has sent her daughter to school to become a doctor. The mother could have been a doctor too, but she never got the opportunity.

What is poverty really? If you look at these experiences, again and again, you come to the conclusion that poverty is not in the person. It is not created by the person who is poor. Poverty is created by the system. I am sure that the daughter of the doctor will not go back to illiteracy. She will push the envelope further. What is wrong with the system? Why could they not fix the system? If you want to remove poverty, instead of trying to fix those who are poor, we should be trying to fix the system.

This is our planet. We have not come from any other planet. This is our home. If this is our home, we have to make sure that it is a safe place. We must hand over this planet to our next generation safer and healthier than we found it. That will be our responsibility. Today it does not look like we are doing that. It looks as if we are the last generation, enjoying the world as much as we can. And all that comes back to the concept of the businesses that we run. Because the only thing we have is a robot-like maximization of profit. We cannot forget everything else. We have to bring back those other considerations and values.

Profit maximization is not the answer. ■

ABOUT THE AUTHOR

Muhammad Yunus, a banker and economist, founded the Grameen Bank in Bangladesh in 1983. Determined to help the poor escape poverty and fueled by the belief that credit is a fundamental human right, he provides tiny cash loans on terms suitable to borrowers. By sharing sound basic financial principles, Yunus teaches people to help themselves. His simple idea of microcredit has grown into an international movement for which Yunus was awarded the 2006 Nobel Peace Prize. He is the author of *Banker to the Poor* (Public Affairs, 2003) and *Creating a World Without Poverty* (Public Affairs, 2008). reflections@solonline.org

FEATURE 9.2

Serving the Underserved

Progressive Energy Solutions Through a Sustainable Business Model

BY ROBERTO BOCCA AND PREMA GOPALAN

One of the best attended sessions at Sol's 2008 Global Forum in Oman was a presentation by Roberto Bocca, then director of Emerging Consumer Markets for BP Alternative Energy, and Prema Gopalan, the founder and executive director of Swayam Shikshan Prayog (Self Education for Empowerment, or SSP), a non-governmental organization (NGO) in India. The two organizations partnered to look at solving the problem of bringing clean energy to some of India's poorest people. This took the form of creating a market together for an innovative, affordable cooking stove that uses pellets made of agricultural waste as fuel. The following is adapted from that session, which addressed the unique nature of corporate-NGO partnerships.



Roberto Bocca

Roberto Bocca:

At the end of 2004, BP started looking at the bottom of the pyramid, those who are economically underserved, who use “regressive” energy. Regressive energy is energy that is considered unhealthy and unsafe. More than 3 billion people around the world use regressive energy, and 1.6 million people die every year of respiratory diseases and indirect pollution attributed to burning regressive fuel. This issue presented a business opportunity for us, and BP began working with SSP to understand how we could solve the issue of regressive energy. The partnership between BP and SSP grew such that SSP became one of the largest distribution channels for a clean-burning stove, and even invested in some manufacturing.



Prema Gopalan

After three and a half years in India, more than 200,000 people have bought our Oorja stove and biomass pellets solution, which is a good sign that it is a sustainable model. Of this, over 20 percent come from the NGO channel set-up by SSP. The partnership with SSP has definitely added value to BP.

In terms of what factors play into partnerships between non-governmental organizations (NGOs) and corporations, I'd like to emphasize the following points about BP's involvement with SSP:

1. Partnership is key.
2. Our business is a business. Our system has to be socially sustainable, environmentally sustainable, and profitable. Without those three elements, the business will not work.
3. Our approach has been very rigorous. While we are co-creating and working with partners, we have created all of the phases that are needed in any business or project.

4. It is necessary to link the three elements of “people, planet, and profit.” Our challenge is always to bring the three elements together to some level of balance.
5. We have been co-creating with the consumer. All that we have done has relied on the access to the consumer that we have achieved. Close to 20 percent of the access we have to our consumers today comes from work with SSP

as an NGO partner. The consumer has always inspired our product.

Prema Gopalan: SSP began as an informal network for the economic empowerment of rural poor women in 1990. After India’s 1993 earthquake, SSP worked in over 1,000 villages in rural Maharashtra to lead disaster recovery efforts. Fifteen years later, SSP partnered with BP Energy to create a business partnership that built on SSP and the networks that emerged from the disaster work. When similar disasters occurred, the latest being the tsunami, SSP involved women’s groups in the recovery and development. Today the NGO partners with over 60,000 women in self-help groups or networks in three disaster-hit states in India.

SSP’s primary goal is to build the social and economic competencies of women at the grassroots level, by creating networks that enable communities to move from the margin to the mainstream of development. We value our partnership with BP, as it has introduced us to a business opportunity that provides livelihoods to large numbers of women who are first-time entrepreneurs.

For poor women, any kind of learning is seen as a luxury. SSP began as a self-education experiment that organizes learning around practical issues. Poor women are centrally involved in finding solutions to the practical problems that the poor face – be it health, water, food security or energy. Social mobilization designed by SSP ensures that women’s groups learn and act collectively by traveling out of their homes for exchanges, market exposure, and training workshops.

SSP provides support to over 5,000 groups that form the economic and social base of our network. Women’s groups operate savings and credit and insurance businesses and act as information providers and planners. Mature groups improve access to services by working hand-in-hand with service providers and government to improve quality of health, water and sanitation services.



By using a market-based approach to development, SSP has created new markets in rural villages that are traditionally difficult to reach. We involve the grassroots women's network in co-creation of the product, business model, and the business itself. Global corporations entering the rural markets in India have found that women's self-help networks involving more than 30 million individuals have an extraordinary reach to remote villages. These groups are formed by the government, by NGOs, and by groups of women themselves. Women who take microcredit start micro enterprises. It is an entry point that allows them to develop financial and organizational capabilities.

Corporations are partnering with NGOs to connect with these networks for marketing and distribution of products. When we started working on the partnership with BP Energy, we found that our biggest challenge was to prepare the women's groups and the NGO teams to shift from development to market-based approaches that entailed partnerships with commercial entities and "Be Ready for Business" social values. This is very different from the micro-credit story.

The Innovation Brought About by the Partnership

In the search for solutions that address basic needs, SSP promotes social businesses that are designed to fulfill three goals – social impact, sustainable livelihoods and women's empowerment. What was really important was that we saw a huge business opportunity that was right in the sectors that we cared about most.

Grassroots women are at the forefront in bettering quality of life. We listened to their demands for products and services that promote "savings" of time, energy, and money. They want to be at the center of creating these products and business models.

Since 2007, the SSP-BP partnership has catered to the clean energy needs of 58,000 customers and families by creating a for-profit entity. Prior to the

launch of the business, the NGO identified the villages, the women, and the groups that would be involved. At the center of the business model are the women's networks, which act as a business platform. The network appoints women as village level entrepreneurs (VLEs) or "Jyotis," a symbol of energy. Jyotis are responsible for the home delivery of cooking stoves and pellets or bio fuels. They are the first users of the stoves. They demonstrate the value of using clean fuels and vow to convert their neighbors and help to create smoke-free villages for the future. Linking to customers through the Jyoti network allows corporations and NGOs to understand rural households and their needs, and to facilitate sustainable solutions.

The engagement between BP and SSP with grassroots women's groups in the partnership created a multi-dimensional business model that followed the growing theme of "People, Planet and Profit." Women are "daily life experts" on practical issues such as food systems, fuel, water facilities, and waste recycling. The co-creation process builds upon their insights to test and innovate new products, reduce costs and empower women to play new roles in the operation and management of business.

Both BP and SSP had to develop very different ways of thinking and working together, because the business models for serving these emerging consumers profitably are different than others. We need to move further in terms of numbers, because this is a high-volume business with low margins. Scaling up is a challenge, but the process can be replicated because in almost every Indian village, women are organized in self-help groups and micro-credit networks.

Producing Social Development Gains from Corporate Partnership

We have gained a fair amount of knowledge about how social networks can function in a business environment. The NGO team, together with the Jyotis, have some powerful insights to offer on how to conduct business in remote, hard-to-reach rural markets. We have created a "social market"



from our member networks that responds to new products and deals with market relationships in a way that is a win-win for commercial entities and communities.

Our real challenge involves sustaining the outcomes of our partnerships. On a daily basis, the business model must deliver social value and business offers to the consumers. People must see and feel such values, because otherwise we will lose their trust, the relationship will go bad, and everything could go wrong very quickly. NGOs bring in credible long-term relationships that are truly helpful in starting businesses in remote markets.

In the prototype testing, things went wrong, but people did not take to the streets. There is patience and understanding between our consumers and members, because networks and groups were explaining the processes. We have to invest in networks, in horizontal learning, and in teams and women who are part of the innovation in order to produce a community of business leaders who can transfer insights across networks, institutions, and corporations.

BP has been extraordinarily sensitive to the fact that women at the grassroots are driving the business on the ground. Experienced Jyotis or entrepreneurs train and hand-hold new entrants. This principle guides our training strategy. We have refused any inputs from commercial market agencies for training, market research or marketing. As an NGO, we have built on scaled social campaigns and used popular promotion methods to take the product to weekly markets and to homes.

Our annual gathering of Jyotis or entrepreneurs was held in early January 2008. It was attended by 820 women – a huge leap from the 30 who attended in 2007. Women presented plays and sang songs about how the stove had changed their lives. They called the stove by names including Lakshmi, [the goddess of wealth and prosperity and a household deity of most Hindu families], because it is an integral part of their life. Cooking food and fire are very important symbols in India. Other songs and skits were about creating awareness among men – fathers, brothers and husbands – about what the women are doing, convincing them that investing in the new coking stove and fuel will pay off.

The system has given women a new economic identity in their villages. Many of them are getting elected to local governments. But what is more interesting is that they have gained the confidence to start new businesses. Unlike before, they are investing their money and taking risks. They are keen on creating a business platform. This can be a boon for large companies wishing to partner with a network of distributors in emerging markets.

Roberto Bocca: The big challenge for us is how to go forward: 200,000 households is great. It is about 1 million people. But it is nothing compared to what we want to achieve.

I think that everybody realizes the value that we are bringing by discovering a new world, a new way of working, and a new space. Being in the market, we have to find out what consumers really want. We started somewhere, and are now somewhere completely different. We are starting to look into the value of carbon. Three years ago, carbon was not even in the agenda.

Prema Gopalan: There is tremendous interest within India from NGOs and corporations on continuing to work together. We struggled to recruit women in the beginning, because women and communities did not understand the concept of this business. There was a lack of family support

for the women, which changed dramatically once families started using the product. They understood its value, and word of mouth is the best marketing we have. Men have become supportive and help women entrepreneurs to handle the business – carry things, keep records, handle cash, and so on. The house is the shop front and therefore is both an asset and a contribution for this business.

We are not faced with drop-outs as yet. But we need women who are more prepared for business and ready to take on risks. We plan to increase economic incentives and introduce social incentives together with better training and monitoring. The business is over if women start dropping out. So, it is important that we sustain women in the first four or six months until they cater to enough customers and earn sufficient incomes.

Next year, we plan to invite GROOTS International – both grassroots women's networks and organizations from Latin America, Africa, the Caribbean, and parts of Asia – to come see our work. They will not learn about the system otherwise, and they are interested in learning how to partner with a corporation. They want to understand what grassroots women are getting out of the partnership, see the partnership at work, and talk to the women on the ground. We all have a lot to learn together. ■

ABOUT THE AUTHORS

Roberto Bocca was director of the emerging consumer markets for BP Alternative Energy. He held various roles in BP since joining the company in 1995. Since 2004, he led the development of the business to provide access to cleaner, safer and affordable energy solutions to a large number of emerging consumers across the developing world. Before joining BP, Roberto worked in Italy for Telecom Italia and Finconsumo in Finance. He is a graduate of the Turin University of Business and Economics. robby2bocca@gmail.com

Prema Gopalan is the founder and executive director of Swayam Shikshan Prayog (SSP) a learning and development organization headquartered in Mumbai, India. SSP's mission is to build and enhance core social, economic and political competencies of grassroots women's collectives and communities with the aim of bringing the rural poor, women and communities from the margins to the mainstream of development. premagab@gmail.com

FEATURE 9.2

Matrix Sales University

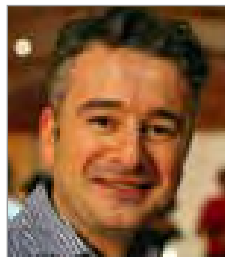
A New Model for Learning

BY ERIC MELLET, PHILIPPE PIERRE, BÉATRICE QUASNIK

An “intelligent” organization is one that makes systematic use of the intelligence of all its players in order to become ever more efficient. This article, based on an empirical study carried out over three years, traces the development of Matrix Sales University (MSU), which is part of the L’Oréal organization. It outlines the factors of MSU’s success and the difficulties of developing a learning organization with concrete operational aims. In view of the decline of traditional solidarity within business and the risk of geographical break-up, belonging to a profession with a strong identity and tradition is seen as the basis for establishing a professional community on a global scale.



Eric Mellet



Philippe Pierre



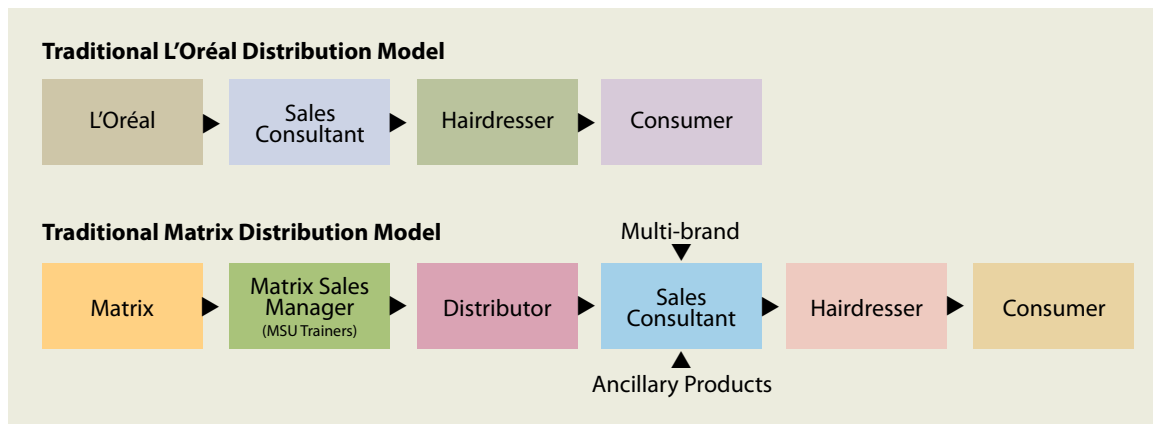
Béatrice Quasnik

The Matrix Sales University (MSU) is dedicated to training, developing, and assisting in the recruitment of salespeople for the brand Matrix. The French company L’Oréal acquired the number one American haircare brand Matrix from Bristol Myers Squibb in 2000. When L’Oréal was preparing the worldwide launch of the Matrix brand in 2003, all the elements of the “marketing mix” were in place except for direct distribution networks. Historically, these networks have been a strong factor in L’Oréal’s success: company sales consultants sell products directly to hairdressers, where as Matrix had traditionally been sold through the indirect distribution model. There was no simple answer to the question of how to internationalize a leading American brand, and deal with the challenge of distribution on a global scale.

