Chapter 1

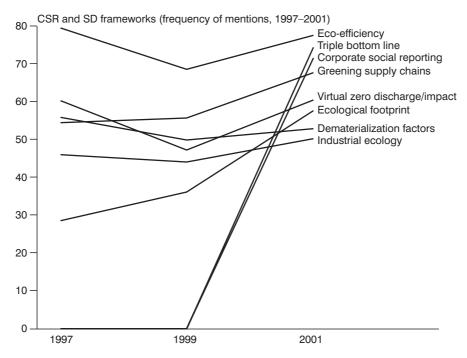
Enter the Triple Bottom Line

John Elkington

In 1994, the author coined the term *triple bottom line*. He reflects on what got him to that point, what has happened since – and where the agenda may now be headed.

The late 1990s saw the term 'triple bottom line' take off. Based on the results of a survey of international experts in corporate social responsibility (CSR) and sustainable development (SD), Figure 1.1 spotlights the growth trend over the two years from 1999 to 2001. As originator of the term, I have often been asked how it was conceived and born. As far as I can remember – and memory is a notoriously fallible thing – there was no single *eureka!* moment. Instead, in 1994 we had been looking for new language to express what we saw as an inevitable expansion of the environmental agenda that SustainAbility (founded in 1987) had mainly focused upon to that point.

We felt that the social and economic dimensions of the agenda – which had already been flagged in 1987's Brundtland Report (UNWCED, 1987) – would have to be addressed in a more integrated way if real environmental progress was to be made. Because SustainAbility mainly works, by choice, with business, we felt that the language would have to resonate with business brains. By way of background, I had already coined several other terms that had gone into the language, including 'environmental excellence' (1984) and 'green consumer' (1986). The first was targeted at business professionals in the wake of 1982's best-selling management book *In Search of Excellence* (Peters and Waterman, 1982), which failed to mention the environment even once. The aim of the second was to help mobilize consumers to put pressure on business about environmental issues. This cause was aided enormously by the runaway success of our book *The Green Consumer Guide*, which sold nearly 1 million copies in its various editions (Elkington and Hailes, 1988).



Source: Environics International

Figure 1.1 The triple bottom line takes off

But back to the triple bottom line (often abbreviated to TBL). Like Paul McCartney waking up with Yesterday playing in his brain and initially believing that he was humming someone else's tune, when the three words finally came to me I was totally convinced that someone must have used them before. But an extensive search suggested otherwise. The next step was whether we should take steps to trademark or otherwise protect the language, as most mainstream consultancies would have done. Counter-intuitively, perhaps, we decided to do exactly the reverse, ensuring that no one could protect it. We began using the term in public, with early launch platforms, including an article in the California Management Review on 'win—win—win' business strategies (Elkington, 1994), SustainAbility's 1996 report Engaging Stakeholders and my 1997 book Cannibals with Forks: The Triple Bottom Line of 21st Century Business (Elkington, 1997). In 1995, we also developed the 3P formulation, 'people, planet and profits', later adopted by Shell for its first Shell Report and now widely used in The Netherlands as the 3Ps.

In the following sections we will look at the drivers of the TBL agenda, at the waves and downwaves in societal pressures on business, at the characteristics of a number of different business models, and at the emerging roles of governments.

Seven drivers

In the simplest terms, the TBL agenda focuses corporations not just on the economic value that they add, but also on the environmental and social value that they add - or destroy.

With its dependence on seven closely linked revolutions (see Figure 1.2), the sustainable capitalism transition will be one of the most complex our species has ever had to negotiate (Elkington, 1997). As we move into the third millennium, we are embarking on a global cultural revolution. Business, much more than governments or non-governmental organizations (NGOs), will be in the driving seat. Paradoxically, this will not make the transition any easier for business people. For many it will prove gruelling, if not impossible.

