Chapter 3
Environmental Sustainability in Business

"I think the world has reached a tipping point now. We're beyond the debates over whether [addressing sustainability] is something that needs to be done or not – it's now mostly about how we do it. […] it's not about altruism, it's about creating value."

Steve Fludder, Vice President, Ecomagination, General Electric (Berns et al. 2009b, 7)

In recent years, some very large, established companies like General Electric have completely overturned their previous negligence of sustainability and now consider it a central aspect of their business strategy. However, many other companies still regard sustainability to be a side issue, and few act decisively in order to derive real value from it. The divide becomes evident in a recent global survey of business leaders[1]: 68 percent of those who considered themselves to be experts with respect to sustainability said that their investments in sustainability aimed at financial returns, as opposed to only 32 percent among self-identified novices. The difference is even greater – 50 versus 10 percent – with respect to whether or not the company has developed "a compelling business case for sustainability" (Berns et al. 2009b, 8f.). Overall, improved company or brand image still represents the most important perceived benefit (Berns et al. 2009a, 58). This is somewhat conflicting with the results from an earlier survey with managers from US-based firms[2]: the top three answers for the primary motivation of the firm for corporate citizenship were revenue growth (16%), increasing profit (16%), and cost savings (13%) (Economist Intelligence Unit 2008a, 24). The discrepancy may stem from the different demographics of the respondents, yet both surveys highlight the fact that sustainability in business is no longer a matter of philanthropy.

[1] 1,560 business leaders from for-profit organisations replied to an electronic survey during March/April 2009. One third of respondents are from the executive suite, fifty percent were senior managers. All regions are represented, the strongest being North America (28%), Europe (14%), Asia Pacific (13%), but also a large number (27%) of global companies (Berns et al. 2009a; Berns et al. 2009b).

[2] The Economist Intelligence Unit (2008a, 2) electronically surveyed 566 managers from US-based companies during September 2008 (39 percent of the respondents were on the level of vice president or above).

A. Sommer: Managing Green Business Model Transformations, SPLCEM, pp. 23–47.
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It is the goal of this chapter to substantiate the assertion that addressing sustainability, more precisely environmental sustainability, makes economic sense, too.

One of the first and most persistent challenges with respect to sustainability in business both to academics and practitioners is to define it (Schaltegger & Burritt 2005, 186ff.).

3.1 Sustainability Defined

For decades, the definition of sustainability has remained a contested issue despite – or maybe because of – the far-reaching consequences of how the term is understood.

A widely used definition among academics and sustainability experts is the so-called Brundtland Commission definition:

> *"Humanity has the ability to make development sustainable – to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs."* (WCED 1987, 8)

Sustainable development thereby represents a process that aims at reaching sustainability as its end state (Schaltegger & Burritt 2005, 185).

Another popular interpretation of sustainability by sustainability pioneer John Elkington has become known as the *triple bottom line* (Elkington 1994; 1999). According to this view, companies should complement their attention to the financial bottom line with consideration of the social and environmental bottom lines. It is argued that there are many triple wins such that the financial bottom line need not to suffer from an expanded, integrated management focus on sustainability.

In contrast, among business leaders who consider themselves novices in the sustainability domain, sustainability is often understood as "maintaining the viability of our business" (Berns et al. 2009a, 37). This definition obviously is a lot less strict than that of the Brundtland Commission and much vaguer than the triple bottom line. In fact, one might actually make a case against environmental protection in general based on the assumption that it often increases cost today and offers limited returns tomorrow. In order to examine environmental sustainability on a microeconomic level, it is necessary to establish a broad understanding of its macroeconomic context first as it has profound influence on future policies and the business environment in general.

3.1.1 The Macroeconomic Perspective: Weak versus Strong Sustainability

Many major controversies on sustainability relate to the rivalling perspectives of weak versus strong sustainability (Schaltegger & Burritt 2005, 187f.). The *weak sustainability* paradigm (tracing back to works of Solow 1974; Hartwick 1977) is

rooted in neoclassical economics and postulates that sustainability only requires that the aggregated stock of all forms of capital[3] – including natural and man-made capital – remains at least constant over time (Droste-Franke 2004, 40ff.). Weak sustainability thereby implies that natural capital is either "super-abundant", or that it can be substituted with man-made capital – both as an input factor and to provide direct utility (Neumayer 2003, 22), or that "technical progress can overcome any resource constraint" (Neumayer 2003, 23). As a result, economic growth can justify the depletion of resources and pollution of the environment as long as the growth in man-made capital is stronger than the damage done to the environment.

In reference to Rawls' *theory of justice* (Rawls 1999, first published 1971) and based on the belief that future generations will be wealthier anyway, one may question current efforts on environmental protection and deduce that it is justified for the current generation to maximise its own welfare instead. Along these lines, Lomborg (2001) demands that available resources should be invested in issues with relatively near-term returns like economic growth or education in poor countries – as opposed to the prevention of (in his view overstated) environmental issues like climate change that mainly concern future generations. In addition, Lomborg argues, future technological advances will make it much more efficient to deal with long-term environmental issues in the future than it would be today. Nordhaus (2008) provides an example of a well-established – but not undisputed (Krugman 2010) – neoclassical cost-benefit analysis of climate change. It is implicitly based on the central weak sustainability assumption of substitutability, and suggests only modest (initial) interventions for combating climate change. It should be noted that these interventions are the result of a utilitarian approach – weak sustainability principally does not warrant any active climate policy given that total welfare is assumed to increase even without it (Neumayer 2003, 31f.).