“In the old-fashioned factory, there was little actual cooperation but a background of dense and stable links outside the working environment. In the modern business of networks and projects, cooperation is intense, but it is set against a background of weak and shifting links.”

— RICHARD SENNETT

Realizing it was impossible to tackle this challenge from headquarters alone and without the necessary resources to pay external consultants to spread the word, L’Oréal’s Sales Training and Development team decided to devise a specific training program for an indirect sales network. Its major objective would be to train, develop, and assist in the recruitment of the best possible salespeople. This global program would empower the Matrix sales managers to train the distributors’ sales consultants, who often sell other haircare brands as well as Matrix (see Figure 1). Keeping the sales force engaged, building on their professional identities, and securing their loyalty to the Matrix brand would be of paramount importance.

FIGURE 1 **Route to Market**

Stage One: The Pilot Project

Few such programs existed at that time in the U.S., despite its being the birthplace of the Matrix brand. L'Oréal Project Manager Eric Mellet discovered a rudimentary training program in Great Britain from which he was able to construct, with the help of a British consultant, a pilot model for commercial training. Mellet chose to rely on his own intuition in developing the pilot, and focused on the idea that “before you can do business; you have to create a relationship. In the same way, before you can engage in training, you have to create a relationship.” The program was designed to enhance and develop relationships between the participants and trainers, and among the participants themselves.

The first session took place at the end of August, 2003 in the Polish town of Plotsk, several hours drive from Warsaw. Fifty-three sales representatives awaited the arrival of the British and French consultants with no great enthusiasm. They had no idea what the program consisted of, but well understood that at the end of it they would find themselves in the field selling Matrix-associated products and services. The module consisted of three days of training, the first devoted to knowledge of the product, the remaining two to appropriate sales behavior.

The new program was based on the study of actual situations, and participants were encouraged to intervene and interact spontaneously at



any moment. The instructors, despite speaking no Polish whatsoever, were well received, but the use of live translators resulted in a communication time lag which stifled spontaneity. “Imagine telling a joke and having people laugh two minutes after you’ve delivered the punch line,” said one trainer. “You need good intentions on both sides to get through situations like that.”

The trainers also encountered another unforeseen cultural barrier: trainees were not used to getting involved in discussion and behaved far more passively than the instructors had anticipated. For Polish sales representatives to dare to express themselves in role-play situations, they had to feel secure.



Merely telling them they were was not sufficient; they had to feel it. A sense of trust was needed for them to understand that the instructors who had come from afar were there not to judge but to train them.

The trainers worked hard to establish and build on attendees' trust, changing plans and logistics several times as they sought to identify and build on what worked with the group. "Energy circulates" as one trainer put it, and the use of audiovisual supports, music, and "ice breaker" exercises lightened the mood and encouraged learning. The participants' superiors, who joined the sales teams for the closing evening session, expressed outright astonishment; they barely recognized the enthusiastic sales staff they had recruited.

During two more test sessions (in Russia and the Czech Republic), the international status and expertise of the instructors – which again could have created a barrier between them and the local participants – was soon forgotten. The combination of reassurance (for the necessary "letting go" of hardened salespeople), thoughtful timing, and creativity, notably in the role-plays, yielded the

desired result. As one of the instructors underlined: "It's not about sacrificing creativity in the name of rigor. Rigid training erases the richness of the relationship, in the act of selling as in the act of training. There's no difference between a good sales rep and a good instructor, and that should be felt during a training session. Daring to personalize training is about defending the sale and its creativity."

Reflection and Learning for Stage Two

With 135 salespeople trained, Mellet's team (in charge of what would become the MSU) felt that the time was right to review the operation. More than 30 other countries were waiting in line to launch the brand, including giants like China, India and Brazil. It would be impossible to rely on direct one-to-one training. It was clear that delegating training responsibilities was necessary. Once again Mellet made an intuitive rather than an intellectual decision and, aided by his martial arts training, was able to look at the situation from a completely different perspective. A former sales representative himself, he returned from his meditations with an idea that contained all the elements that eventually developed into the MSU. He envisioned a training organization that would resemble a university and would function like a franchise, supplying support to subsidiaries. In addition to training representatives, it would be run in such a way as to ensure the recruitment and secure the loyalty of hundreds of salespeople throughout the world.

To be effective, the strategy had to be shared with all levels of the business hierarchy, including sales staff, sales managers, operational directors of the headquarters, marketing and training teams. All the participants (representatives of the staff both of Matrix and its distributors) had to be able to unify around a common profession – commerce – and a pedagogy aligned with the stated values of the brand as it originated in the United States ("connected," "daring," "smart tech," "positive energy," and "professional passion").¹ Defined as KTD ("Knowing/Training/Doing") the three-stage training process, at both basic and advanced levels, would

consist of 1) preparation with the “knowledge content” as a common point of reference; 2) “training” with actual situations, role-plays, and practical cases; and 3) “doing,” which would conclude with on-site “road check” sales calls with a trainer. After this confirmation, salespeople would be given their “passport” and validated in the MSU database.

The MSU dynamic is based on group learning: notions of group, community and interaction between participants are present at every formal step of the program. At the outset, constraints such as time lag and geographical distance would have made a good case for an e-learning tool with a minimum of human presence. This option was immediately rejected. The program designers understood and took into account the fact that commercial performance and the economic exchange between hair stylists and sales representatives throughout the world are often underpinned by concrete interpersonal relationships. Through these relationships they distribute information and share best practices, as well as different forms of professional, cultural and social capital. For MSU to work – to build knowledge (both individual and collective) and loyalty – participants needed to feel “seen,” that they “belonged” to an MSU collective, one that transcended national boundaries.

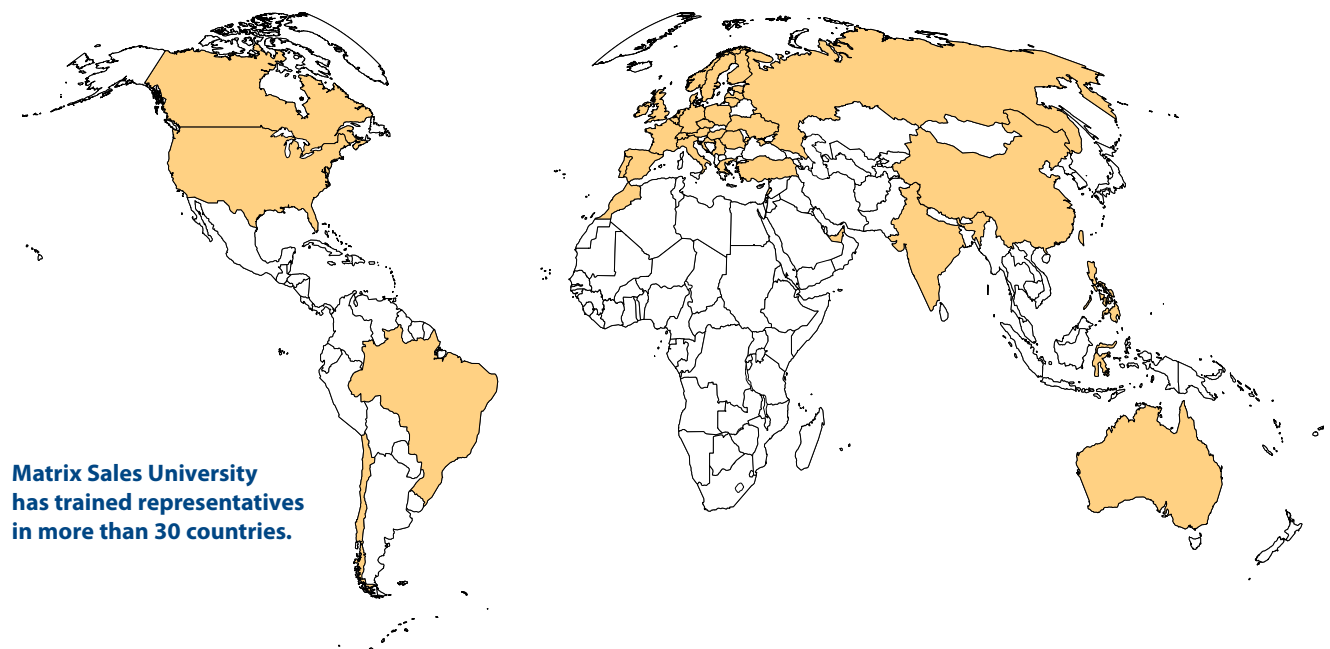
The program also had to overcome two major obstacles: language and history. When more than 20 nationalities are gathered together, one cannot simply insist on conventional English, and even less on simultaneous translation, which is prohibitively expensive. The language barrier can in fact be the more dangerous of the two obstacles, because the problems that arise from it are often difficult to detect when using live interpreters and English as a common working language. MSU trainings would emphasize non-verbal communication to allow an engagement that was easier and more powerful on the part of the participants. Training programs would make extensive use of music, videos, and any aspect of nonverbal communication that could federate and communicate positive energy.

The second cultural obstacle is historical. Just twenty years ago, the countries in which the first three sessions took place were living under a political regime that left little room for individual affirmation. If the approach had been presented as being based on one single “team,” it might have provoked considerable turmoil at a time when the Poles, Russians and Czechs were only just beginning to discover the market economy. While being fully aware of the potential misuse of psychology in the workplace, the MSU promoters nevertheless sought to valorise the symbolic dimension of belonging to the MSU, encouraging, for example, the awarding of diplomas to participants at the end of the session, a ritual that marks a rite of passage from “ordinary person” to “member of an extraordinary group.”

Stage Two: MSU Trainer Camps

The conception and the development of the global train-the-trainer program took ten months. It was organized around two principles: a balance between common content and practices, and the ability to adapt the training to different cultural contexts. The second principle consisted of creating the conditions needed to allow the salespeople to appropriate the program as their own.





**Matrix Sales University
has trained representatives
in more than 30 countries.**

In February 2005, just 18 months after the training session in Poland, the team held the first “MSU Trainers Camp” outside Paris. Forty-five instructors from 32 countries (including China, Sweden, Canada and Great Britain) joined together. For the promoters of the MSU, this was the decisive moment. They were testing, on a real scale, the “teacher training” tool they had been working on for months. The hotel they were staying in took on a real campus feel, with as many as 16 languages spoken around the dinner table. For five days and four nights, participants bonded in what became an intense personal and professional experience. By the program’s close, it was clear that the MSU challenge was being taken up. Just two months later, the first wave of national commercial managers began launching their own programs, having sold their distributors on the idea. Understandably they were the “old hands” who had taken part in the first experimental sessions: Poland, Russia, and the Czech Republic. They were soon followed by Hungary, Finland, Italy, Chile, Hong Kong, the Philippines, Lebanon, Dubai and Canada – more than 15 countries in all, in which 500 Matrix sales staff were trained.

After this first Trainers Camp, the “MSU Trainers Community” formed. An Internet site was created, and trainers posted photographs and videos to circulate the latest news and experiences of the

instructors, sales staff, distributors. After the second Trainers Camp, another wave of countries launched their MSU franchises: China, Brazil, Great Britain, Germany, Austria, Switzerland, Belgium, Sweden, Morocco, Greece, Croatia and Romania.

The mass training system gained in power and gave rise to several remarkable local training initiatives. In Canada, for example, an agreement was signed with Laval University to certify training undertaken by the MSU. Some countries took the initiative and developed modules to meet their own specific cultural or technical needs. These innovations were incorporated into the basic program, and adopted with ease by other countries. A worldwide community linked by common practices was clearly forming, in which each member country supplied their own specific codes and contents.

Learning How to Learn Together

Training Camps are destined to offer training supports that are subsequently relayed to representatives who are, to quote a manager from Matrix Russia, generally “people who have undertaken only brief formal studies and who more or less admit to feeling bad about the fact. This constitutes a mental model that makes them recalcitrant to training; they see themselves as “bad students,” and anything that resembles school as

an obligation they wish to rid themselves of at the earliest opportunity, as it is for them synonymous with failure. They also have a great need of recognition, a kind of revenge they need to take against life. It's the financial success of selling and the social recognition that goes with it that motivates them."

The power of the MSU approach comes in part from the fact that the creators of the program confronted these very difficulties and turned them to the program's advantage. An adult in training is not someone who doesn't know, but rather someone who aspires to know differently, the better to construct his or her own autonomy of thought and action. The pedagogy of the Training Camps seeks to "take off from" operational questions from the participants themselves. Wherever the MSU has been deployed, it has been impossible to know in advance the skill level of the salespeople, or the mix in terms of age and ambition, which leads trainers to "choose to work each sequence from the skills that are already present in the room," as one instructor put it. Finding the right mix is not only a question of technique and pedagogical ingenuity; it rests on a fundamental choice, one specific to the learning organization, where one renounces the temptation to only plan and control. It trusts that the training will unfold organically, naturally and spontaneously.

From this pedagogical work arose, or rather was revealed, an intense need for the actors to "put it in words," to recount their sales and management experiences. The Training Camps, like all the MSU training sessions for sales staff, revealed an inter-adult teaching domain that was largely conversational. Role play and discussions elicited knowledge that sprung forth from participants, that was first and foremost a moment of orality, of *maieutics* shared among a group of equals. They also provided a forum for "learning by events" (losing a client, logistic breakdowns, a particular salon's credit difficulties, etc.). On leaving such a session of exchanges, people knew more, collectively. New knowledge appeared through the dynamic confrontation of different points of view and the stimulation that arose from it.