	Old Paradigm	\rightarrow	New Paradigm
1 Markets	Compliance	\rightarrow	Competition
2 Values	Hard	\rightarrow	Soft
3 Transparency	Closed	\rightarrow	Open
4 Life-cycle technology	Product	\rightarrow	Function
5 Partnerships	Subversion	\rightarrow	Symbiosis
6 Time	Wider	\rightarrow	Longer
7 Corporate governance	Exclusive	\rightarrow	Inclusive

Figure 1.2 Seven sustainability revolutions

Markets

Revolution 1 will be driven by competition, largely through markets. For the foreseeable future, business will operate in markets that are more open to competition, both domestic and international, than at any other time in living memory. The resulting economic earthquakes will transform our world.

When an earthquake hits a city built on sandy or wet soils, the ground can become 'thixotropic': in effect, it turns to jelly. Entire buildings can disappear into the resulting quicksands. In the emerging world order, entire markets will also go thixotropic, swallowing entire companies, even industries. Learning to spot the market conditions and factors that can trigger this process will be a key to future business survival, let alone success.

In this extraordinary environment, growing numbers of companies are already finding themselves challenged by customers and the financial markets about aspects of their TBL commitments and performance. Furthermore, although we will undoubtedly see continuing cycles based on wider economic, social and political trends, this pressure can only grow over the long term. As a result, business will shift to a new approach, using TBL thinking and accounting to build the business case for action and investment.

Values

Revolution 2 is driven by the worldwide shift in human and societal values. Most business people, indeed most people, take values as a given, if they think about them at all. Yet, our values are the product of the most powerful programming that each of us has ever been exposed to. When they change, as they seem to do with every succeeding generation, entire societies can go thixotropic. Companies that have felt themselves standing on solid ground for decades suddenly find that the world as they knew it is being turned upside down and inside out.

Remember Mrs Aquino's peaceful revolution in the Philippines? Or the extraordinary changes in Eastern Europe in 1989? Recall the experiences of Shell during the Brent Spar and Nigerian controversies, with the giant oil company later announcing that it would, in future, consult NGOs on such issues as environment and human rights before deciding on development options? Think, too, of Texaco. The US oil company paid US\$176 million in an out-of-court settlement in the hope that it would bury the controversy about its poor record in integrating ethnic minorities. Now, with the dawn of the 21st century, we have a new roll-call of companies that have crashed and burned because of values-based crises, among them Enron and Arthur Andersen.

Transparency

Revolution 3 is well under way, is being fuelled by growing international transparency and will accelerate. As a result, business will find its thinking, priorities, commitments and activities under increasingly intense scrutiny worldwide. Some forms of disclosure will be voluntary, but others will evolve with little direct involvement from most companies. In many respects, the transparency revolution is now 'out of control'. Even China is being forced to open up by such factors as the global SARS epidemic that it helped to spawn.

This opening up process is itself being driven by the coming together of new value systems and radically different information technologies, from satellite television to the internet. The collapse of many forms of traditional authority also means that a wide range of different stakeholders increasingly demand information on what business is going and planning to do. Increasingly, too, they are using that information to compare, benchmark and rank the performance of competing companies. The 2001 inauguration of the Global Reporting Initiative (GRI), built on TBL foundations, is one of the most powerful symbols of this trend.

Life-cycle technology

Revolution 4 is driven by and – in turn – is driving the transparency revolution. Companies are being challenged about the TBL implications either of industrial

or agricultural activities far back down the supply chain or about the implications of their products in transit, in use and – increasingly – after their useful life has ended. Here we are seeing a shift from companies focusing on the acceptability of their products at the point of sale to a new emphasis on their performance from cradle to grave – that is, from the extraction of raw materials right through to recycling or disposal. Managing the life cycles of technologies and products as different as batteries, jumbo jets and offshore oil rigs will be a key emerging focus of 21st-century business. Nike has been the 'poster child' for campaigners in this area; but we will see many other companies fall victim as the spotlight plays back and forth along their supply chains.