Environmental optimism as described above is strongly contested. Counterarguments range from rather technical arguments like the use of high discount rates that make future returns of environmental protection look small compared to its cost today (e.g., Weitzman 1998; Portney & Weyant 1999) to very fundamental arguments that relate to the relationship between human welfare and material prosperity (for a comprehensive discussion, see Neumayer 2003). The growth imperative has been contested noticeably at least since the early 1970ies (e.g., see Nordhaus & Tobin 1972), with the most prominent call for reconsidering the current path of development issued by the Club of Rome report "The Limits to Growth" (Meadows et al. 1972). Modern societies' fixation on consumption is considered a dead end by many academics that are active in the sustainability domain today (e.g., see Ehrenfeld 2005; 2008; Jackson 2009; Fedrigo & Hontelez

[3] Various forms of capital can be distinguished: Classical economics distinguishes land, labour and human-made capital (Ekins et al. 2003, 166). In the context of sustainability, other disaggregations are common. For instance, Ekins (1992) differentiates manufactured (machines, buildings, infrastructure, etc.), human (knowledge, skills, etc.), social/organisational (networks, organisations, etc.), and natural (natural resources, pollution sinks, etc.) capital. For the sake of simplicity, I will distinguish only natural capital and man-made capital.

2010). Yet, economic growth as measured by the disputed gross domestic product (GDP) is still at the top of the political agenda of developed and developing countries alike (for a discussion of alternatives to GDP see Stiglitz et al. 2009).

Advocates of *strong sustainability* in the tradition of Herman Daly (e.g., Daly 1992, first published in 1977), by contrast, would argue that the majority of current human economic activity – that involves burning fossil fuels, producing waste, emitting greenhouse gases, etc. – is non-sustainable business practice. One of their main arguments against the weak sustainability paradigm is directed against the underlying assumption that natural capital is substitutable (Neumayer 2003). One interpretation of strong sustainability therefore demands that physical stocks of so-called *critical natural capital* must not be used beyond their regenerative capacity and cannot be substituted with each other or other forms of capital (Droste-Franke 2004, 42). Indispensable ecosystem services like climate regulation or fresh water obviously belong to this category. However, a definitive conceptualisation of criticality of natural capital is still pending (Brand 2009).

Ekins et al. (2003, 168f.) present various theoretical and practical reasons why they think that scientists should prefer strong sustainability as the a priori position and revert to weak sustainability only in cases where it has been shown to be appropriate. Maybe the most intuitive among them is that the loss of natural capital can be irreversible, which is very rarely the case for manufactured capital.

Based on earlier works by Endres & Radke (1998) and Pezzey (1994), Droste-Franke attempts to integrate the concepts of weak and strong sustainability and suggests the following three priorities for sustainable development (Droste-Franke 2004, 63): First, all stocks of capital considered relevant to society must be kept above critical levels. Second, appropriately valued changes to all relevant forms of capital must always be non-declining in total. Third, the present value of intertemporal utility needs to be maximised under the constraints of priorities 1 and 2.

The first priority may be interpreted as a safety margin against imminent unacceptable environmental damage which must not be violated even if efficiency considerations suggest otherwise. For example, Nordhaus considers such non-economic constraints in his analysis (Nordhaus 2008, 17): He argues that governments may want to limit the maximum temperature rise from global warming to 2.5° C if climate scientists conclude that a stronger rise could trigger fatal feedback processes. Priority 2 is satisfied as long as a continuous increase in total welfare is projected. Priority 3 combines the concept of intergenerational equity with welfare maximisation. Interestingly, Nordhaus found that most of the tested climate-constraint cases are still close to the economic optimum (Nordhaus 2008, 15).

In summary, few scientists are extreme proponents of either weak or strong sustainability in that they claim natural capital is either completely substitutable or not at all, respectively. Moreover, as Neumayer (2003, 89) remarks, the controversy between the two rivalling paradigms can neither be resolved theoretically nor empirically – at least not in the near-term future.

3.1.2 Corporate Sustainability

The lack on consensus in defining sustainability is problematical as companies are left to interpret sustainability as they choose. If companies follow the weak sustainability paradigm – which most companies active in the field today do – sustainability is usually equated with *eco-efficiency* (e.g., Schmidheiny 1992), i.e. "creating more goods and services with ever less use of resources, waste and pollution" (WBCSD 2000, 1). Most corporate environmental initiatives are designed in the spirit of eco-efficiency. Of course, the problem with eco-efficiency is that absolute environmental degradation still grows if efficiency gains are fully consumed by even stronger increases in economic output. In fact, within the paradigm of weak sustainability such developments are desirable as long as the aggregated capital increases. The cumulative effects of such a development may still be devastating for the environment in the long run.

One proposal for solution are so-called "factor X" concepts that demand radical improvements in resource productivity. For example, reaching factor four allows doubling prosperity while requiring half the natural capital (von Weizsäcker et al. 1995). By decoupling economic growth from environmental pollution and resource use, its proponents are hoping to avoid the painful trade-off between a healthy environment and a high (material) standard of living.

However, critics argue that reaching factor X is a necessary, but not a sufficient condition for saving the planet for future generations. The requirements from strong sustainability go further and may be translated into management rules for individual companies that include the following (see Neumayer 2003, 25; based on Daly 1992): A company must not harvest more than the highest sustainable yield, and pollute the environment only to an extent that does not harm its absorptive capacity.

Some large companies have responded to the demands from strong sustainability advocates and set highly ambitious long-term targets. For instance, Wal-Mart has formulated the goal of creating zero waste, using only renewable energy, and "to sell products that sustain our natural resources and the environment" (Wal-Mart 2007, 41). However, it has to be acknowledged that most of the few companies that have formulated respective goals are still far away from living up to their ambitious aspirations.