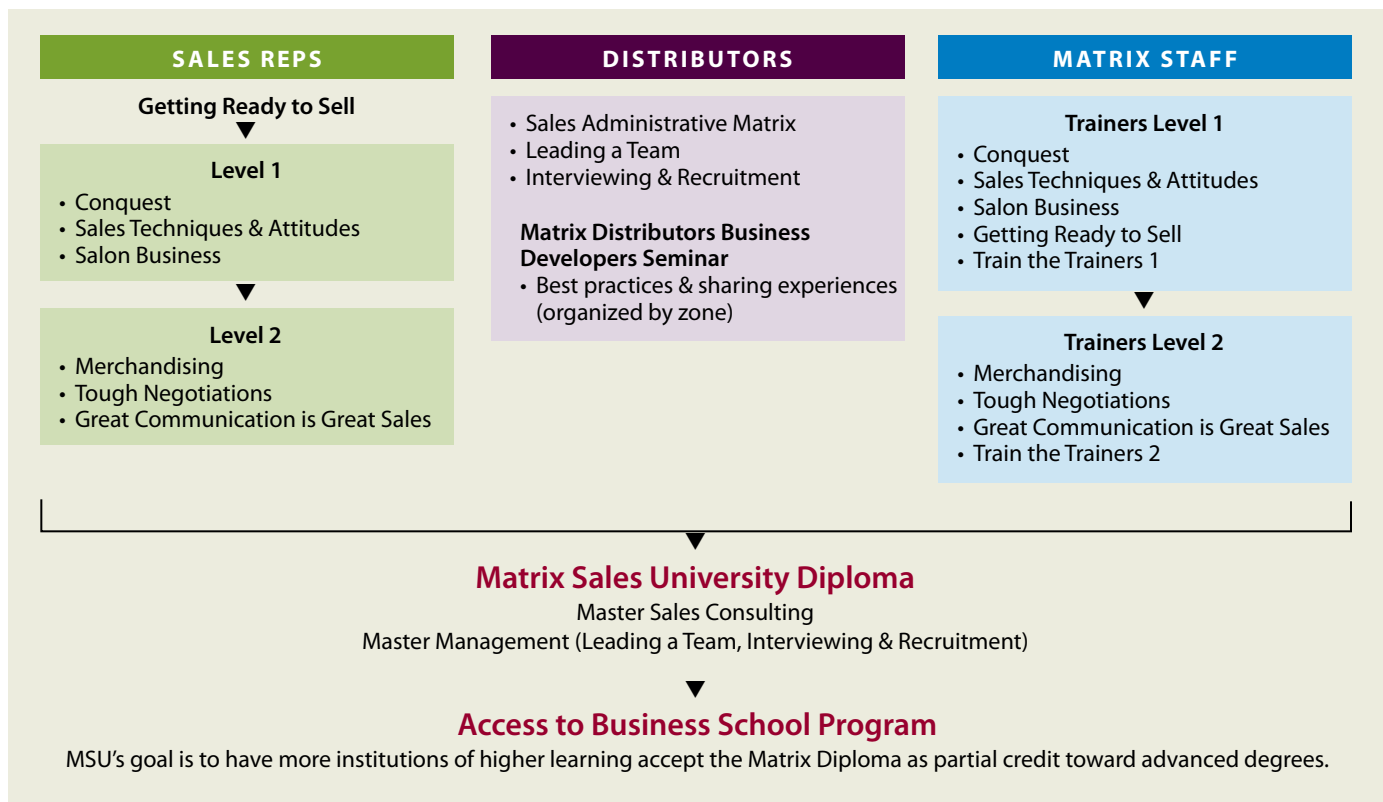
The MSU program seeks to transcend obstacles that make up cultural differences, as well as differences of training level and seniority within the business, by giving participants the possibility of expressing themselves in the service of a common project. For the MSU training to have meaning, it has to represent for all involved the opportunity

The MSU program seeks to transcend obstacles that make up cultural differences, as well as differences of training level and seniority within the business, by giving participants the possibility of expressing themselves in the service of a common project.

for both personal and professional development. Its holistic human approach integrates all the dimensions of "think – feel – act." This invitation to authenticity produces visible transformation (witness the Polish managers who no longer recognized their employees); strangers at the beginning of the course become firm friends, joined in relationships that will last long beyond the group illusion of the moment. In addition, by taking part in the local construction of training modules, the elders transmit to the young, and stand a good chance of securing their loyalty. The elders feel valorised and rediscover that the paradox of any training program is one of accepting others as they are, while offering them the possibility of becoming someone different. The business of training is, after all, structured with the objective to transmit knowledge.

Learning for the Future

MSU gives everyone the opportunity to learn continually, be trained at the Training Camps and, in turn, to train local teams upon returning to the country of origin. The "chain of value creation" on a worldwide scale has invigorated the learning process not only of the Matrix sales staff but also the brand's distributors. Since the 2006 launch of training in the U.S, there have been further

FIGURE 2 **The Matrix Sales University Curriculum**

The heart of the MSU's operation consists of two to five-day training seminars, conferences, e-learning, teacher training, coaching and various models of self-learning (through the use of CD-ROM and video). MSU also offers more innovative activities which are being formalized throughout several countries, such as practice-oriented communities on commercial expansion, and partnerships with major universities.

innovations, including the creation of a specific path for distributors, which was presented and adopted at the 2007 MSU Trainers Camp.

In most of the countries in which the brand is present, the sales network is indirect. But rather than relying blindly on salespeople's interest or abilities, MSU shows salespeople "how to sell intelligently, making the sale have a real value for the salon".² One of the objectives of the program is to train distributor teams to become more than simple "order takers" from the hair stylists. As a director of Matrix's Polish subsidiary put it: "Training the sales staff directly thanks to Matrix, we now have the means to check on site that the program has enabled our hair stylist clients to offer new services in the development of their business." The MSU enriches the nature of negotiations undertaken by

the Matrix teams with their (wholesale) distributors, and, consequently, further down the line, with the hair stylists themselves. It illustrates the global dimension of Matrix for those who have opted to contract with it. It is a training tool more advantageously priced and of superior quality than anything else on the market, conceived in close collaboration with other teams (marketing, education, and sales administration) dedicated to the brand. The training provided within the framework of the Matrix University has become a tool for external communication and even sales staff recruitment.

To date, MSU has trained over 4,300 people. Saying that it seems to be reviving the profession of sales representative where it is least expected is to underline that the profession, in a business

present in over 110 countries, constitutes the basis of belonging and a means of distinguishing between a good craftsman and a beginner, a scale of talent measurement. As Philippe Zarifian reminds us,³ “in principle – and we forget this all too often – the cutting edge of the profession is reached when, through hard-earned respect of existing rules, the individual manages to bring his/her own personality to bear and do something original.”

The MSU shows how the position of the players (sales representatives, distributors, general managers) within a network and the resources that are provided to become competent, which determines the world of possible economic action and the desire to learn. In the world of hair care, part of the informal economy lies outside the official regulation of economic reports, the nature of the business being also governed by rules of reciprocity within the domestic sphere, the social economy in part regulated by values associated with professional hair care unions. Networks, institutions and systems of meaning are constituent elements of the economy and complicate any

too hastily modelled representation of economic success as a simple a question of profit.

Finally, the MSU illustrates through its training tools and its system of internal normalization, how the “global” business creates its own private languages, different from those spoken in public and academic institutions (thereby perhaps even calling into question the real value of the diplomas it awards). For those piloting the training program on a worldwide level, one strategic issue affirms itself: that of developing, between countries and between teams, exchange and interaction of a kind of knowledge that does not originate in traditional school and university education; to assure the passage from tacit to explicit knowledge; to favor a learning process which is not conceived solely along the lines of unity of action, place, and time. There is not, on one side, a “commonplace” knowledge acquired through experience and on the other a “noble” knowledge produced by science, but instead a collective dynamic that moves from one to the other, each unable to exist without the other.⁴ ■

ABOUT THE AUTHOR

Eric Mellet is a sales training and development Director for L'Oréal Professional Products.
emellet@fr.loreal.com

Philippe Pierre is a consultant and researcher with the Interdisciplinary Laboratory for Economical Sociology (National Scientific Research Center – CNRS Paris). contact@philippepierre.com

Béatrice Quasnik is a consultant specializing in learning organizations. She is a member of the Board of SOL France, and author of *Unleash Your Energies* (Paris, First Management, 1995).
beatrice.quasnik@wanadoo.fr

ENDNOTES

- 1 L. Losoncy & J. Santy, *Passionate Salon Professionals* (Sanford, Florida: DC Press, 2006).
- 2 J. P. Thomassin, “Matrix U”, *Canadian Hairdresser*, 2006, p. 30.
- 3 P. Zarifian, “Organization apprenante et formes de l'expérience,” *Symposium Constructivismes: usages et perspectives en éducation*, Geneva, September 8, 2000.
- 4 V. Merle, “Apprendre tout au long de la vie : pourquoi, comment?,” Minutes of a quarterly public session at UNESCO, April, 27, 2006, the Worldwide Committee for Education and Lifelong Training, p. 3.

BOOK EXCERPT 9.2

The Necessary Revolution

How We Got Into This Predicament



Peter Senge

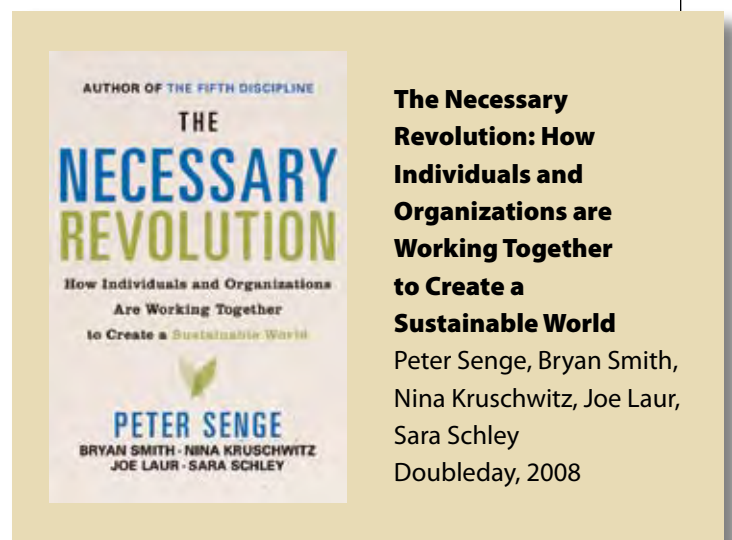
Something important has happened in the last stage of the industrial era that sets it apart from the past: Globalization has brought a level of interdependence between nations and regions that never existed before, along with truly global problems that also have no precedent. The Industrial Age isn't ending because of a decline in opportunities for further expansion. It is ending because individuals, organizations, and governments are realizing that its side effects are unsustainable. But endings are also beginnings. In *The Necessary Revolution*, Peter Senge and his coauthors share the guiding ideas that are essential for creating a more sustainable future: seeing systems, collaborating across boundaries, and moving from problem solving to creating. The book is full of stories and examples of individuals and organizations who are putting these ideas into action, many of whom are associated with SoL. This excerpt explains "how we got here" and lays out the case for urgency in radically shifting the kind of thinking that has made the industrial era so successful, and so disastrous.

The Wages of Success

How did we get to the point where we are running out of the resources (such as oil) that support our way of life, and others (such as clean air and fresh drinking water) that support life itself? And how did entire industries, such as fishing and agriculture, find themselves in trouble as well, as chronic overfishing and the drive for ever-higher crop yields led to widespread depletion of fish stocks and a historic loss of topsoil?

How on earth did we get here? The short answer is because of our success, success beyond anyone's wildest dreams.

In the first stage of the Industrial Revolution (1750 to 1820), the rise of large-scale manufacturing caused labor productivity in England to rise a hundredfold. But the Revolution did not simply change the way we worked; it transformed the way we lived, the way we thought about ourselves, and the way we viewed the world. Nothing like it had ever occurred before.



The Necessary Revolution: How Individuals and Organizations are Working Together to Create a Sustainable World

Peter Senge, Bryan Smith, Nina Kruschwitz, Joe Laur, Sara Schley
Doubleday, 2008

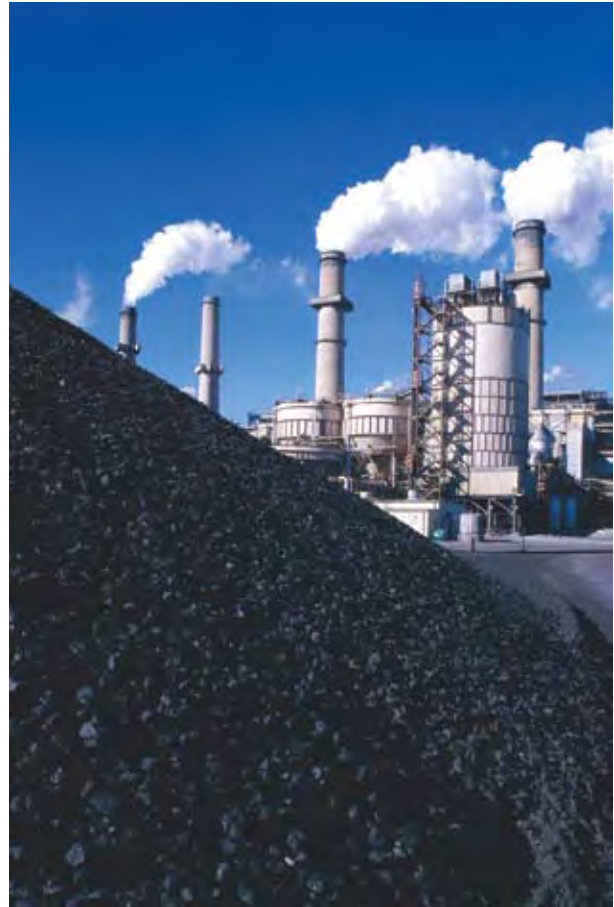
It didn't take long for innovations such as the assembly line to spread to other countries in northern Europe and to the hinterlands of the United States, whose exploding population and vast store of natural resources enabled the former colony to become the next industrial power. Industry was booming and so, too, were

the material standards of living. As the United States' population increased from about 10 million to 63 million between 1820 and 1890, the country's industrial production grew thirtyfold. The resulting fivefold growth in output per person was even greater than the productivity gains on the other side of the Atlantic.

The impacts the Industrial Revolution had on quality of life were undeniable. As industrial expansion continued into the twentieth century, life expectancy in the industrial world roughly doubled, literacy jumped from 20 percent to over 90 percent, and benefits hitherto unimaginable sprang up in the form of products (from private cars to iPods), services (from air travel to eBay), and astounding advances in medicine, communication, education, and entertainment. With this kind of success, it is little wonder that the side effects of the Industrial Age success story went largely ignored.

But the downsides of this great prosperity were steadily accumulating from the very beginning. Some were hard not to notice. In the 1800s, England's level of fossil fuel combustion grew dramatically, and so too did levels of water and air pollution. In the late 1800s, London's infamous "fog," particulate emissions from burning coal, caused a virtual epidemic of respiratory diseases once confined to coal-mining communities. By 1952, air quality in London was so bad that the "great smog" (four days of toxic air trapped over the city) killed more than 4,000 people and galvanized the government to create air pollution regulations.¹

Other side effects went unseen. Invisible CO₂ emissions in the United Kingdom rose from virtually zero to over a million tons per year by the end of the nineteenth century. During America's twentieth-century economic miracle, the amount of fossil fuels burned grew so much that by the end of the century CO₂ emissions totaled almost two billion tons annually, or about seven tons per person.



Despite growing awareness of the importance of a healthy environment and successes in pollution reduction, even a cursory summary shows that things have mostly gone from bad to worse worldwide. Let's look at the problems by category.