Partners

Revolution 5 will dramatically accelerate the rate at which new forms of partnership spring up between companies, and between companies and other organizations – including some leading campaigning groups. Organizations that once saw themselves as sworn enemies will increasingly flirt with and propose new forms of relationship to opponents who are seen to hold some of the keys to success in the new order. As even groups such as Greenpeace have geared up for this new approach, we have seen a further acceleration of the trends that drive the third and fourth sustainability revolutions. None of this means that we will see an end to friction and, on occasion, outright conflict. Instead, campaigning groups will need to work out ways of simultaneously challenging and working with the same industry – or even the same company.

Time

Time is short, we are told. Time is money. But, driven by the sustainability agenda, Revolution 6 will promote a profound shift in the way that we understand and manage time. As the latest news erupts through CNN and other channels within seconds of the relevant events happening on the other side of the world, and as more than US\$1 trillion sluices around the world every working day, so business finds that current time is becoming ever 'wider'. This involves the opening out of the time dimension, with more and more happening every minute of every day. Quarterly – and even online – reporting requirements are key drivers towards this wide-time world.

By contrast, the sustainability agenda is pushing us in the other direction — towards 'long' time. Given that most politicians and business leaders find it hard to think even two or three years ahead, the scale of the challenge is indicated by the fact that the emerging agenda requires thinking across decades, generations and, in some instances, centuries. As time-based competition, building on the platform created by techniques such as 'just in time', continues to accelerate the pace of competition, the need to build in a stronger 'long time' dimension to

business thinking and planning will become ever-more pressing. The use of scenarios, or alternative visions of the future, is one way in which we can expand our time horizons and spur our creativity.

Corporate governance

Ultimately, whatever the drivers, the business end of the TBL agenda is the responsibility of the corporate board. Revolution 7 is driven by each of the other revolutions and is also resulting in a totally new spin being put on the already energetic corporate governance debate. Now, instead of just focusing on issues such as the pay packets of 'fat cat' directors, new questions are being asked. For example, what is business for? Who should have a say in how companies are run? What is the appropriate balance between shareholders and other stakeholders? And what balance should be struck at the level of the triple bottom line?

The better the system of corporate governance, the greater the chance that we can build towards genuinely sustainable capitalism. To date, however, most TBL campaigners have not focused their activities at boards; nor, in most cases, do they have a detailed understanding of how boards and corporate governance systems work. This, nonetheless, constitutes a key jousting ground of tomorrow. The Coalition for Environmentally Responsible Economies (CERES) joint venture with Innovest on the corporate governance aspects of the risks associated with climate change is an early example of the trend.

It is clear that a growing proportion of corporate sustainability issues revolve not just around process and product design, but also around the design of corporations and their value chains, of 'business ecosystems' and, ultimately, of markets. Experience suggests that the best way to ensure that a given corporation fully addresses the TBL agenda is to build the relevant requirements into its corporate DNA from the very outset – and into the parameters of the markets that it seeks to serve. An early example here would be the Chicago Climate Exchange (CCX), which is experimenting with the trading of greenhouse emissions.

Clearly, we are still a long way from reaching this objective; but considerable progress has been made in recent decades. The centre of gravity of the sustainable business debate is in the process of shifting from public relations to competitive advantage and corporate governance – and, in the process, from the factory fence to the boardroom (see Table 1.1). A series of political pressure waves has been driving these shifts.