In this work, the chosen focus lies on the field of environmental sustainability (and not social or governance aspects per se). As explained earlier, this is not to suggest that the other dimensions can be ignored (to the contrary). It is merely a reflection of the fact that environmental sustainability generally represents the largest opportunity for companies, or at least, it is the easiest to identify and quantify for the purpose of business model transformations (the reputational and litigation risks from social and governance issues can be huge). Moreover, the focus on environmental sustainability should not hide the fact that companies who wish to take sustainability seriously need to adopt an integrated, holistic perspective on

economic, social, and environmental aspects of sustainability (see figure 3.1). Often, these three dimensions are indivisible. Independent of the respective organisational structure for sustainability management and the company-specific focus on individual sustainability issues, advanced companies share the understanding that there are links between all three sustainability dimensions that need to be actively managed (Schaltegger & Wagner 2006a). Integrating all sustainability dimensions is thereby a greater challenge than optimising the effectiveness of each aspect individually (Schaltegger & Burritt 2005). This work focuses on the opportunities arising from ecological issues and their interfaces with the social and the economic dimension in particular (eco-efficiency).

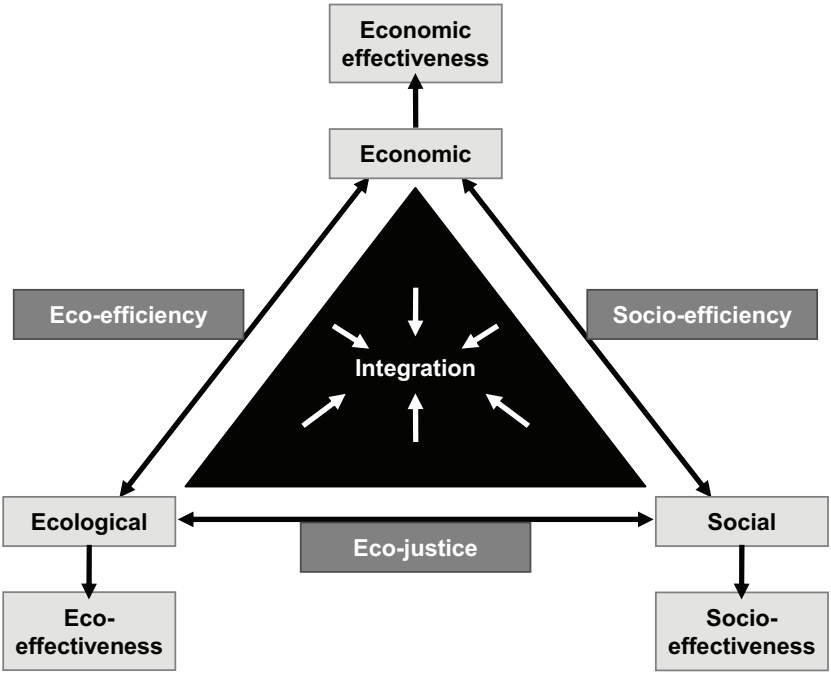

Fig. 3.1 Corporate Sustainability aspects and their interrelations (Schaltegger & Burritt 2005, 189)

Although this integrated, holistic understanding has started to take hold in the academic and business community (Forstmoser 2006) it does not mean that there is a consensus on sustainability language and terms yet. In corporate settings, sustainability is often referred to as *Corporate Social Responsibility* (CSR). In some manufacturing companies, so-called *Health, Safety and Environment* (HSE) departments cover much of what is usually attributed to corporate sustainability. In the financial industry, the term *ESG* (Environmental, Social and Governance) is commonly used. All these terms may mean the same or not, depending on who

uses them and in which context. In the following, the term *corporate sustainability* will be used, thereby adopting the definition below:

> *"[Corporate sustainability management] deals with both the analysis and management of the effects of environmental and social activities on the competitiveness and economic success of a company, as well as with the analysis and management of the social and environmental effects of business activities."* (Schaltegger & Wagner 2006a, 4)

Despite the presented theoretical arguments and empirical evidence that the corporate mindset has shifted in favour of corporate sustainability, one objection must not be lightly dismissed: that it may be just a passing management fad.

3.2 The Relevance of Corporate Sustainability for Economic Success

> *"All truth passes through three stages. First, it is ridiculed. Second, it is violently opposed. Third, it is accepted as being self-evident."*
> Attributed to Arthur Schopenhauer (1788-1860)[4]

Corporate sustainability advocates are rarely ridiculed these days. Many people now find claims of its importance for a company's success self-evident, at least on a generic level (Lee 2008). Although much has changed since the famous criticism of Milton Friedman (Friedman 1970), not all business managers have been converted. From a practical point of view, it seems unlikely that corporate sustainability will turn out to be a management fad – the fact that companies adhere to their commitment to corporate sustainability even during the downturn and with scarce financial resources suggests otherwise: 60 percent of respondents in the already quoted management survey indicated unchanged or increasing commitment for their companies (Berns et al. 2009b, 8). Rather, managers' increased interest in corporate sustainability has led to an urgent need for new strategic frameworks and approaches to manage it (Berns et al. 2009a, 73) – a condition that this publication seeks to improve.

Nevertheless, sceptics of corporate sustainability express doubts with respect to the postulated economic benefits of corporate sustainability.