Industrial Waste

- The U.S. economy consumes over 100 billion tons of raw materials per year; more than 90 percent of this, by weight, ends up as waste from extraction and production processes. That works out to about 1 ton of waste per person per day.²
- Solid and liquid industrial wastes (such as plastics and petrochemical wastes) disperse through groundwater, and airborne pollutants (such as acids) can travel hundreds or thousands of miles

before they end up in rainfall, soil, and water. These pollutants affect health both directly (they've played a role in the significant increase in asthma since 1960) and indirectly (by decreasing food and water quality).³

- The "Asian Brown Cloud," a dense blanket of airborne, mostly industrial particulates, has been blamed for 500,000 deaths from respiratory illness per year in India alone.⁴
- Seventy percent of the developing world's untreated industrial waste is dumped into rivers, lakes, oceans, or soil.⁵

Consumer and Commercial Waste and Toxicity

- Approximately 8 billion tons per year of carbon in the form of carbon dioxide are emitted globally through the burning of fossil fuels for transportation, heat, and electricity worldwide. This is approximately 5 billion tons more than the biosphere can absorb.⁶
- Around the world, more than 90 percent of computers, TVs, video and audio recorders, PDAs, and other consumer and commercial electronics end up in landfills. About 20 to 30 million cars are taken off the road every year around the world; in the United States, about three-quarters by weight are recovered as scrap metal, but in the developing world, most old cars end up as waste in landfills.⁷
- Packaging waste has grown 400 percent in the past twenty years, mostly cardboard and diverse plastic containers and wrappings. While a few types of plastic containers are recycled at higher rates (such as water and soft drink bottles in developed countries), the vast majority of plastics worldwide – more than 90 percent – end up as solid waste. In the United States, for example, 93 percent of plastics end up in landfills.⁸
- Toxins embedded in everyday products also pose significant health risks even before they are discarded to landfills. For example, immunologists have shown that a great many diseases (such as many cancers) have become far more prevalent to-

day due to toxins in our bodies that come not only from food ingredients but also from chemicals in products, dyes used in cloth, and plastic compounds in children's toys, computer screens, and household appliances.⁹

Non-regenerative (Non-renewable) Resources

- In a study commissioned by the U.S. government, the U.S. petroleum industry recently reported that world oil and gas supplies will be unable to keep up with rising global demand over the next twenty-five years, which could lead to continually rising prices (oil rose from \$25 per barrel to \$100 per barrel between 2000 and the end of 2007), shortages, and social instability in both producer and consumer economies.¹⁰
- The United States consumes about 20 million barrels of oil a day (about 25 percent of global consumption); China consumes about 6 million; Japan, 5 million. About 80 percent of the oil consumed in the United States is imported.¹¹
- Other mineral resources in significant decline include zinc, copper, and iridium, all critical for technological innovations we've come to depend on, such as computers and cell phones.
- Coal is relatively abundant (known stocks are expected to last 50 to 100 years at current extraction rates) but problematic: It is the single biggest source of air pollution in the United States (and includes substantial amounts of highly toxic elements such as mercury), and CO₂ emitted per unit of energy (BTU) is roughly double that of natural gas. Coal generates 54 percent of the United States' electricity, 80 percent of Australia's, and 80 percent of China's growing electricity use.¹²

Regenerative (Renewable) Resources

- Freshwater quality. More than one-fifth of the world's people do not have reliable access to clean drinking water, and many are chronically dehydrated. Many natural water supplies – rivers, lakes,

groundwater – have become increasingly degraded. Roughly two-thirds of the water we use goes to agriculture, and runoff from pesticides and fertilizers is the single biggest polluter.¹³

- Topsoil. Overproduction has caused severe or extreme soil degradation of over 1 billion hectares (or over two and a half billion acres) in the past fifty years – more than the size of India and China combined.¹⁴
- Fisheries. Over 70 percent of the world's fisheries are chronically overfished. Many species are so depleted that if drastic actions are not taken soon, their populations will likely be unable to recover. This will affect more than just consumers; the fishing industry itself will suffer, and as coastal economies are ruined, the unemployed will migrate, becoming part of the growing millions of unwelcome migrants worldwide.¹⁵
- Forests. More than a third of the world's forests have disappeared in the past fifty years. Their loss, especially in the tropics, affects the lives of many communities and species and reduces the rate at which CO₂, the main greenhouse gas driving climate change, is absorbed from the atmosphere.¹⁶

Our diminishing resources and growing waste underlie a host of related economic stresses and reflect environmental and social imbalances that all but ensure that, without significant change, these problems will worsen.

The first imbalance concerns nature's capacities to continue regenerating resources and providing the "eco-services" upon which human life depends – clean water, breathable air, fertile soil, pollination, and a stable climate. In economic terms, most of these services either have no substitute or are prohibitively expensive to generate by alternative means.¹⁷ Today, according to the UN's Millennium Ecosystem Assessment report, one-third of the major ecosystems that provide these essential services worldwide – from forests to grasslands and wetlands – are in "significant



decline," and another one-third are "in danger." Since 1900, more than half of the world's wetlands have been lost. Today, 50 percent of the world's five hundred major rivers are heavily polluted or drying up in their lower reaches. The acidification of oceans (primarily due to the absorption of CO₂ from fossil fuels) has, in the past twenty years, caused the loss of 20 percent of the world's coral reefs, while 20 percent more have been seriously degraded. Many of these reefs protect coastal areas from flooding and serve as critical breeding areas for marine life.¹⁸

As the Millennium Ecosystem Assessment report also discusses, declining ecosystems and increasing pollution tend to correlate with the erosion of our sense of spiritual and non-material well-being, in developing and developed countries alike. Growing social stresses are all too often taken as the norm today. In the developed world, we are plagued by anxiety, overwork, stress, mistrust, fear, and anger. America isn't the only advanced country "bowling alone," to

borrow Robert Putnam's famous phrase for the breakdown of social community; similar signs of social stresses have been increasing in other nations, such as the tensions in Europe over growing African and Islamic immigrations.

In developing countries, environmental and social stresses often have a harder economic edge. According to the World Bank, from 1980 to 2000 the bottom quartile of the world's people found that their share of global income fell from 2.5 percent to 1.2 percent.¹⁹ Today, about 50 million people globally migrate each year to cities, usually driven by the collapse of traditional economies and environmental degradation of land and fisheries (as noted previously). This migration rate is far greater than can be absorbed by urban economies, and as a consequence approximately 500 million chronically underemployed people currently live in squatter camps or slums.²⁰

Inevitably, these underlying imbalances – deteriorating ecosystems and fraying social harmony – reinforce one another. The poor invariably bear a disproportionate share of the consequences of industrial waste and compromised ecosystems. This is one reason the extremes in inequity persist and are largely getting worse worldwide. Second, people living under growing stress, whether physical, psychological, or economic, have great difficulty acting as stewards for the future.

An inventory such as this can go on forever, becoming more exhausting as it becomes more exhaustive. The point, however, is not to be comprehensive but rather to be systemic: to see the deeper patterns behind all these problems, which at first glance might seem unrelated.

What these examples demonstrate is that the industrial system that has brought us so many benefits is now generating countless dangerous side effects that are swamping its ability to continue advancing standards of living. One of two outcomes is possible: Either we keep on with business as usual, leaving the accumu-

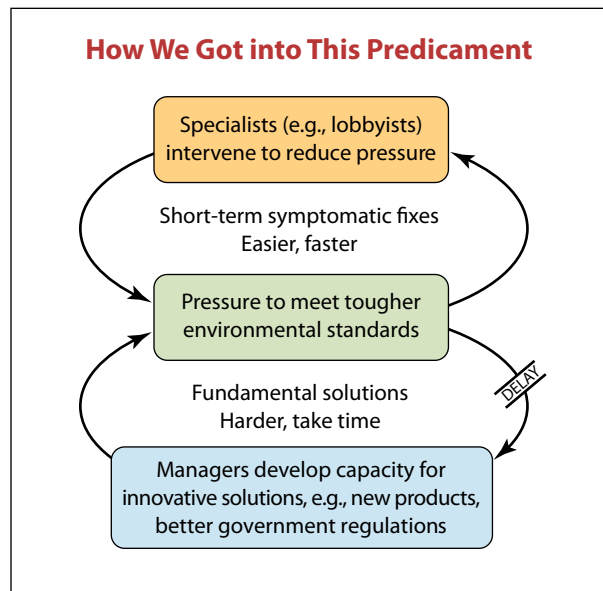
lating side effects to continue growing until they overwhelm us, or we step back far enough to rethink where we are headed. Notice we said the first thing that needs to be done is to take a step back.

Not surprisingly, when we – individuals, companies, non-profits, governments – first acknowledge problems such as the ones we're discussing, our instinct is to do the opposite, to apply exactly the same kind of thinking that created these challenges in the first place. We focus on the symptoms in front of us – the river is dirty, we emit too much CO₂ – and ignore the underlying forces contributing to them. We devise ways – usually through some combination of stop-gap regulations or find-the-villain blame games – to try to fix the symptoms.

Focusing on eliminating the symptoms is always tempting. Taking two aspirin to relieve the pain of a headache can be an effective solution that works quite quickly. But if a person gets severe headaches every few days, there are probably deeper, longer-term sources of the problem, such as stress or overwork, that all the aspirin in the world will not help. In fact, the aspirin can even make matters worse by masking the pain, and along with it the signals that there are deeper sources of the problem. Over time, this neglect leads to a worsening of symptoms and the need for still more intense symptomatic fixes, such as more powerful drugs that simply continue the pattern of ignoring the underlying cause of the pain.

In most organizational situations, this pattern, known as "shifting the burden," often includes shifting the locus of responsibility for dealing with difficult problems to various "others" or "experts." Business executives have been doing this for years, hiring consultants to sort out their chronic management problems, safety specialists to reduce the number of accidents, and, today, environmental specialists, such as pollution experts, to scrub emissions from smokestacks.

FIGURE 2.1 Shifting the Burden to “Expert” Specialists



The net effect of decades of shifting the burden to experts is that many people today regard issues involving water, waste and toxicity, energy, and community health as “someone else’s problems.” While businesspeople often have strong views about the ineffectiveness of government regulation, many also

simultaneously advocate that it is up to government to tackle such problems. And many, rather than working proactively with government to come up with more innovative fundamental solutions (lower loop in Figure 2.1), have shifted the burden to lobbyists who fight to preserve the status quo (the upper loop).

And, of course, government leaders likewise have their own set of “experts” for addressing symptoms in the form of environmental departments and agencies to whom they shift responsibility. These groups are often isolated from the core functions of government such as economic and foreign policy, taxation, and national security, and as a result their actions have marginal impact.

But the time for shifting responsibility to others, or covering up deep problems with simplistic solutions that only make problems “go away” for a short time, is running out.

In the earlier phases of the Industrial Age, the wealthy simply moved away from factories and their waste by-products. Later, we found ways to dump wastes farther away from population centers (New York City

Tips on Reading Causal Loop Diagrams

Throughout the book, you will find causal loop diagrams such as Figure 2.1, which portray interactions that give rise to patterns of change (or non-change) and forces over time. For example, in the shifting-the-burden pattern, the problem symptom “Pressure to meet tough environmental standards” can be addressed in two ways: a short-term symptomatic fix, such as using lobbyists, or a more fundamental solution, such as new environmentally friendly products or working proactively with government for better regulations. Think of these two loops as competing: If the symptomatic fix wins out, pressure to meet tougher standards diminishes and there is less need for fundamental solutions. But this leads to new forces. If fundamental solutions are neglected, the problem symptom will eventually return: since nothing is being done to actually address the underlying environmental problems, pressures will build up again. If the company still opts for the symptomatic solution when these pressures again need to be addressed (which is likely, given that the fundamental solution is no easier and they now are used to working with the lobbyists), it will lead to still more lobbying. In this way, forces build over time to shift the burden to depending more and more on lobbyists.

exports over 10,000 tons of solid waste per day).²¹ But in today's interconnected world, "away" is going away. As population and industrialization have continued to grow geometrically, waste generated in one region affects others. The earth, after all, is a finite system. Particulate emissions from Beijing affect air quality in Los Angeles, and those from Los Angeles affect asthma rates in New York. Our common atmosphere, oceans, and groundwater systems have always connected us, but the scale of industrial activity has now reached a point where the consequences of local actions are no longer simply local. The space in which short-term, Band-Aid solutions to fundamental challenges will work is contracting as fast as the space for more landfills and toxic waste dumps. The time for rethinking and redesigning is at hand.

Seeing the Whole Picture

For most of us, the endless litany of environmental and societal crises is overwhelming, both emotionally and cognitively. It is no wonder that so many simply "turn off" when confronted with another story of climate-change-related severe weather, water shortages, or toxic waste. The first problem to deal with is simply "How do I take all of this in without frying my circuits?"

"Systems thinking" has long been a cornerstone in our work on organizational learning, but the term often seems more daunting (it can easily sound like an intellectual task reserved for Ph.D.s) than helpful. In fact, systems thinking is not about fighting complexity with more complexity. It simply means stepping back and seeing patterns that are, when seen clearly, intuitive and easy to grasp.

Several years ago, working with the Rocky Mountain Institute, an energy and resource research and consultancy group, we developed a simple "systems picture" to help people make sense of the situation in which we find ourselves today.²² The gist of the picture centers on six basic ideas.

If you had to explain our predicament to a ten-year-old, this would be a good way to start:

1. The industrial system – what we make, buy, and use (from cars and TVs to buildings and power plants) – sits within the larger systems of nature.
2. This larger natural world includes living, regenerative resources, such as forests, croplands, and fisheries, and other resources that, from a human time perspective, do not regenerate, such as oil and minerals.
3. The regenerative resources can sustain human activities indefinitely, so long as we do not "harvest" them more rapidly than they replenish themselves.
4. The non-regenerative resources can only be depleted or "extracted." (That is why mining, oil production, and other similar industries are called "extractive industries.") And not surprisingly, since they cannot be replenished, sooner or later – as is happening right now – many start to run out.

Because modern societies are set up to focus on the benefits and output of industry, we tend to either not see or pay less attention to the fifth and sixth features:

5. In the process of extracting and harvesting resources in order to produce and use goods, the industrial system also generates waste – waste from extracting and harvesting resources, and from how we produce, use, and eventually discard goods. This waste damages the ability of nature to replenish resources.
6. The industrial system also sits within a larger social system of communities, families, schools, and culture. Just as overproduction and waste damage natural systems, they also cause anxiety, inequity, and stresses in our societies.