ENTER THE TRIPLE BOTTOM LINE

Table 1.1 <i>T</i>	BL agenda	moves	trom	tactory	tence	to	boardroom
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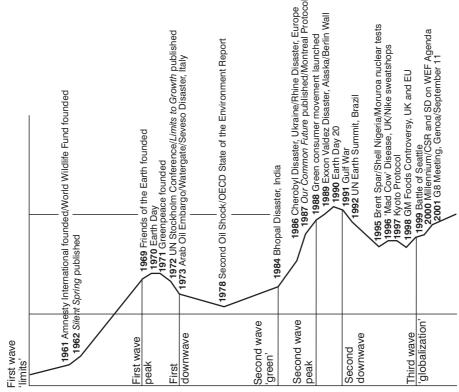
1970s	1970s-1980s	Late 1980s	Late 1990s
PR managers Lawyers	 Environment managers Planners Project managers Process designers 	 Marketers Product designers New product development specialists 	 Chief executive officers Board members Chief financial officers Investor relations specialists Strategists

Three pressure waves

From 1960 to the present, three great waves of public pressure have shaped the environmental agenda. The roles and responsibilities of governments and the public sector have mutated in response to each of these three waves — and will continue to do so. Although each wave of activism has been followed by a downwave of falling public concern, each successive wave has significantly expanded the agendas of politics and business:

- Wave 1 brought an understanding that environmental impacts and natural resource demands have to be limited, resulting in an initial outpouring of environmental legislation. The business response was defensive, focusing on compliance, at best.
- Wave 2 brought a wider realization that new kinds of production technologies and new kinds of products are needed, culminating in the insight that development processes have to become sustainable – and a sense that business would often have to take the lead. The business response began to be more competitive.
- Wave 3 focuses on the growing recognition that sustainable development
 will require profound changes in the governance of corporations and in the
 whole process of globalization, putting a renewed focus on government
 and on civil society. Now, in addition to the compliance and competitive
 dimensions, the business response will need to focus on market creation.

The environmental protection role that governments assumed after wave 1 turns out to be inadequate for supporting the larger economic metamorphosis that now needs to occur. Indeed, the whole concept of 'environmental protection' may be limiting our thinking in terms of the necessary scale of change required for sustainable development. Policies and regulations designed to force companies to comply with minimum environmental standards are inadequate



CSR and SD frameworks (frequency of mentions, 1961-2001)

Source: SustainAbility and UNEP (2002b)

Figure 1.3 *Pressure waves, 1961–2001*

for encouraging the creative, socially responsible entrepreneurship needed to evolve new and more sustainable forms of wealth creation – in what we call the 'chrysalis economy'.

To understand how the roles and responsibilities of government must change, we need to consider how the corporations and value chains whose activities governments regulate are themselves evolving through different stages in response to the three waves of public pressure (see Figure 1.3).

The first pressure wave – 'Limits' – was built from the early 1960s. The wave intensified at the end of the decade, peaking from 1969 to 1973. Throughout the mid 1970s, a wave of environmental legislation swept across the Organisation for Economic Co-operation and Development (OECD) region, and industry went into compliance mode. The first downwave followed, running from the mid 1970s to 1987. Acid rain had a major impact on European

Union (EU) politics during the early 1980s; but this was, on the whole, a period of conservative politics, with energetic attempts to roll back environmental legislation. However, a major turning point was reached in 1987.

The second – 'Green' – pressure wave began in 1988 with the publication of Our Common Future by the Brundtland Commission (UNWCED, 1987), injecting the term 'sustainable development' into the political mainstream.

Issues such as ozone depletion and rainforest destruction helped to fuel a new movement: Green consumerism. The peak of the second wave ran from 1988 to 1991. The second downwave followed in 1991. The 1992 UN Earth Summit in Rio delayed the impending downwave, triggering 'spikes' in media coverage of issues such as climate change and biodiversity, but against a falling trend in public concern. The trends were not all down, however: there were further spikes, driven by controversies around companies such as Shell, Monsanto and Nike, and by public concerns – at least in Europe – about 'mad cow disease' and genetically modified foods.

The third pressure wave – 'Globalization' – began in 1999. Protests against the World Trade Organization (WTO), World Bank, International Monetary Fund (IMF), Group of 8 industrialized countries (G8), World Economic Forum and other institutions called attention to the critical role of public and international institutions in promoting - or hindering - sustainable development. The 2002 UN World Summit on Sustainable Development (WSSD) brought the issue of governance for sustainable development firmly on to the global agenda - although not on to the agenda of the government of the US. The US, which helped to trigger and lead the first two waves, has remained in something of a downwave in relation to issues such as climate change, running counter to public opinion and pressure in other OECD countries.