3.2.1 Critical Views on Corporate Sustainability

Historically, most environmentalists have vigorously fought for their cause. Based on the understanding that our planet is seriously at risk, many have deduced that helping the environment must be good business – because "it *ought* to be" (Reinhardt 1999, 150). Countless examples of win-win situations for both the environment and the financial bottom line have been collected. Yet, corporate

[4] According to Wikiquote, the quotation is disputed (Wikiquote 2009).

sustainability has all too often been presented one-sidedly without acknowledging the difficulties and risks (Walley & Whitehead 1994; Esty & Winston 2009, xxf.). Ironically, these overzealous efforts to promote corporate sustainability may in fact have harmed the sustainability movement in the long run. Every manager knows that business reality is not quite as straightforward – it is full of ambiguity and difficult trade-offs (Reinhardt 1999). Many managers therefore consider corporate sustainability a shallow term; sustainability issues are believed to be non-substantial. These sceptics may further argue that all the talk is merely a form of political correctness (Berns et al. 2009b, 11). On this note, sustainability activities that are vital for the competitiveness of a firm may be argued to have just been relabelled and reassigned. Worse even, conventional wisdom holds that environmental protection in general does not improve competitiveness but instead entails additional cost (Ambec & Lanoie 2008). This line of thought is flanked by the belief that corporate sustainability is not only bogus in economic terms; that it is also the role of the government – and not business – to enforce sustainable business practices (Friedman 1970). Providing public goods like clean air beyond legal compliance is doubtful to be rewarded according to this view; market pressures would instead dictate maximising profits (Berchicci & King 2007, 5f.).

In a softened form of criticism, sceptics may argue that opportunities and threats stemming from corporate sustainability are real but insignificant. This fits with the view that sustainability is a matter of public relations and possibly product marketing – but that it is largely irrelevant to the core of the business. This view seems to become less widespread, but is still prevalent, especially among managers that are relatively inexperienced in the sustainability domain (Berns et al. 2009b).

The controversy around corporate sustainability also includes aspects of rivalling ideologies and contrasting ethical perspectives (Schaltegger & Wagner 2006b, 2) as explained above. However, these aspects go far beyond the scope of this work. I believe that ethical arguments will not persuade a sufficient fraction of corporate leaders to consider Green Business Model Transformations, at least not in the case of public companies. Consequently, and because I believe that a case for Green Business Model Transformation can often be made without explicitly relying on ethical arguments, I will concentrate my analysis on economic considerations that may be accepted both within the neoclassical and the (moderate) environmentalist camp (for a systematic comparison see Gladwin et al. 1995).

In conclusion, my claim is that the economic opportunities stemming from corporate sustainability are big and largely untapped; that green business models in particular can be used to create value, sometimes on a grand scale. In the following section I will present theoretical and empirical evidence to back these seemingly bold statements.

3.2.2 Evidence for the Value Creation Potential of Corporate Sustainability

3.2.2.1 Corporations' Blind Spot on Green Opportunities (and Risks)

The claim that corporate sustainability can create previously neglected value immediately points to the economist's famous metaphorical "$10 bills on the ground": According to traditional economists these bills can never be found, "because someone would have already picked them up" (Porter & van der Linde 1995b, 98). Thus, if someone spotted a bill nevertheless, it would have to be counterfeit.

However, such reasoning is based on the unrealistic assumption that information in the market is perfect and that all large opportunities from environmental sustainability have already been identified (Porter & van der Linde 1995b, 98f.). By contrast, Porter & van der Linde argue that – in order to recognise the opportunities to improve resource productivity, innovativeness, and competitiveness – it may even be beneficial to enact stricter (but flexible) environmental regulation. This way, so they argue, the widespread lack of attention and professionalism regarding environmental matters can be reduced (Porter & van der Linde 1995b, 99f.). The so-called *Porter Hypothesis* has been discussed controversially (e.g., Jaffe et al. 1995; Walley & Whitehead 1994; see also Ambec & Lanoie 2008). Nevertheless, it has to be acknowledged that general awareness and reporting capabilities have greatly increased since (KPMG 2008). However, some of the other impediments that Porter and van der Linde recognise are still very relevant today: The business environment is still complex and fast changing (Berns et al. 2009b, 14) – probably even more so than 15 years ago. Aragón-Correa & Sharma (2003) argue that while perceived unpredictability of the general business environment actually facilitates adopting proactive environmental strategies, uncertainty about the impact of external changes on the organisation and about the effects of individual decisions as well as complexity are considerable barriers. Combined with organisational inertia (Shrivastava 1995b, 942) the forces opposing a resolute pursuit of green opportunities can become very strong. This is especially true for established companies in mature, low growth industries in which substantial risk-taking is less rewarding (Russo & Fouts 1997). It seems a lot safer to stick to compliance and from time to time adopt established "best practices" from peers, rather than undertaking major novel green initiatives. However, this kind of passive, uncreative approach just reinforces the preconception that corporate sustainability offers only limited upsides to the company (if any) and may thus create a self-fulfilling prophecy.

While environmental reporting capabilities have improved significantly over the last years, there is still a lack of strategic management tools needed to move beyond incremental improvement of environmental performance (Berns et al. 2009a, 73). A cost-based mindset towards environmental management (Porter & van der Linde 1995a) as well as control problems to adequately align incentives

(Porter & van der Linde 1995b, 99) may further impede corporations from picking up the $10 bills – or seeing them in the first place. This includes the still widespread fixation on quantifiable short-term benefits (Christensen et al. 2008, 103f.) and coordination issues across organisational units (Johnson 2010, 155ff.). However, at least one condition has probably changed in favour of attempting bold, green initiatives: stakeholder pressure. The relationship between stakeholders and corporate sustainability will be explained in section 3.3.2. However, while the increased pressure has raised the topic on the corporate agenda, most activities are still to be considered passive and non-substantial in nature (Berns et al. 2009b, 12). Thus, the question whether sustainability pioneers are rewarded as a general rule has yet to be answered (Steger 2006, 442).