These six ideas are captured in Figures 2.2a through c on page 27, starting with the initial phase of the Industrial Age, driven primarily by expansion of production and employment, and continuing into the last half

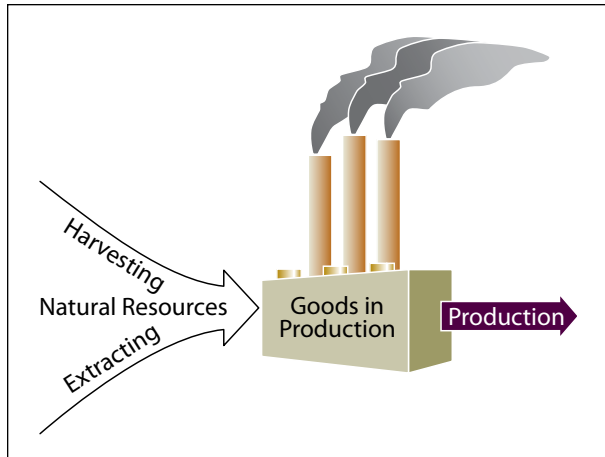
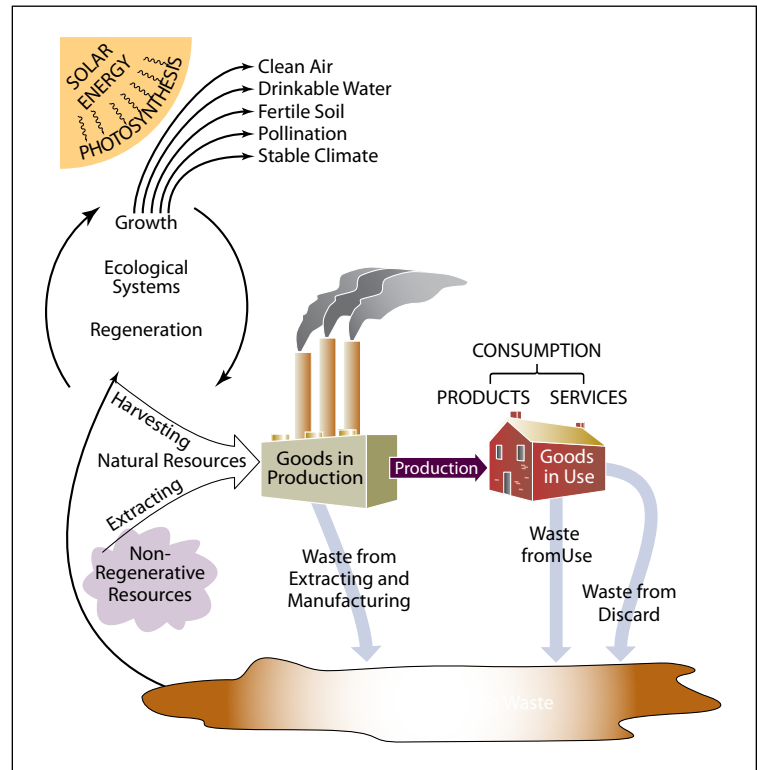
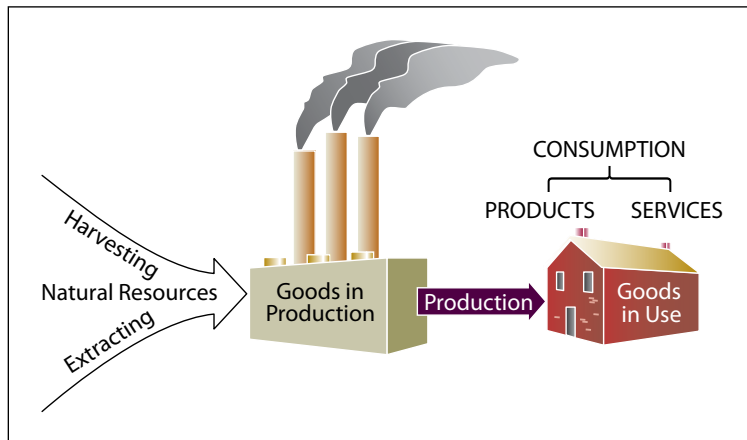
FIGURE 2.2A **Industrial Age (1750–1950)**

FIGURE 2.2C

FIGURE 2.2B **Industrial Age (1950–Present)**

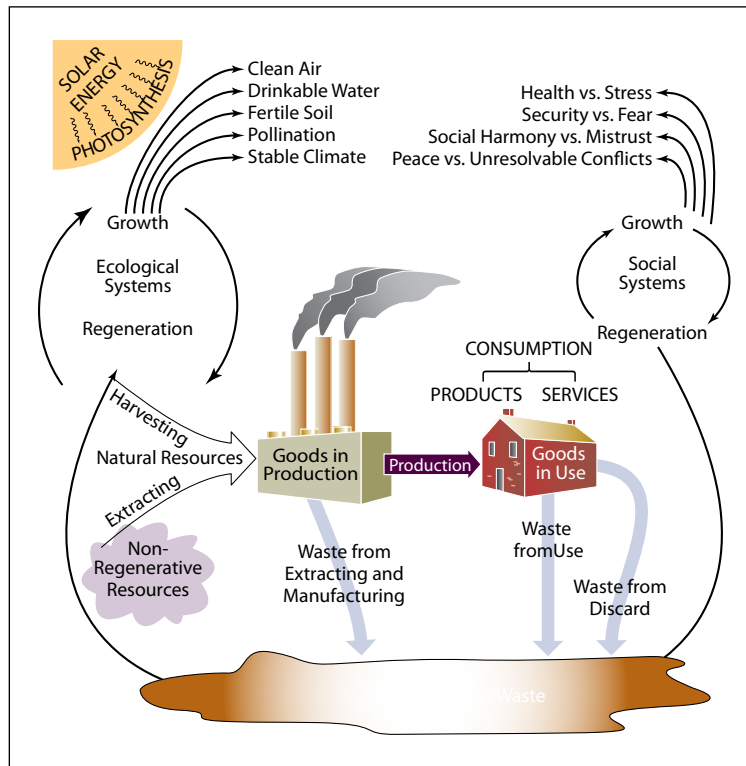
century, driven increasingly by growing consumption. This includes consumption of both tangible consumer goods (such as cellular phones and iPods) and services (such as air travel and music downloads), both of which are produced by companies based on their capital equipment and facilities.

But seeing the whole picture is difficult (see figure on page 28). Until very recently, most politicians, businesspeople, and media have focused on only the

“system within a system” – the industrial economy and how to keep it expanding. Concern for the health of the larger social and ecological systems within which the industrial system sits has been confined largely to the “back page,” even though public concern for these larger systems has been growing for more than a generation. Only in the last couple of years have we seen more front-page articles about the economy, business, and technology that mention the declining health of the ecosystems that enable the global economic system to function.

That relatively few paid much attention to these larger problems is perfectly understandable. Ignoring unintended side effects is hardly limited to this environment. Indeed, it is one of the most common underlying pat-

FIGURE 2.2D



terns that we have experienced when helping companies understand systems thinking. For example, managers are often rewarded generously for cutting costs and improving short-term profits, but the side effects of their maneuvers, such as demoralized workers or angry customers, often end up costing the company more in the long run.

Put differently, we have gotten into our predicament today because of a way of thinking that focuses on parts and neglects the whole. We have become masterful at focusing on immediate goals – such as short-term profits – and neglecting the larger systems of which quarterly profits are but one small part. But this is changing because the larger reality can no longer be ignored.

The Case for Urgency: The 80-20 Challenge

Although the problems of the Industrial Age have been evident for decades, there is now one important difference, an increasingly inescapable mandate urging us to wake up and start operating differently: global climate change.

Though but one of many side effects of global industrial growth, climate change has two unique aspects: The current and prospective costs are enormous for both rich and poor, and it provides simple, numerical indicators of just how far out of balance we are – and how rapid and strong the adjustments must be if we are to avert disaster.

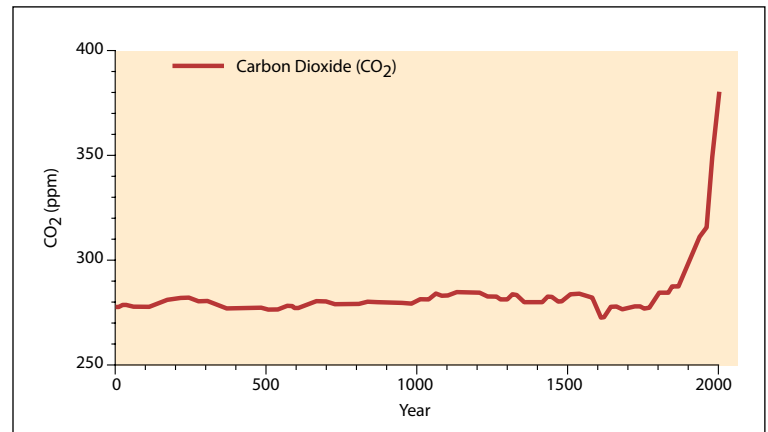
Although science rarely provides absolute certainty, a consensus has emerged among scientists, and among a small but growing cadre of influential leaders, that the changes needed to avert extreme and possibly uncontrollable climate change will be greater and must happen far more quickly than we imagined even a few years ago. In this sense, climate change is a particular sort of gift, a time clock telling us how fast the Industrial Age is ending.

As for the costs of climate change, they already are considerable, and will be far greater if we do not address the issue quickly and systematically. In 2007, Oxfam International, one of the world's largest and most respected civil society organizations (often called non-governmental organizations or NGOs), published the first study on climate change "compensation" costs for the poor – what it would take to compensate for the suffering from disease, failed crops, and dislocation arising from climate change. This report placed the costs at \$50 billion globally and noted that they will rise precipitously in the coming years. In preparing the report, Oxfam's larger goal is to establish a method to make these escalating costs visible. The costs to the insurance industry already can be seen: Insurance premiums are rising dramatically – up to 40 percent in Florida, 20 percent in

coastal Massachusetts, and 400 percent for some off-shore oil rigs – reflecting the risks of climate instability. These rates make self-insurance (dropping coverage and taking your chances) more economical for many businesses and homeowners in high-risk areas such as southern Florida. The influential Stern Report, commissioned by the UK government in 2006 and led by a former World Bank chief economist, concluded that if dramatic changes are not made soon, the costs to the world of climate change in the next decade could equal or exceed the costs of World War II.²³

Unlike so many other global social and environmental problems, in one sense climate change is simple – because its primary dimensions are measurable. Scientists now have extensive evidence of how rapidly CO₂ and other greenhouse gases are accumulating in the atmosphere, and how that compares with historical levels.

FIGURE 2.3



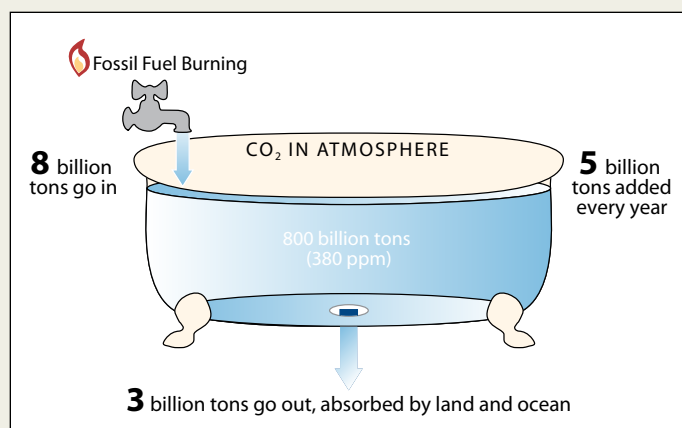
CO₂ concentrations in the atmosphere have been rising throughout the industrial era, with the current level more than 30 percent higher than in 1850.²⁴ This level is continuing to increase rapidly because the

The CO₂ Bathtub

The difference between inflows and outflows of CO₂ in the atmosphere works just like a bathtub: The CO₂ level rises as long as more flows in than flows out. This simple fact has confused many people, including many in important leadership positions, who believe that curtailing emissions growth alone would solve the climate change problem.²⁶

So long as the inflow of CO₂ emissions exceeds the outflow of CO₂ removed from the atmosphere, at some point the bathtub will “overflow.” This means that unless we reduce emissions to equal CO₂ removed from the atmosphere – in other words, a 60 percent to 80 percent reduction of worldwide emissions – we will likely enter an era of irreversible climate change.

FIGURE 2.4



The atmosphere as a bathtub, with annual inputs and outputs of CO₂. The level in the tub is rising by about 5 billion tons per year (2.1 billion tons of carbon equivalent = 1 part per million (ppm) CO₂).

(An interactive simulation of the CO₂ bathtub is available at http://www.sustainer.org/tools_resources.)

amount of CO₂ emitted from combusting fossil fuels in our power plants, buildings, cars, trucks, airplanes, and factories each year – about 8 billion tons of carbon equivalent per year worldwide – is more than double what can be removed from the atmosphere and absorbed by natural biomass (trees, plants, and plankton) and dissolved in oceans.²⁵

No one can say with certainty how much CO₂ in the atmosphere is too much, but a few basic facts are starting to coalesce into a strong consensus.

First, current levels of CO₂ are almost one-third higher than at any other time in the past 650,000 years.²⁷ This includes much of human history, a period of time in which, despite periodic ice ages, the overall climate was conducive to human life.

Second, concentrations of CO₂ in oceans and biomass are far above historic levels, causing problems such as ocean acidification and raising questions about how much more these natural CO₂ sinks can absorb. If they start to absorb less, more CO₂ will concentrate faster in the atmosphere, driving global warming faster.

Third, there is a long time lag before the full effects of CO₂ are felt on temperature and climate; scientific estimates put this at thirty to fifty years. This means that the full effects of current atmospheric CO₂ levels will not be felt until 2050 or even later.

And finally, at some point, rising CO₂ and greenhouse gas levels trigger “runaway” effects in which climate change causes further climate change, such as melting arctic permafrost releasing methane (another greenhouse gas) into the atmosphere, leading to still more warming.²⁸ Once these “tipping point” feedbacks take off, our ability to influence the future may decline significantly.

So how much CO₂ is too much? Some scientists feel that present levels of CO₂ (about 380 ppm) are already too high. Others believe the risks of triggering irreversible and uncontrollable effects will increase substantially if CO₂ levels continue rising as they have for another one to two decades (reaching levels exceeding 425 ppm or so). By contrast, continued business-as-usual growth in CO₂ emissions would lead to mid-century CO₂ levels about twice as high (approximately 550 ppm) as the historic maximum for the last 650,000 years, and far more dangerous – levels that few with any sense of stewardship for future generations, let alone present ones, should tolerate.²⁹

In some sense, the “How high is too high?” debate is academic because simply stabilizing CO₂ levels will require extraordinary and dramatic reductions in emissions worldwide – a crucial point to which the people of the world have just begun to awaken. A little more than a decade ago, a number of nations came together to shape the Kyoto Protocol, the first intergovernmental agreement to confront climate change (which the United States never signed). The accord focused on curbing emissions growth. But as we now know, stopping the rise of CO₂ levels in the atmosphere, the primary source of climate change, will actually require significant emissions reductions. Accomplishing this will require a sea change in the kinds of energy we use, cars we drive, buildings we live and work in, cities we design, and ways both people and goods move around the world, as well as other changes no one can even imagine.

Advances in climate science will continue to be crucial for understanding the specifics of how rising average temperatures are likely to affect rainfall and drought patterns, storm activity and intensity, the spread of disease, and significant increases in sea levels. But science can take us only so far. Sooner or later, it becomes a matter of making choices, not simply waiting for more predictions.³⁰

Already, people and institutions around the world are starting to formulate bold “stretch goals” – aspirational targets that can galvanize the imagination, creativity, and courage truly called for.³¹ Though the details of these goals differ, their central message is the same: To stabilize CO₂ in the atmosphere at levels that minimize the threat of catastrophic consequences will require a 60 percent to 80 percent reduction in emissions within the next two decades!³² We call this the 80-20 Challenge, the bell tolling the end of the Industrial Age.