The third downwave began, we believe, late in 2002. Intuitively, we expect it to last somewhere between five and eight years. The focus this time will be on new definitions of security, new forms of governance (both global and corporate), the 'access' agenda (for example, access to clean water, affordable energy, drugs for HIV/AIDS, malaria and tuberculosis, and so on), the role of financial markets (for example, evolving forms of liability, with the problems that have hit the asbestos and tobacco industries spreading to such industries as fast food, fossil energy and auto manufacture) and the increasingly central role of social entrepreneurs.

Further afield, we expect fourth and fifth waves, very likely on shorter time frequencies and – possibly – with less dramatic fluctuations in public interest. As these subsequent waves and downwaves develop, what we call the chrysalis economy will emerge and evolve.

The chrysalis economy

If it emerges at all, a sustainable global economy will emerge through an era of intense technological, economic, social and political metamorphosis (Elkington, 2001). A key driver will be the unsustainability of current patterns of wealth creation and distribution. Today's economy is highly destructive of natural and social capital, and is characterized by large and growing gaps between rich and poor. The events of 11 September 2001 and – intentionally or not – the subsequent aftermath served notice on the rich world that both absolute and relative poverty will be major issues in the future.

Because current patterns of wealth creation will generate worsening environmental and social problems, pressures will continuously build on both corporations and governments to make a transition to sustainable development. Figure 1.4 distinguishes four main types of company, or 'value webs', along the evolutionary path to a chrysalis economy – namely, corporate 'locusts', 'caterpillars', 'butterflies' and 'honeybees'.

The key to developing environmental policies that facilitate the transition to sustainability is to understand that the roles of government need to be different in relation to the four different types of corporation. For example, corporate butterflies and honeybees need to be treated very differently from corporate caterpillars and locusts.

Corporate locusts

Some corporations operate as destructive locusts throughout their life cycles; others only display locust-like behaviours occasionally. There are corporate locusts everywhere destroying social and environmental value and undermining the foundations for future economic growth. Some parts of Africa, Asia, Latin America and regions once controlled by the old Soviet Union are literally crawling with them.

Among the key characteristics of a corporate locust are:

- the destruction of natural, human, social and economic capital;
- collectively, an unsustainable 'burn rate', potentially creating regional or even global impacts;
- a business model that is unsustainable over the long run;
- periods of invisibility, when it is hard to discern the impending threat;
- a tendency to swarm (think gold rushes), overwhelming the carrying capacity of social systems, ecosystems or economies; and
- an incapacity to foresee negative system effects, coupled with an unwillingness to heed early warnings and learn from mistakes.

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	Low impact	High impact
Regenerative (increasing returns)	Butterflies	Honeybees
Degenerative (decreasing returns)	Caterpillars	Locusts

Figure 1.4 Corporate characteristics

When most companies were corporate locusts, government had to take the offensive. Key tasks were to stamp on the worst offenders and on locust-like behaviours in business as a whole. In a globalizing world, one key challenge for environmental protection agencies is to extend their regulatory and enforcement reach to problem companies operating outside of their formal jurisdiction.

Corporate caterpillars

Usually, caterpillars are harder to spot than locusts because their impacts are more localized. But if you live or work right next door to a corporate caterpillar, their degenerative impacts may make it hard to see that these corporations have a significant potential for metamorphosis. Corporate caterpillars tend to:

- generate relatively local impacts, most of the time;
- show single-minded dedication to the business task at hand;
- depend upon a high 'burn rate', although usually of forms of capital that are renewable over time;
- operate on a business model that is unsustainable when projected forward into a more equitable world of 8 to 10 billion people;
- have the potential for transformation into a more sustainable guise, often based upon a mutated business model; and
- operate in sectors where there is evidence that pioneering companies are already starting to metamorphose towards more sustainable forms of value creation.