The considerations above explain why green opportunities may still be untapped. However, three issues remain open: How significant are they? What do they consist of? How can they be seized?

The following includes a short summary of the literature regarding these questions. Various practical examples of green value creation will be provided in part III, chapter 7.

3.2.2.2 Empirical Studies on the Link between Environmental and Economic Performance

An important insight that overenthusiastic environmentalists frequently fail to mention is the fact that while corporate sustainability *can* create value, it does not under every circumstance, nor does it happen automatically without adequate sustainability management (Schaltegger & Synnestvedt 2002).

A growing number of quantitative empirical studies try to clarify the link between environmental sustainability and economic/financial performance. Different variables are commonly used for this purpose (Molina-Azorin et al. 2009, 1093): Frequently used financial performance measures include ROA, ROS, ROE, stock market returns, stock price, and profits. Resource consumption, emissions, toxic waste, oil and chemical spills, and recovered, treated or recycled substances are commonly used measures of environmental performance. Some studies measure environmental management instead of performance, e.g. in terms of environmental strategy and practices, types of undertaken initiatives, environmental management systems, or ISO 14001 certification. This variety of measures already indicates the problem of methodological diversity in this field of research.

Three broad types of quantitative empirical studies have been used to investigate the link between environmental and economic performance: portfolio analyses, event studies, and studies measuring long-term effects based on regression analysis (Ambec & Lanoie 2007, 16ff.).

Portfolio analyses examine how companies with highly rated environmental performance perform at the stock market compared to the investment universe. In their meta-study Ambec & Lanoie (2007) examined 16 studies, five of which found a positive link, but 11 of which found no statistically significant differences. Another meta-study examining 20 studies also showed mixed results (UNEP & Mercer 2007). Overall, sustainable responsible investment (SRI) seems to offer comparable risk-adjusted returns – which is a success in itself as restricted portfolios are intrinsically disadvantaged due to their lower diversification.

Event studies consider certain environmental events and their effects on the stock price. Especially bad news has been found to have a noticeable impact: For the 14 studies considered by Ambec & Lanoie (2007; 2008) they report an average abnormal daily loss of 2.22%. In a way, this result is not surprising as unforeseen hits to the bottom line should result in adjustments by the stock market. However, there is less evidence that positive events are equally rewarded. For example, the announcement of the inclusion in the well-known Dow Jones Sustainability Index (DJSI) family was found to have only very small effects (< 0.1%) on the stock price (Consolandi et al. 2008).

A third type of studies analyses long-term effects of the environmental performance of selected companies by using regression analysis. Of the 12 studies in this category considered by Ambec & Lanoie (2007), nine show a positive, one a negative relationship, and two studies found no impact.

All three types of studies discussed above suffer from methodological problems which are not enlarged upon here in detail (for a discussion of issues see Ambec & Lanoie 2008). However, one challenge of particular relevance is to reveal the underlying causal chains that are responsible for the described statistical findings.

3.2.2.3 Examination of Causality behind Statistical Findings

Four basic causal relationships are applicable for the link under examination (Ambec & Lanoie 2008, 58f.): First, financial performance may influence environmental performance. A positive relationship is plausible based on the premise that companies that do well can afford to spend money on environmental protection. This possibility is relevant because a significant positive correlation between environmental and economic performance may be misinterpreted to be caused by environmental performance in cases where philanthropy is the true source. Empirical data from Japan supports this hypothesis (Nakao et al. 2007), while Wagner et al. (2002) found no respective evidence of significance. A second possibility is that there is a third factor that influences both environmental and economic performance. However, most studies of the subject (like the ones mentioned above) are led by the hypothesis that the causal relationship goes the other way round, i.e. environmental performance and environmental management influences economic performance. Lastly, there may be no significant linkage at all, a condition that could be true for firms operating in a business environment where ecological

issues are of subordinate importance (Ambec & Lanoie 2008, 57f.; Molina-Azorin et al. 2009, 1095). In addition, even if there is a strong causal relationship, cause and effect may be separated by a delay of several years and are thus difficult to isolate (Hart & Ahuja 1996; King & Lenox 2002). The fact that meta-analyses of empirical studies (Ambec & Lanoie 2007; Molina-Azorin et al. 2009) found that results regarding the direction of the correlation are not univocal indicates that the underlying causal chains are non-trivial.

None of the four causal relationships can be ruled out yet. In fact, all may be present under certain circumstances and further research is needed to gain a deeper understanding of the topic (Ambec & Lanoie 2008). Especially the question which specific chains of cause and effect the relationships are based on would be of high interest. The use of case studies is essential to meet this challenge. Although case studies tend to lack representativeness due to limited sample sizes and company-specific circumstances, they are very well suited to unraveling complex causal relationships (Schaltegger & Wagner 2006a, 7). Hence, case studies represent a major source of insights on how to successfully manage Green Business Model Transformations (see chapters 7 and 8).