While focusing on CO₂ levels helps us to understand the urgency we face, it is equally important to remind ourselves that climate change is not an isolated problem. Rather, it is part and parcel of all the other problems that are signaling the end of the Industrial Age: accumulating waste by-products that derive from the take-make-waste industrial system; diminishing resources (some of which are driving CO₂ levels further upward: about 6 billion tons of CO₂ per year are

released from deforestation – including the burning and decaying of wood – alone); deteriorating ecosystems; the intensification of social stresses (such as the United States’ foreign policies, driven by dependency on Middle East oil). Climate change is but one thread in a larger cloth; we cannot simply remove the thread, but must reweave the cloth.

Because the side effects of globalization are inter-related, meeting the 80-20 Challenge of reducing emissions 80 percent in twenty years will require changes in all the major global industrial systems: food and water, energy and transportation, and the global production and distribution of goods. Little in our modern way of living will be unaffected.

In other words, the change will not happen without a radical shift in the thinking that has made the industrial era so successful – and so disastrous. ■

ENDNOTES

- 1 David Urbinato, “London’s Historic ‘Pea-Soupers,’” EPA Journal, Summer 1994, www.epa.gov/history/topics/perspect/london.htm.
- 2 Paul Hawken, Amory Lovins, and E. Hunter Lovins, *Natural Capitalism* (Boston: Little, Brown, 1999), 8. The waste equals 1.5 tons per day if you assume the average American weighs 150 pounds, and twenty times a person’s weight per day.
- 3 Millennium Ecosystem Assessment, *Ecosystems and Human Well-being: General Synthesis* (Washington, DC: Island Press, 2005), www.millenniumassessment.org/en/Synthesis.aspx.
- 4 UNEP, “The Asian Brown Cloud,” Executive Summary, 2002, www.scientificjournals.com/sj/espr/Pdf/ald/5339.
- 5 Millennium Ecosystem Assessment, *Ecosystems and Human Well-being: General Synthesis*.
- 6 See carbon bathtub diagram, page 29, Scientists debate how much of the CO₂ emitted from burning fossil fuels can be absorbed in “carbon sinks” such as plants and algae and dissolved into the oceans. Peter N. Spotts, “Nature’s Carbon ‘Sink’ Smaller than Expected,” *Christian Science Monitor*, May 3, 2007.
- 7 U.S. Geological Survey, Mineral Commodity Summaries, January 2004, http://minerals.er.usgs.gov/minerals/pubs/commodity/iron_&_steel_scrap/festscmc04.pdf.
- 8 www.epa.gov/epaoswer/non-hw/muncpl/pubs/06data.pdf.
- 9 W. R. Orr and J. W. Roberts, “Everyday Exposure to Toxic Pollutants,” *Scientific American*, February 1998, 90; W. McDonough and M. Braungart, *Cradle to Cradle* (New York: North Point Press, 2002).
- 10 Jad Mouawad, “Big Rise Seen in Demand for Energy,” *New York Times*, July 19, 2007.
- 11 Energy Information Administration, www.eia.doe.gov, and www.energyliteracy.org/compare-oil.html.
- 12 International Energy Outlook, 2007, www.eia.doe.gov/oiaf/ieo/pdf/electricity.pdf; Union of Concerned Scientists, www.ucsusa.org/clean_energy/coalvswind/c01.html.
- 13 Millennium Ecosystem Assessment, *Ecosystems and Human Well-being: General Synthesis*.
- 14 Ibid.

- 15 Ibid.; Jason DeParle, "A Global Trek to Poor Nations, from Poorer Ones," *New York Times*, December 27, 2007.
- 16 Millennium Ecosystem Assessment, *Ecosystems and Human Well-being: General Synthesis*.
- 17 For example, Biosphere 2, an experimental man-made closed ecological system built in the 1980s, failed to provide clean air, water, and food for eight people over the first mission's two years. The project cost about \$200 million.
- 18 Millennium Ecosystem Assessment, *Ecosystems and Human Well-being: General Synthesis*.
- 19 Similar shifts in income and wealth have occurred in developing countries; for example, the poorest 10 percent of Americans have seen their income share fall from 3.5 percent to less than 1 percent in the past twenty years. 20 Mark Kinver, "The Challenges Facing an Urban World," BBC News, June 15, 2006, <http://news.bbc.co.uk/2/hi/science/nature/5054052.stm>.
- 21 Annie Correal, "12,000 Tons a Day, and What to Do with It," *New York Times*, September 18, 2007; John Rather, "A Long, Long Haul from the Curb," *New York Times*, December 4, 2005.
- 22 See Hawken, Lovins, and Lovins, *Natural Capitalism*.
- 23 Nicholas Stern, *The Economics of Climate Change: The Stern Review* (Cambridge University Press, 2007), Overall financial impact and benefits of early action; Gordon Brown speech on climate change, WWF, November 19, 2007.
- 24 CO₂ concentrations are measured in parts per million (ppm), a standard method of measuring the concentrations of atmospheric gases. CO₂ in 2007 was estimated at 380 ppm, versus about 280 ppm in 1850.
- 25 The scientific convention for measuring CO₂ flows is in equivalent tons of carbon per year. Estimates on how much of present emitted CO₂ is absorbed by the biosphere and oceans range from 2 to over 3 billion tons a year. J. Hansen and M. Sato, PNAS 101,16109, 2004; Greenblatt, Princeton.
- 26 John Sterman and Linda Booth Sweeney, "Cloudy Skies: Assessing Public Understanding of Global Warming," *Reflections: The SoL Journal* 7, 3 (2007); Linda Booth Sweeney and John Sterman, "Understanding Public Complacency about Climate Change: Adults' Mental Models of Climate Change Violate Conservation of Matter," *Climatic Change Journal*, February 2007, Vol. 80, No. 3-4, 213-238.

ABOUT THE AUTHORS

Peter Senge, senior lecturer at MIT and the founding chair of the Society for Organizational Learning (SoL), is the author or co-author of several bestselling books, including *The Fifth Discipline*, *Schools That Learn*, and *Presence*. reflections@solonline.org

Bryan Smith, coauthor with Senge of *The Dance of Change* and two other Fifth Discipline fieldbooks, is a member of the faculty at York University's Sustainable Enterprise Academy, and president of Broad Reach Innovations, Inc. reflections@solonline.org

Nina Kruschwitz, manager of the Fifth Discipline Fieldbook Project, is the editor of *Reflections: The SoL Journal on Knowledge, Learning, and Change*. reflections@solonline.org

Joe Laur co-founded the SoL Sustainability Consortium in 1998. He is the vice president of content for Greenopolis.com. reflections@solonline.org

Sara Schley, co-founder of the SoL Sustainability Consortium, is a mentor for the Harold Grinspoon Foundation. reflections@solonline.org

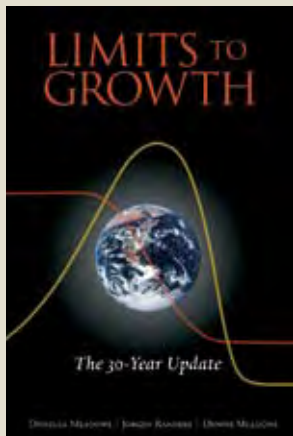
- 27 Long-term data on CO₂ and temperature fluctuations, based on ice-core studies, shows cycles in both, such as have produced periodic ice ages, but at no time was CO₂ above 300 ppm (as compared to today's 380 ppm). The Industrial Age came at the end of a long warming period where CO₂ levels had risen to about 280 ppm by 1850.
- 28 Examples of these "tipping points" are melting ice cover leading to reduced reflectivity of the earth and further warming (the albedo effect); melting arctic permafrost releasing stored greenhouse gases, also leading to further warming; and rising temperatures reducing forest cover, leading to less carbon sequestration and still more warming.
- 29 S. Pacala and R. Socolow, "Stabilization Wedges: Solving the Climate Problem for the Next 50 Years with Current Technologies," *Science* 305 (2004): 969–72.
- 30 For example, on March 11, 2002, in a speech given at Stanford University, Sir John Browne, then-chairman and CEO of British Petroleum, explained why his company broke ranks with other oil corporations in 1997 and decided to face up to climate change. First, it was clear that reputable science could not be ignored. The science wasn't complete—but science is never complete. Still, they knew enough to say that there were long-term risks and that precautionary action was necessary if we were to avoid the greater risk—of delaying until the point where draconian action was unavoidable.
- 31 For example, the Sustainable Development Commission in Britain (involving many senior business and government executives) is working on setting targets for reductions in emissions from all forms of personal mobility of 30 percent by 2010 and 60 percent by 2020.
- 32 While a 60 percent reduction relative to present global emissions (8 to 3 gtc/year) might be sufficient, the 80 percent target is needed because of uncertainties regarding whether carbon sinks can continue to absorb this much excess CO₂ and virtual certainties that China and India will be unable to achieve such 60 percent decreases.

BOOK EXCERPT 9.2

Limits to Growth:

Tools for the Transition to Sustainability

In 1972, three scientists from MIT created a computer model that analyzed global resource consumption and production. Their results – published in the bestseller *Limits to Growth* – shocked the world and created stirring conversation about global “overshoot,” or resource use beyond the carrying capacity of the planet. In this update, published 30 years later, they offer an analysis of present and future trends in resource use, and assess a variety of possible outcomes. The authors believe that humanity can still reverse some of its damage to Earth if it takes appropriate measures now to reduce inefficiency and waste. In this excerpt, they lay out five tools that will be necessary for our survival over the long term.



Limits to Growth: The 30-Year Update

Donella Meadows, Jorgen
Randers, Dennis L. Meadows
Chelsea Green, 2004

“Can we move nations and people in the direction of sustainability? Such a move would be a modification of society comparable in scale to only two other changes: the Agricultural Revolution of the late Neolithic and the Industrial Revolution of the past two centuries. Those revolutions were gradual, spontaneous, and largely unconscious. This one will have to be a fully conscious operation, guided by the best foresight that science can provide. . . . If we actually do it, the undertaking will be absolutely unique in humanity’s stay on the Earth.”

—WILLIAM D. RUCKELSHAUS, 1989

“We must be careful not to succumb to despair, for there is still the odd glimmer of hope.”

—EDOUARD SAOUMA, 1993



Donella Meadows

We have been writing about, talking about, and working toward sustainability for over three decades now. We have had the privilege of knowing thousands of colleagues in every part of the world who work in their own ways, with their own

talents, in their own societies toward a sustainable society. When we act at the official, institutional level and when we listen to political leaders, we often feel frustrated. When we work with individuals, we usually feel encouraged.

Everywhere we find folks who care about the earth, about other people, and about the welfare of their children and grandchildren. They recognize the human misery and the environmental degradation around them, and they question whether policies that promote more growth along the same old lines can make things better. Many of them have a feeling, often hard for them to articulate, that the world is headed in the wrong direction and that preventing disaster will require some big changes. They are willing to work for

those changes, if only they could believe their efforts would make a positive difference. They ask: What can I do? What can governments do? What can corporations do? What can schools, religions, media do? What can citizens, producers, consumers, parents do?

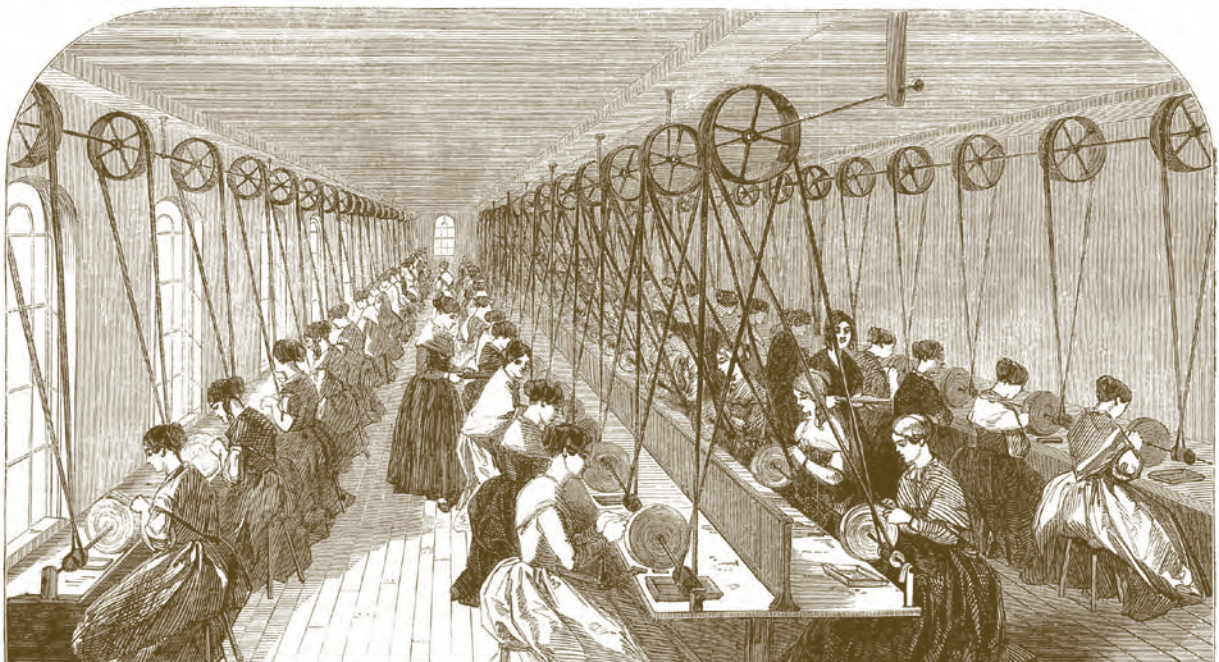
Experiments guided by those questions are more important than any specific answers, though answers abound. There are “50 simple things you can do to save the planet.” Buy an energy-efficient car, for one. Recycle your bottles and cans, vote knowledgeably in elections – if you are among those people in the world blessed with cars, bottles, cans, or elections. There are also not-so-simple things to do: Work out your own frugally elegant lifestyle, have at most two children, argue for higher prices on fossil energy (to encourage energy efficiency and stimulate development of renewable energy), work with love and partnership to help one family lift itself out of poverty, find your own “right livelihood,” care well for one piece of land, do whatever you can to oppose systems that oppress people or abuse the earth, run for election yourself.

All these actions will help. And, of course, they are not enough. Sustainability and sufficiency and equity require structural change; they require a revolution, not in the political sense, like the French Revolution, but in the much more profound sense of the agricultural or industrial revolutions. Recycling is important, but by itself it will not bring about a revolution.

What will? In search of an answer, we have found it helpful to try to understand the first two great revolutions in human culture, insofar as historians can reconstruct them.

The First Two Revolutions: Agriculture and Industry

About 10,000 years ago the human population, after millennia of evolution, had reached the huge (for the time) number of about 10 million. These people lived as nomadic hunter-gatherers, but in some regions their numbers had begun to overwhelm the once abundant plants and game. To adapt to the problem of disappearing wild resources they did two things.