Here the challenge for governments is to provide appropriate conditions for old businesses to evolve and new businesses to grow, but at the same time to use regulatory and financial incentives to ensure that these businesses develop in line with environmental and sustainable development objectives. Key roles here include:

- support for research and development (R&D) and technology demonstration programmes;
- public-private partnerships;
- green purchasing;
- elimination of perverse subsidies; and
- ecological tax reform.

Corporate butterflies

Corporate butterflies are easy to spot, even though most are comparatively small. By their very nature, they are often highly conspicuous and, in recent years, have been abundantly covered in the media (think Ben & Jerry's, the Body Shop and Patagonia). An economic system fit for corporate butterflies would almost certainly be a world well down the track towards sustainability.

Yet, as Paul Hawken has argued, even if every company in the world were to model itself on such companies, our economies would still not be sustainable. For that, we will need to develop and call upon the swarm and hive strengths of the corporate honeybee. Even so, corporate butterflies have a crucial role to play in evolving 'chrysalis capitalism'. Among other things, they model new forms of sustainable wealth creation for the honeybees to mimic and, most significantly, scale up. Some characteristics include:

- a sustainable business model, although this may become less sustainable as success drives growth, expansion and increasing reliance on financial markets and large corporate partners;
- a strong commitment to the corporate social responsibility (CSR) and sustainable development (SD) agendas;
- the tendency to define its position by reference to locusts and caterpillars;
- a wide network, although not among locusts or honeybees;
- increasingly, involvement in symbiotic relationships;
- persistent indirect links to degenerative activities;
- a potential capacity to trigger quite disproportionate changes in consumer priorities and, as a result, in the wider economic system; and
- high visibility and a disproportionately powerful voice for such economic lightweights.

Like their natural counterparts, corporate butterflies tend to occur in 'pulses'. After rain, for example, a desert can suddenly come alive with butterflies. In much the same way, pulses of corporate butterflies were a feature of the 1960s, with booms in alternative publishing, wholefood and renewable energy technology businesses, and again during the 1990s, when sectors such as ecotourism, organic food, SD consulting and socially responsible investments

(SRIs) began to go mainstream. Government policies designed to help sound corporate caterpillars will generally also serve corporate butterflies well. Government can also encourage change by identifying, supporting and celebrating any companies that move from the caterpillar stage to the butterfly stage.

Corporate honeybees

This is the domain into which growing numbers of government agencies, innovators, entrepreneurs and investors will head in the coming decades. A sustainable global economy would hum with the activities of corporate honeybees and the economic versions of beehives. Although bees may periodically swarm like locusts, their impact is not only sustainable but also strongly regenerative. The key characteristics of the corporate honeybee include:

- a sustainable business model, albeit based on constant innovation;
- a clear and appropriate set of ethics-based business principles;
- strategic sustainable management of natural resources;
- a capacity for sustained heavy lifting;
- sociability and the evolution of powerful symbiotic partnerships;
- the sustainable production of natural, human, social, institutional and cultural capital; and
- a capacity to moderate the impacts of corporate caterpillars in its supply chain, to learn from the mistakes of corporate locusts and, in certain circumstances, to boost the efforts of corporate butterflies.

Some implications for governments

Given current demographic trends, the selective pressures that work in favour of sustainable development can only increase. As this occurs, we will see many patterns of change in corporate behaviours. Some companies that remain strongly degenerative will attempt to improve their images through clever mimicry of butterfly and honeybee traits. It will not be uncommon to find the same corporation displaying some mix of caterpillar, locust, butterfly and honeybee behaviours simultaneously. But no company is fated to remain trapped forever in locust form. With the right stimulus and leadership, any organization can start the transformative journey, although it is usually easier to go from caterpillar to butterfly than from locust to honeybee.