Schaltegger & Burritt (2005) aim to reconcile the seemingly contradicting views on the impact of environmental efforts on economic success by suggesting that these views reflect different management approaches and performance levels, not mere perceptions (see figure 3.2). For example, companies that employ reactive, end-of-pipe solutions can indeed expect increasing costs from any voluntary effort towards environmental protection (represented by the lower curve ES_0-EP_0). In contrast, well-managed pollution prevention can save resources and thus improve the cost base (curve ES_0-A-B-EP_1). Sometimes these savings can be substantial as the case of 3M's Pollution Prevention Pays (3P) programme demonstrates – the company saved US$ 500 million over 15 years (Shrivastava 1995a). The natural-resource-based view (Hart 1995) provides a theoretical framework to link competitiveness and environmental performance. Along with pollution prevention, Hart argues that product stewardship and sustainable development[5] can improve competitiveness. Analogous to the classic resource-based view (e.g., Wernerfelt 1984; Barney 1991b; Peteraf 1993), he argues that superior investment in environmental resources bestow competitive advantage to firms vis-à-vis competitors due to factor immobility and barriers to competition.

[5] In his paper, Hart understands sustainable development as a strategy to "sever the negative links between environment and economic activity in the developing countries" (Hart 1995, 996).

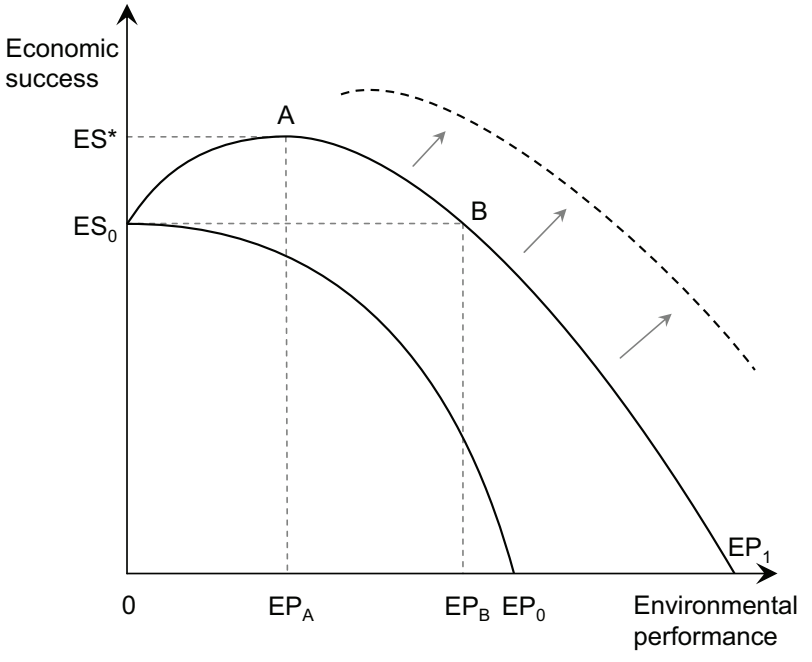

Fig. 3.2 Possible relations between voluntary corporate environmental performance and economic success (similar to Schaltegger & Synnestvedt 2002, 341; Schaltegger & Burritt 2005, 197; Schaltegger & Wagner 2006a, 11)

At some point, however, the marginal gain from environmental protection declines and becomes economically disadvantageous relative to mere compliance (point B). Hence, profit-maximising management should seek to find the "sweet spot" (point A) that offers maximum economic returns and yet encompasses superior environmental performance (EP_A) compared to legal minimum standards (0).

Exceptional environmental management may even push the curve further outwards (dashed curve), thus relaxing the trade-off and facilitating even better performances in both dimensions. Green business models may allow particularly large shifts, e.g. by enabling innovative new, green value propositions that expand existing or create new markets. Such discontinuities also suggest that the link may not be a smooth curve as depicted in figure 3.2, but involve "steps" (Schaltegger & Burritt 2005, 199).

In an effort to set in motion large-scale win-win dynamics as described above, General Electric has launched the company-wide "Ecomagination" initiative in 2005. GE's high expectations are reflected in the ambitious growth targets for products covered by the initiative from US$ 6 billion in 2004 to US$ 25 billion in 2010 (General Electric 2007). Although some of the reported revenue growth stems from products that were in the pipeline or already existed but were added to the portfolio later, the growth is still remarkable (General Electric 2010a).

In conclusion, differences in empirical findings may reflect differences in subsamples and their relative position between the two curves on the graph of figure 3.2, as well as the varying look of the curves themselves, depending on the industry, country and considered year of the study (Schaltegger & Burritt 2005, 200). It has been demonstrated that the relationship between environmental and economic performance can be positive based on costs as well as revenues. However, it has also become clear that a progressive mindset and sound management practices are needed – especially if the aspired results are in the magnitude of that of GE and 3M.

The following section provides a systematic overview of the business case for (environmental) sustainability. Later in chapters 7 and 8, these (mostly generic) considerations are complemented by exemplified but detailed analyses of how levers for green value creation can be used in practice.

3.2.3 The Business Case for Environmental Sustainability

The term *business case for sustainability* refers to the question how "the competitiveness and business success of a company [can] be improved with voluntarily created outstanding environmental and social performance" (Schaltegger & Wagner 2006a, 1). Ultimately, every business case can be reduced to a limited number of general levers for value creation (Schaltegger & Hasenmüller 2005, 8ff.; Berns et al. 2009b, 15; Esty & Winston 2009, 101ff.). Although environmental and social dimensions are often intertwined, the following summary focuses on environmental performance only.