Some of them intensified their migratory lifestyle. They moved out of their ancestral homes in Africa and the Middle East and populated other areas of the game-rich world.

Others started domesticating animals, cultivating plants, and staying in one place. That was a totally new idea. Simply by staying put, the proto-farmers altered the face of the planet, the thoughts of humankind, and the shape of society in ways they could never have foreseen.

For the first time it made sense to own land. People who didn't have to carry all their possessions on their backs could accumulate things, and some could accumulate more than others. The ideas of wealth, status, inheritance, trade, money, and power were born. Some people could live on excess food produced by others. They could become full-time toolmakers, musicians, scribes, priests, soldiers, athletes, or kings. Thus arose, for better or worse, guilds, orchestras, libraries, temples, armies, competitive games, dynasties, and cities.

As its inheritors, we think of the agricultural revolution as a great step forward. At the time it was probably a mixed blessing. Many anthropologists think that agriculture was not a better way of life, but a necessary one to accommodate increasing populations. Settled farmers got more food from a hectare than hunter-gatherers did, but the food was of lower nutritional quality and less variety, and it required much more work to produce. Farmers became vulnerable in ways nomads never were to weather, disease, pests, invasion by outsiders, and oppression from their emerging ruling classes. People who did not move away from their own wastes experienced humankind's first chronic pollution.

Nevertheless, agriculture was a successful response to wildlife scarcity. It permitted yet more population

growth, which added up over centuries to an enormous increase, from 10 million to 800 million people by 1750. The larger population created new scarcities, especially in land and energy. Another revolution was necessary.

The industrial revolution began in England with the substitution of abundant coal for vanishing trees. The use of coal raised practical problems of earthmoving, mine construction, water pumping, transport, and controlled combustion. These problems were solved relatively quickly, resulting in concentrations of labor around mines and mills. The process elevated technology and commerce to a prominent position in human society – above religion and ethics.

Again everything changed in ways that no one could have imagined. Machines, not land, became the central means of production. Feudalism gave way to capitalism and to capitalism's dissenting offshoot, communism. Roads, railroads, factories, and smokestacks appeared on the landscape. Cities swelled. Again the change was a mixed blessing. Factory labor was even harder and more demeaning than farm labor. The air and waters near the new factories turned unspeakably filthy. The standard of living for most of the industrial workforce was far below that of a farmer. But farmland was not available; work in a factory was.

It is hard for people alive today to appreciate how profoundly the industrial revolution changed human thought, because that thought still shapes our perceptions. In 1988 historian Donald Worster described the philosophical impact of industrialism perhaps as well as any of its inheritors and practitioners can:

The capitalists . . . promised that, through the technological domination of the earth, they could deliver a more fair, rational, efficient and productive life for everyone. . . . Their method was simply to free individual enterprise from the bonds of traditional hierarchy

and community, whether the bondage derived from other humans or the earth . . . That meant teaching everyone to treat the earth, as well as each other, with a frank, energetic, self-assertiveness. . . . People must . . . think constantly in terms of making money. They must regard everything around them – the land, its natural resources, their own labor – as potential commodities that might fetch a profit in the market. They must demand the right to produce, buy, and sell those commodities without outside regulation or interference. . . . As wants multiplied, as markets grew more and more far-flung, the bond between humans and the rest of nature was reduced to the barest instrumentalism.¹

That bare instrumentalism led to incredible productivity and a world that now supports, at varying levels of sufficiency, 6,000 million people – more than 600 times the population existing before the agricultural revolution. Far-flung markets and swelling demands drive environmental exploitation from the poles to the tropics, from the mountaintops to the ocean depths.

The success of the industrial revolution, like the previous successes of hunting-gathering and of agriculture, eventually created its own scarcity, not only of game, not only of land, not only of fuels and metals, but of the total carrying capacity of the global environment. Humankind's ecological footprint had once more exceeded what was sustainable. Success created the necessity for another revolution.

The Next Revolution: Sustainability

It is as impossible now for anyone to describe the world that could evolve from a sustainability revolution as it would have been for the farmers of 6000 bc to foresee the corn and soybean fields of modern Iowa, or for an English coal miner of ad 1800 to imagine an automated Toyota assembly line. Like the other great revolutions, the coming sustainability revolution will also change the face of the land and the foundations of human identities, institutions, and cultures. Like the previous revolutions, it will take centuries to unfold fully – though it is already under way.



Of course no one knows how to bring about such a revolution. There is not a checklist: "To accomplish a global paradigm shift, follow these 20 steps." Like the great revolutions that came before, this one can't be planned or dictated. It won't follow a list of fiat from government or a proclamation from computer modelers. The sustainability revolution will be organic. It will arise from the visions, insights, experiments, and actions of billions of people. The burden of making it happen is not on the shoulders of any one person or group. No one will get the credit, but everyone can contribute.

Our systems training and our own work in the world have affirmed for us two properties of complex systems germane to the sort of profound revolution we are discussing here.

First, information is the key to transformation. That does not necessarily mean more information, better statistics, bigger databases, or the World Wide Web, though all of these may play a part. It means relevant, compelling, select, powerful, timely, accurate information flowing in new ways to new recipients, carrying new content, suggesting new rules and goals (rules and goals that are themselves information). When its information flows are changed, any system will behave differently. The policy of glasnost, for example – the simple opening of information channels that had long been closed in the Soviet Union – guaranteed the rapid transformation of Eastern Europe beyond anyone's expectations. The old system had been held in place by tight control of information. Letting go of that control triggered total system restructuring (turbulent and unpredictable, but inevitable).

Second, systems strongly resist changes in their information flows, especially in their rules and goals. It is not surprising that those who benefit from the current system actively oppose such revision. Entrenched political, economic, and religious cliques can constrain

almost entirely the attempts of an individual or small group to operate by different rules or to attain goals different from those sanctioned by the system. Innovators can be ignored, marginalized, ridiculed, denied promotions or resources or public voices. They can be literally or figuratively snuffed out.

Only innovators, however – by perceiving the need for new information, rules, and goals, communicating about them, and trying them out – can make the changes that transform systems. This important point is expressed clearly in a quote that is widely attributed to Margaret Mead, "Never deny the power of a small group of committed individuals to change the world. Indeed that is the only thing that ever has."

We have learned the hard way that it is difficult to live a life of material moderation within a system that expects, exhorts, and rewards consumption. But one can move a long way in the direction of moderation. It is not easy to use energy efficiently in an economy that produces energy-inefficient products. But one can search out, or if necessary invent, more efficient ways of doing things, and in the process make those ways more accessible to others.

Above all, it is difficult to put forth new information in a system that is structured to hear only old information. Just try, sometime, to question in public the value of more growth, or even to make a distinction between growth and development, and you will see what we mean. It takes courage and clarity to challenge an established system. But it can be done.

In our own search for ways to encourage the peaceful restructuring of a system that naturally resists its own transformation, we have tried many tools. The obvious ones are displayed through this book – rational analysis, data gathering, systems thinking, computer modeling, and the clearest words we can find. Those are tools that anyone trained in science and economics

VISIONING

means imagining, at first generally and then with increasing specificity, what you really want. That is, what you really want, not what someone has taught you to want, and not what you have learned to be willing to settle for. Visioning means taking off the constraints of “feasibility,” of disbelief and past disappointments, and letting your mind dwell upon its most noble, uplifting, treasured dreams.

would automatically grasp. Like recycling, they are useful, necessary, and they are not enough.

We don’t know what will be enough. But we would like to conclude by mentioning five other tools we have found helpful. We introduced and discussed this list for the first time in our 1992 book. Our experience since then has affirmed that these five tools are not optional; they are essential characteristics for any society that hopes to survive over the long term. We present them here again in our concluding chapter “not as the ways to work toward sustainability, but as some ways.”

“We are a bit hesitant to discuss them,” we said in 1992, “because we are not experts in their use and because they require the use of words that do not come easily from the mouths or word processors of scientists. They are considered too ‘unscientific’ to be taken seriously in the cynical public arena.”

What are the tools we approached so cautiously? They are: visioning, networking, truth-telling, learning, and loving. It seems like a feeble list, given the enormity of the changes required.

But each of these exists within a web of positive loops. Thus their persistent and consistent application initially by a relatively small group of people would

have the potential to produce enormous change – even to challenge the present system, perhaps helping to produce a revolution.

“The transition to a sustainable society might be helped,” we said in 1992, “by the simple use of words like these more often, with sincerity and without apology, in the information streams of the world.” But we used them with apology ourselves, knowing how most people would receive them.

Many of us feel uneasy about relying on such “soft” tools when the future of our civilization is at stake, particularly since we do not know how to summon them up, in ourselves or in others. So we dismiss them and turn the conversation to recycling or emission trading or wildlife preserves or some other necessary but insufficient part of the sustainability revolution – but at least a part we know how to handle.

So let’s talk about the tools we don’t yet know how to use, because humanity must quickly master them.

Visioning

Visioning means imagining, at first generally and then with increasing specificity, what you really want. That is, what you really want, not what someone has taught you to want, and not what you have learned to be willing to settle for. Visioning means taking off the

constraints of “feasibility,” of disbelief and past disappointments, and letting your mind dwell upon its most noble, uplifting, treasured dreams.

Some people, especially young people, engage in visioning with enthusiasm and ease. Some find the exercise of visioning frightening or painful, because a glowing picture of what could be makes what is all the more intolerable. Some people never admit their visions, for fear of being thought impractical or “unrealistic.” They would find this paragraph uncomfortable to read, if they were willing to read it at all. And some people have been so crushed by their experience that they can only explain why any vision is impossible. That’s fine; skeptics are needed, too. Vision needs to be disciplined by skepticism.

We should say immediately, for the sake of the skeptics, that we do not believe vision makes anything happen. Vision without action is useless. But action without vision is directionless and feeble. Vision is absolutely necessary to guide and motivate. More than that, vision, when widely shared and firmly kept in sight, does bring into being new systems.

We mean that literally. Within the limits of space, time, materials, and energy, visionary human intentions can bring forth not only new information, new feedback loops, new behavior, new knowledge, and new technology, but also new institutions, new physical structures, and new powers within human beings. Ralph Waldo Emerson recognized this profound truth 150 years ago:

Every nation and every man instantly surround themselves with a material apparatus which exactly corresponds to their moral state, or their state of thought. Observe how every truth and every error, each a thought of some man’s mind, clothes itself with societies, houses, cities, language, ceremonies, newspapers. Observe the ideas of the present day . . . see how each

of these abstractions has embodied itself in an imposing apparatus in the community, and how timber, brick, lime, and stone have flown into convenient shape, obedient to the master idea reigning in the minds of many persons. . . .

It follows, of course, that the least change in the man will change his circumstances; the least enlargement of ideas, the least mitigation of his feelings in respect to other men . . . would cause the most striking changes of external things.²

A sustainable world can never be fully realised until it is widely envisioned. The vision must be built up by many people before it is complete and compelling. As a way of encouraging others to join in the process, we’ll list here some of what we see when we let ourselves imagine a sustainable society we would like to live in – as opposed to one we would be willing to settle for. This is by no means a definitive list. We include it here only to invite you to develop and enlarge it.

- Sustainability, efficiency, sufficiency, equity, beauty, and community as the highest social values.
- Material sufficiency and security for all. Therefore, by individual choice as well as communal norms, low birth rates and stable populations.
- Work that dignifies people instead of demeaning them. Some way of providing incentives for people to give their best to society and to be rewarded for doing so, while ensuring that everyone will be provided for sufficiently under any circumstances.
- Leaders who are honest, respectful, intelligent, humble, and more interested in doing their jobs than in keeping their jobs, more interested in serving society than in winning elections.
- An economy that is a means, not an end; one that serves the welfare of the environment, rather than vice versa.
- Efficient, renewable energy systems.
- Efficient, closed-loop materials systems.

- Technical design that reduces emissions and waste to a minimum, and social agreement not to produce emissions or waste that technology and nature can't handle.
- Regenerative agriculture that builds soils, uses natural mechanisms to restore nutrients and control pests, and produces abundant, uncontaminated food.
- The preservation of ecosystems in their variety, with human cultures living in harmony with those ecosystems; therefore, high diversity of both nature and culture, and human appreciation for that diversity.
- Flexibility, innovation (social as well as technical), and intellectual challenge. A flourishing of science, a continuous enlargement of human knowledge.
- Greater understanding of whole systems as an essential part of each person's education.
- Decentralization of economic power, political influence, and scientific expertise.
- Political structures that permit a balance between short-term and long-term considerations; some way of exerting political pressure now on behalf of our grandchildren.
- High-level skills on the part of citizens and governments in the arts of nonviolent conflict resolution.
- Media that reflect the world's diversity and at the same time unite cultures with relevant, accurate, timely, unbiased, and intelligent information,

presented in its historic and whole-system context.

- Reasons for living and for thinking well of ourselves that do not involve the accumulation of material things.

Networking

We could not do our work without networks. Most of the networks we belong to are informal. They have small budgets, if any, and few of them appear on rosters of world organizations.³ They are almost invisible, but their effects are not negligible. Informal networks carry information in the same way as formal institutions do, and often more effectively. They are the natural home of new information, and out of them new system structures can evolve.⁴

Some of our networks are very local, some are international. Some are electronic, some involve people looking each other in the face every day. Whatever their form, they are made up of people who share a common interest in some aspect of life, who stay in touch and pass around data and tools and ideas and encouragement, who like and respect and support each other. One of the most important purposes of a network is simply to remind its members that they are not alone.

A network is nonhierarchical. It is a web of connections among equals, held together not by force, obligation, material incentive, or social contract, but by shared values and the understanding that some tasks can be accomplished together that could never be accomplished separately.

NETWORKS

are almost invisible, but their effects are not negligible. Informal networks carry information in the same way as formal institutions do, and often more effectively. They are the natural home of new information, and out of them new system structures can evolve.

We know of networks of farmers who share organic pest control methods. There are networks of environmental journalists, “green” architects, computer modelers, game designers, land trusts, consumer cooperatives. There are thousands and thousands of networks that developed as people with common purposes found each other. Some networks become so busy and essential that they evolve into formal organizations with offices and budgets, but most come and go as needed. The advent of the World Wide Web certainly has facilitated and accelerated the formation and maintenance of networks.

Networks dedicated to sustainability at both the local and the global levels are especially needed to create a sustainable society that harmonizes with local ecosystems while keeping itself within global limits. About local networks we can say little here; our localities are different from yours. One role of local networks is to help reestablish the sense of community and relation to place that has been largely lost since the industrial revolution.

When it comes to global networks, we would like to make a plea that they be truly global. The means of participation in international information streams are as badly distributed as are the means of production. There are more telephones in Tokyo, it has been said, than in all of Africa. That must be even more true of computers, fax machines, airline connections, and invitations to international meetings. But once more the wonder of human inventiveness seems to provide a surprising solution in the form of the Web and cheap access devices.