The roles of government here will be many and various. Aspects of traditional environmental protection approaches will still be necessary; but to build truly sustainable wealth-creation clusters, the public sector will need to

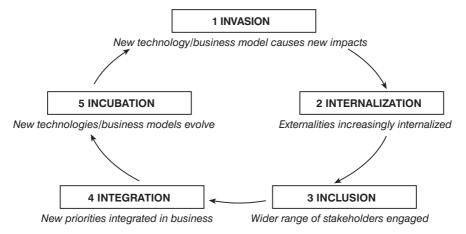


Figure 1.5 The learning flywheel

take a leaf out of the private sector's book and embark on major 'silo-busting' campaigns. Like corporations and value webs, governments and their agencies will need to move through the various stages shown in the learning flywheel (see Figure 1.5):

- The first stage focuses on *invasion* the natural process by which an
 innovation, be it a new technology or a new business model, invades an
 opportunity space, creating economic, social or environmental impacts in
 the process. Here, government agencies play a key role in identifying new
 types of impact and pioneering assessment methods.
- In the second stage, we see the emphasis shift to the process of *internalization*
 by which a company or value web absorbs some of the costs previously externalized to society or the environment. Government involvement is critical to ensure externalities are properly costed and internalized.
- As the burdens of internalization build, so management needs to know where the real priorities lie, and we see a new interest in *inclusion*. This is the process by which a wide range of internal and external stakeholders are progressively engaged, their priorities established and their legitimate needs met. The public sector has often lagged in this area; but its role will be increasingly significant in establishing key priorities for action and investment.
- Next comes the emerging challenge of integration. Every time business is
 required to address a new agenda, there is the problem of silos as has
 successively been the case with environment, health and safety (EHS), total
 quality management (TQM), information technology (IT), shareholder value
 added (SVA) and corporate social responsibility (CSR). Even leading
 companies still have a great deal to do in terms of silo-busting and the

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	Governance	Markets
Emerging	Boards	Business models
Existing	Balance sheets	Brands

Figure 1.6 *Integration challenges*

integration of triple bottom line thinking into corporate strategy and corporate governance. Governments, too, will find that silo-busting and integration are critical to success in their own operations.

In the process, the TBL language may sometimes be unhelpful, encouraging parallel activities rather than true integration. Early in 2003, as a result, we titled our fifth conference tour of Australia and New Zealand 'Beyond the Triple Bottom Line: Boards, Brands and Business Models'. The message was that the challenges of integration will increasingly play out in four key areas. As Figure 1.6 shows, these are the realms of balance sheets (transparency, accountability, reporting and assurance), boards (ultimate accountability, corporate governance and strategy), brands (engaging investors, customers and consumers directly in sustainability issues) and business models (moving beyond corporate hearts and minds to the very DNA of business).

All of that said, even the best-run companies may not be sustainable if their business models or technologies are not sustainable in the long haul. In such cases, we need to focus on the prospects for incubation, considering how more sustainable technologies, business models and industries can be incubated in today's world. Even the most productive beehives have to start from a few brood-cells. And, apart from early projects around industrial ecology, we have hardly even begun to think how governments and other key actors can catalyse new clusters (geographical or virtual) of sustainable businesses (Rosenberg, 2002).

In SustainAbility's own work, we will be focusing growing attention both on such clustering and on the role of social entrepreneurs in developing 'out-of-the-box', 'leapfrog' strategies, business models and technologies for tackling the unserved needs of the world's poorest communities.

In sum, the TBL agenda as most people would currently understand it is only the beginning. A much more comprehensive approach will be needed that involves a wide range of stakeholders and coordinates across many areas of government policy, including tax policy, technology policy, economic development policy, labour policy, security policy, corporate reporting policy and so on. Developing this comprehensive approach to sustainable development and environmental protection will be a central governance challenge – and, even more critically, a market challenge – in the 21st century.