3.2.3.1 Levers for Value Creation through Environmental Sustainability

The business case for sustainability can be evaluated with metrics on three different levels (Peloza & Yachnin 2008): *End state outcome metrics* (e.g., share price), *intermediate outcome metrics* (e.g., profits), and *mediating metrics* (e.g. energy consumption). For a causal analysis, understanding the mediating process is essential. Value creation levers are grouped into the following three categories that they most directly affect, and which ultimately determine the economic success of the firm:

- Profits, i.e. revenue (price or volume) and cost
- Tangible and intangible assets
- Risk

Corporate sustainability can either affect the categories above directly in financial terms, or affect value creation more indirectly through complex causal relationships. Moreover, value creation levers never produce isolated effects, which is one of the reasons why it is so difficult to prove the positive link between environmental and economic performance.

Value creation levers for generating profits

There are countless ways that superior environmental performance can improve both the top and the bottom line of companies (e.g., see Lankoski 2000, 26f. for a list). Key levers mentioned in the literature are specified below, but are not exhaustive.

Although not always the case, some green brands and products are capable of commanding a price premium (Manget et al. 2009, 14ff.), boost sales, or increase customer loyalty (Esty & Winston 2009, 127ff.). Moreover, some companies are able to capitalise on their sustainability efforts by entering completely new markets, e.g. hitherto underserved, developing markets (Hart & Milstein 1999, 29ff.; WEF 2009), or environmental goods and services markets (OECD & Eurostat 1999).

Apart from green product differentiation and addressing new markets, overall environmental performance of a company may also positively affect its access to certain markets (Ambec & Lanoie 2008, 47ff.), e.g. by acquiring a preferred supplier status with eco-minded customers or as a result of reputational spillover effects in business relationships (also see Lankoski 2000, 128f.). However, this lever is much harder to quantify in a business case than green product sales.

On the cost side, many companies realise substantial savings by using energy and other input factors more efficiently, by recycling waste and using environmentally-friendly substitutes, or by reducing cost related to emissions like taxes, treatment cost or pollution rights (Lankoski 2006, 34f.).

Like 3M's 3P programme, the use of respective equipment and operating methods to avoid quality defects and prevent pollution can create substantial cost savings in production (Shrivastava 1995a). In order to take full advantage of sustainability-related cost saving opportunities, however, companies need to consider business operations holistically. That is, product development should incorporate environmental aspects already in the design phase and take into account the whole life cycle (Dechant et al. 1994, 12f.); process improvements should be considered along the complete value chain (Nidumolu et al. 2009, 59ff.). For instance, Wal-Mart expects significant logistics savings from packaging reductions of its suppliers (Wal-Mart 2007, 58).

Despite the many ways to cut internal cost, companies should not necessarily limit their search for competitive advantage to their own cost base – sustainability may also facilitate *increasing* the cost of competitors, thus improving the company's *relative* cost base (Reinhardt 1999, 152ff.). A firm with strong environmental credentials can lobby for stricter regulation (McWilliams et al. 2002), thereby putting less sustainable rivals under pressure. It may also benefit from green subsidies or public investment (Schneidewind 1995, 40). In fact, Russo & Fouts (1997, 540) argue that the potential benefits go beyond simple cost advantages and revenue potential, that an environmental leader's "ability to influence public policies in ways that confer competitive advantage" should be considered a valuable intangible asset.

Value creation levers for creating tangible and intangible assets

Like political acumen, most benefits attributed to superior environmental performance are intangible assets. Reputation thereby represents a key item. Miles & Covin (2000) argue that environmental marketing performance is a major factor for reputation, and financial performance in general. Brand value is not easy to quantify, but estimates of successful green branding efforts claim gains in the billions of dollars in some instances (Interbrand 2008, 12ff.). Brand is long known to create demand and positively affect future sales. Pioneering brands (see Schmalensee 1982) – for which sustainability (still) offers lots of opportunities – can even realise demand advantages that go beyond classic advertising effects.

Another important potential benefit relates to human resources: Environmental (and social) sustainability can be used to increase productivity by boosting employee morale, and help recruiting and retaining high-quality talent (Steger 2006, 431; Siegel 2009, 14). On a more general note, CSR can arguably improve relationships and thus reduce transactions cost with any targeted stakeholder group (Jones 1995; Barnett 2007).

Moreover, in contrast to compliance-focused firms, environmentally proactive firms may be able to derive competitive advantages from deploying new technology and accumulating internal routines and know-how that is difficult to imitate (Russo & Fouts 1997, 537f.). In some cases these may qualify for legal protection as intellectual property. For instance, legislation for zero emission cars in California created a surge in respective U.S. patent filings in the 1990ies, especially by Japanese car manufacturers (Bedsworth & Taylor 2007, 9ff.). Proactive Toyota in particular was subsequently able to capitalise on its early investments (Maynard 2007; Avadikyan & Llerena 2010) (see also chapter 7.8).

Managing risk

The recent *Deepwater Horizon* oil spill that is estimated to cost BP dozens of billions of dollars (The Economist 2010) is a dramatic reminder how important managing environmental risk can be. Historic examples show that severe neglect of the sustainability dimension can even entail companies or entire industries losing their social (or legal) licence to operate. Instructive examples include the prolonged misconduct of the once widely admired American company Johns-Manville with respect to asbestos health risks; it culminated in 1982 in the largest bankruptcy in American history until then (Sells 1994). A more recent example is the scandal around tainted Chinese milk in 2008 that made the entire industry implode (Branigan 2008; Ramzy 2008).

The magnitude and type of environmentally driven business risks differ widely by industry sector (Steger 2006). Firms can systematically identify and mitigate these business risks, even if they are subtle or improbable to materialise (Esty & Winston 2009, 114ff.). Yet risk management does not eliminate the possibility of being attacked by an activist group. Companies can try unilaterally to create goodwill by going beyond compliance in environmental protection to avoid such

attacks. At the same time, however, signalling responsiveness to stakeholder demands can make the company a more attractive target (Baron & Diermeier 2007). In many instances, seeking collaborative relationships with certain NGOs rather than taking a purely defensive approach will be the best option (Esty & Winston 2009, 69ff.).