One could argue that Africa and other underrepresented parts of the world should attend first to their needs for many things other than computers and Web access. We disagree; the needs of the underprivileged cannot be effectively communicated, nor can the world benefit from their contributions, unless their voices

can be heard. Some of the greatest gains in material and energy efficiency have come in the design of communications equipment. It is possible within a sustainable ecological footprint for everyone to have the opportunity for global as well as local networking. We must close the “Digital Divide.”

If some part of the sustainability revolution interests you, you can find or form a network of others who share your particular interests. The network will help you discover where to go for information, what publications and tools are available, where to find administrative and financial support, and who can help with specific tasks. The right network will not only help you learn, but also allow you to pass your learning on to others.

Truth-Telling

We are no more certain of the truth than anyone is. But we often know an untruth when we hear one. Many untruths are deliberate, understood as such by both speaker and listeners. They are put forth to manipulate, lull, or entice, to postpone action, to justify self-serving action, to gain or preserve power, or to deny an uncomfortable reality.

Lies distort the information stream. A system cannot function well if its information streams are corrupted by lies. One of the most important tenets of systems theory, for reasons we hope we have made clear in this book, is that information should not be distorted, delayed, or sequestered.

“All of humanity is in peril,” said Buckminster Fuller, “if each one of us does not dare, now and henceforth, always to tell only the truth and all the truth, and to do so promptly – right now.”⁵ Whenever you speak to anyone, on the street, at work, to a crowd, and especially to a child, you can endeavor to counter a lie or affirm a truth. You can deny the idea that having more things makes one a better person. You can question

TRUTH-TELLING

We are no more certain of the truth than anyone is. But we often know an untruth when we hear one. Many untruths are deliberate, understood as such by both speaker and listeners. They are put forth to manipulate, lull, or entice, to postpone action, to justify self-serving action, to gain or preserve power, or to deny an uncomfortable reality.

the notion that more for the rich will help the poor. The more you can counter misinformation, the more manageable our society will become.

Here are some common biases and simplifications, verbal traps, and popular untruths that we run into frequently in discussing limits to growth. We think they need to be pointed out and avoided, if there is ever to be clear thinking about the human economy and its relationship to a finite Earth.

Not: A warning about the future is a prediction of doom.

But: A warning about the future is a recommendation to follow a different path.

Not: The environment is a luxury or a competing demand or a commodity that people will buy when they can afford it.

But: The environment is the source of all life and every economy. Opinion polls typically show that the public is willing to pay more for a healthy environment.

Not: Change is sacrifice, and it should be avoided.

But: Change is challenge, and it is necessary.

Not: Stopping growth will lock the poor in their poverty.

But: It is the avarice and indifference of the rich that lock the poor into poverty. The poor need new attitudes among the rich; then there will be growth

specifically geared to serve their needs.

Not: Everyone should be brought up to the material level of the richest countries.

But: There is no possibility of raising material consumption levels for everyone to the levels now enjoyed by the rich. Everyone should have their fundamental material needs satisfied. Material needs beyond this level should be satisfied only if it is possible, for all, within a sustainable ecological footprint.

Not: All growth is good, without question, discrimination, or investigation.

Nor: All growth is bad.

But: What is needed is not growth, but development. Insofar as development requires physical expansion, it should be equitable, affordable, and sustainable, with all real costs counted.

Not: Technology will solve all problems.

Nor: Technology does nothing but cause problems.

But: We need to encourage technologies that will reduce the ecological footprint, increase efficiency, enhance resources, improve signals, and end material deprivation.

And: We must approach our problems as human beings and bring more to bear on them than just technology.

Not: The market system will automatically bring us the future we want.

But: We must decide for ourselves what future we want. Then we can use the market system, along with many other organizational devices, to achieve it.

Not: Industry is the cause of all problems, or the cure.

Nor: Government is the cause or the cure.

Nor: Environmentalists are the cause or the cure.

Nor: Any other group [economists come to mind] is the cause or the cure.

But: All people and institutions play their roles within the large system structure. In a system that is structured for overshoot, all players deliberately or inadvertently contribute to that overshoot. In a system that is structured for sustainability, industries, governments, environmentalists, and most especially economists will play essential roles in contributing to sustainability.

Not: Unrelieved pessimism.

Nor: Sappy optimism.

But: The resolve to tell the truth about both the successes and failures of the present and the potentials and obstacles in the future.

And above all: The courage to admit and bear the pain of the present, while keeping a steady eye on a vision of a better future.

Not: The World3 model, or any other model, is right or wrong.

But: All models, including the ones in our heads, are a little right, much too simple, and mostly wrong. How do we proceed in such a way as to test our models and learn where they are right and wrong? How do we speak to each other as fellow modelers with an appropriate mixture of skepticism and respect? How do we stop playing right-wrong games with each other and start designing right-wrong tests for our models against the real world?

That last challenge, sorting out and testing models, brings us to the topic of learning.

Learning

Visioning, networking, and truth-telling are useless if they do not inform action. There are many things to do to bring about a sustainable world. New farming methods have to be worked out. New businesses have to be started and old ones have to be redesigned to reduce their footprint. Land has to be restored, parks protected, energy systems transformed, international agreements reached. Laws have to be passed and others repealed. Children have to be taught, and so do adults. Films have to be made, music played, books published, Web sites established, people counseled, groups led, subsidies removed, sustainability indicators developed, and prices corrected to portray full costs.

All people will find their own best role in all this doing. We wouldn't presume to prescribe a specific role for

LEARNING

means the willingness to go slowly, to try things out, and to collect information about the effects of actions, including the crucial but not always welcome information that the action is not working. One can't learn without making mistakes, telling the truth about them, and moving on. Learning means exploring a new path with vigor and courage, being open to other people's explorations of other paths, and being willing to switch paths if one is found that leads more directly to the goal.

anyone but ourselves. But we would make one suggestion: Whatever you do, do it humbly. Do it not as immutable policy, but as experiment. Use your action, whatever it is, to learn.

The depths of human ignorance are much more profound than most of us are willing to admit. This is especially so at a time when the global economy is coming together as a more integrated whole than it has ever been, when that economy is pressing against the limits of a wondrously complex planet, and when wholly new ways of thinking are called for. At this time, no one knows enough. No leaders, no matter how authoritative they pretend to be, understand the situation. No policy should be imposed wholesale upon the whole world. If you cannot afford to lose, do not gamble.

Learning means the willingness to go slowly, to try things out, and to collect information about the effects of actions, including the crucial but not always welcome information that the action is not working. One can't learn without making mistakes, telling the truth about them, and moving on. Learning means exploring a new path with vigor and courage, being open to other people's explorations of other paths, and being willing to switch paths if one is found that leads more directly to the goal.

The world's leaders have lost both the habit of learning and the freedom to learn. Somehow a political system has evolved in which the voters expect leaders to have all the answers, that assigns only a few people to be leaders, and that brings them down quickly if they suggest unpleasant remedies. This perverse system undermines the leadership capacity of the people and the learning capacity of the leaders.

It's time for us to do some truth-telling on this issue. The world's leaders do not know any better than

anyone else how to bring about a sustainable society; most of them don't even know it's necessary to do so. A sustainability revolution requires each person to act as a learning leader at some level, from family to community to nation to world. And it requires each of us to support leaders by allowing them to admit uncertainty, conduct honest experiments, and acknowledge mistakes.

No one can be free to learn without patience and forgiveness. But in a condition of overshoot, there is not much time for patience and forgiveness. Finding the right balance between the apparent opposites of urgency and patience, accountability and forgiveness is a task that requires compassion, humility, clearheadedness, honesty, and – that hardest of words, that seemingly scarcest of all resources – love.

Loving

One is not allowed in the industrial culture to speak about love, except in the most romantic and trivial sense of the word. Anyone who calls upon the capacity of people to practice brotherly and sisterly love, love of humanity as a whole, love of nature and of our nurturing planet, is more likely to be ridiculed than to be taken seriously. The deepest difference between optimists and pessimists is their position in the debate about whether human beings are able to operate collectively from a basis of love. In a society that systematically develops individualism, competitiveness, and short-term focus, the pessimists are in the vast majority.

Individualism and shortsightedness are the greatest problems of the current social system, we think, and the deepest cause of unsustainability. Love and compassion institutionalized in collective solutions is the better alternative. A culture that does not believe in, discuss, and develop these better human qualities suffers from a tragic limitation in its options. "How good a society does human nature permit?" asked

LOVING

One is not allowed in the industrial culture to speak about love, except in the most romantic and trivial sense of the word. Anyone who calls upon the capacity of people to practice brotherly and sisterly love, love of humanity as a whole, love of nature and of our nurturing planet, is more likely to be ridiculed than to be taken seriously. The deepest difference between optimists and pessimists is their position in the debate about whether human beings are able to operate collectively from a basis of love. In a society that systematically develops individualism, competitiveness, and short-term focus, the pessimists are in the vast majority.

psychologist Abraham Maslow. "How good a human nature does society permit?"⁶

The sustainability revolution will have to be, above all, a collective transformation that permits the best of human nature, rather than the worst, to be expressed and nurtured. Many people have recognized that necessity and that opportunity. For example, John Maynard Keynes wrote in 1932:

The problem of want and poverty and the economic struggle between classes and nations is nothing but a frightful muddle, a transitory and unnecessary muddle. For the Western World already has the resource and the technique, if we could create the organization to use them, capable of reducing the Economic Problem, which now absorbs our moral and material energy, to a position of secondary importance. . . .

Thus the . . . day is not far off when the Economic Problem will take the back seat where it belongs, and . . . the arena of the heart and head will be occupied . . . by our real problems – the problems of life and of human relations, of creation and behaviour and religion.⁷

Aurelio Peccei, the great industrial leader who wrote constantly about problems of growth and limits, economics and environment, resources and governance, never failed to conclude that the answers to the world's problems begin with a "new humanism." In 1981 he expressed this view:

The humanism consonant with our epoch must replace and reverse principles and norms that we have heretofore regarded as untouchable, but that have become inapplicable, or discordant with our purpose; it must encourage the rise of new value systems to redress our inner balance, and of new spiritual, ethical, philosophical, social, political, aesthetic, and artistic motivations to fill the emptiness of our life; it must be capable of restoring within us . . . love, friendship, understanding, solidarity, a spirit of sacrifice, conviviality; and it must make us understand that the more closely these qualities link us to other forms of life and to our brothers and sisters everywhere in the world, the more we shall gain.⁸

It is not easy to practice love, friendship, generosity, understanding, or solidarity within a system whose rules, goals, and information streams are geared for lesser human qualities. But we try, and we urge you to try. Be patient with yourself and others as you and

they confront the difficulty of a changing world. Understand and empathize with inevitable resistance; there is resistance, some clinging to the ways of unsustainability, within each of us. Seek out and trust in the best human instincts in yourself and in everyone. Listen to the cynicism around you and have compassion for those who believe in it, but don't believe it yourself.

Humanity cannot triumph in the adventure of reducing the human footprint to a sustainable level if that adventure is not undertaken in a spirit of global partnership. Collapse cannot be avoided if people do not learn to view themselves and others as part of one integrated global society. Both will require compassion, not only with the here and now, but with the distant and future as well. Humanity must learn to love the idea of leaving future generations a living planet.

Is anything we have advocated in this book, from more resource efficiency to more compassion, really possible? Can the world actually ease down below the limits and avoid collapse? Can the human footprint be reduced in time? Is there enough vision, technology, freedom, community, responsibility, foresight, money, discipline, and love, on a global scale?

Of all the hypothetical questions we have posed in this book, these are the most unanswerable, though many people will pretend to answer them. Even we – your authors – differ among ourselves when tallying the odds for and against. The ritual cheerfulness of many uninformed people, especially world leaders, would say the questions are not even relevant; there are no meaningful limits. Many of the informed are infected with the deep cynicism that lies just under the ritual public cheerfulness. They would say that there are severe problems already, with worse ones ahead, and that there's not a chance of solving them.

Both of those answers are based, of course, on mental models. The truth of the matter is that no one knows.

We have said many times in this book that the world faces not a preordained future, but a choice. The choice is between different mental models, which lead logically to different scenarios. One mental model says that this world for all practical purposes has no limits. Choosing that mental model will encourage extractive business as usual and take the human economy even farther beyond the limits. The result will be collapse.

Another mental model says that the limits are real and close, and that there is not enough time, and that people cannot be moderate or responsible or compassionate. At least not in time. That model is self-fulfilling. If the world's people choose to believe it, they will be proven right. The result will be collapse.

A third mental model says that the limits are real and close and in some cases below our current levels of throughput. But there is just enough time, with no time to waste. There is just enough energy, enough material, enough money, enough environmental resilience, and enough human virtue to bring about a planned reduction in the ecological footprint of humankind: a sustainability revolution to a much better world for the vast majority.

That third scenario might very well be wrong. But the evidence we have seen, from world data to global computer models, suggests that it could conceivably be made right. There is no way of knowing for sure, other than to try it. ■

Reprinted with permission of Chelsea Green Publishers.

ABOUT THE AUTHORS

Donella Meadows was a scientist, author, teacher, and farmer widely considered ahead of her time. She was one of the world's foremost systems analysts and lead author of the influential *Limits to Growth* – the 1972 book on global trends in population, economics, and the environment that was translated into 28 languages and became an international bestseller. That book launched a worldwide debate on the earth's capacity to withstand constant human development and expansion.

Jorgen Randers is a policy analyst and President Emeritus of the Norwegian School of Management. He lives in Oslo, Norway.

Dennis Meadows is a professor of Systems Management and director of the Institute for Policy and Social Science Research at the University of New Hampshire. He co-authored the original *Limits to Growth* with Donella Meadows in 1972. He lives in Durham, New Hampshire. reflections@solonline.org

Reflections

The SoL Journal

on Knowledge, Learning, and Change

Volume 9, Number 2

EDITORIAL TEAM

Managing Editor
Nina Kruschwitz

Publisher
C. Sherry Immediato

Publications Assistant
Chris Doyon

SUBSCRIPTION OPTIONS

To order online and for a full description of subscription options, visit our website: reflections.solonline.org.

Receive *Reflections* as a SoL Connections member:

- USD\$125 U.S. (electronic edition only)

One year individual subscription:

- USD\$75 U.S. (electronic edition only)

University/Non-profit Institution

- USD\$175 United States
- USD\$195 International

For-profit Institution

- USD\$275 United States
- USD\$295 International

Reflections: The SoL Journal is published quarterly in electronic format and once per year as a hard copy compilation by the Society for Organizational Learning. Inquiries regarding subscriptions, address changes, back issues, reprints, and permission requests should be directed to:

reflections@solonline.org

Reflections: The SoL Journal

PO Box 381050

Cambridge, MA 02238-1050

+1.617.300.9515 (phone)

+1.617.812.1257 (fax)

E-mail: reflections@solonline.org

reflections.solonline.org



ISSN 1524-1734
EISSN 1536-0148

© 2009 by the Society for Organizational Learning.
SoL is a registered trademark of the Society for Organizational Learning.

Design & Production: DG Communications (NonprofitDesign.com)