Naturally, managing environmental risks is mainly about reducing potential downsides like lawsuits, consumer boycotts, or brand damage. This makes it difficult to demonstrate that a chosen level of effort is adequate (Reinhardt 1999, 155f.). However, there are also some benefits that are directly visible: First, sound environmental risk management can reduce the cost of capital (Sharfman & Fernando 2008) and insurance premia (Lankoski 2000, 27). It will also help firms to score high in sustainability rankings like that of the DJSI (SAM & PwC 2010). The direct effect of inclusion in respective indices on the stock price is still very small, but will probably grow in importance (Consolandi et al. 2008).

3.3 Building the Business Case for Sustainability

If environmental sustainability is to be recognised within the firm as a serious and significant business opportunity, building a robust business case is essential (Berns et al. 2009b, 20). This involves a systematic assessment of the value creation levers mentioned above (and potentially additional ones).

There are numerous known tools to identify, build, implement, and monitor the business case for sustainability (e.g., see Steger 2006, 440f.; Schaltegger et al. 2007). Yet, building a business case for sustainability can be challenging. Firstly, the costs of environmental initiatives are often underestimated (Walley & Whitehead 1994), and it is not clear if they will actually create value before a detailed analysis has been conducted. Especially for more radical endeavours like a Green Business Model Transformation, managers shy away from these business cases because of the associated risks, inherent uncertainty, and longer-term payback (Steger 2006, 432). As explained above, many of the major value creation levers are also hard to quantify in financial terms. On the one hand, this makes the proposed transformation harder to justify to sceptical managers. On the other hand, there is a risk of "massaging" the numbers, and that less obvious practical obstacles get ignored. For instance, sales targets of a new green product may be set unrealistically high if the overall value proposition is not sufficiently attractive to a broad target audience – relying primarily on green aspects will usually not work for the mainstream. Moreover, if the corporate brand or the company's business practices are not compatible with selling green products, even attractive value propositions may fail to deliver expected results. Lastly, even if environmental sustainability can be used successfully to boost sales as projected, unexpected cost increases may offset the benefits. Many firms will thus first need to acquire "green competencies" (Marcus & Fremeth 2009, 22f.) in order to operate a successful green business model.

In conclusion, opportunities are plentiful, as are the associated challenges. These intertwined issues will be elaborated upon from chapter 7 onwards based on practical examples. Next, the basics of environmental issues and practical means of dealing with them are outlined.

3.3.1 Overview of Environmental Sustainability as a Management Issue

Environmental problems are diverse (Millennium Ecosystem Assessment 2005): Their scope can be global (e.g. climate change), regional (e.g., water scarcity), or local (e.g., waste). Some issues build up over a long time (e.g., ozone depletion), other problems have short-term characteristics (e.g., local spills of toxic material). Moreover, while some environmental problems can be corrected (e.g., acid rain), others are irreversible (e.g., loss in biodiversity). There is also a complex system of direct and indirect drivers that reinforce environmental degradation. Some of the most fundamental sources of concern like population growth and changes in lifestyle lie well beyond the sphere of influence of individual corporations.

Obviously, different industries face different environmental issues, or do so with different intensities (Steger 2006, 420ff.; SAM & PwC 2010). Moreover, significant portions of the environmental impact of firms can occur upstream in the supply chain (e.g., for the food industry) or downstream at the customer (e.g., for the automotive industry).

The diversity and complexity of issues makes it difficult for companies to take a holistic approach towards environmental sustainability and find lasting solutions to the most pressing problems. Moreover, companies undertaking Green Business Model Transformations need to consider not only the objective characteristics of environmental issues, but also the perception that relevant groups (customers, politicians, etc.) have of them. “Objective characteristics” is an idealised term that refers to what science claims to know about an issue, knowing that conflicting claims may arise and research findings may be proven wrong in some cases.

3.3.2 Current Perceptions on Environmental Issues

There is a large temptation for companies to jump on the bandwagon and focus only on “hype issues” like climate change. Concentrating on issues based on current public sentiment can backfire as it has been seen historically that the perceived importance of environmental issues can shift dramatically over time. For example, while 30 percent of Europeans considered climate change to be the most serious problem for the world as a whole in 2008, only 18 percent did so less than a year later in the wake of the economic crisis (TNS Opinion & Social 2009). The Economist found similar fluctuations in the US. The survey also revealed a widespread lack of basic knowledge on the issue which may contribute to the strong volatility of opinions as well (The Economist 2009, 9). Apart from short-term fluctuation, long-term shifts can be observed as well: resource depletion, acid rain,

the fear of nuclear accidents, ozone depletion, climate change, and now again the risks of nuclear power have all been prominently featured in the media over some period of time. At the same time, the number of industries that are "in the firing line" has increased dramatically since the 1960ies (Elkington 1994, 95). An overview of the ten environmental issues that most concerned European Union citizens end of 2007 is presented in table 3.1[6]:

Table 3.1 Top 10 environmental concerns in the European Union 2007 (TNS Opinion & Social 2008, 6)

1	Climate change (57%)
2	Water pollution of seas, rivers, lakes and underground sources (42%)
3	Air pollution (40%)
4	Man-made disasters, i.e. major oil spills or industrial accidents, etc. (39%)
5	Natural disasters, i.e. earthquakes, floods, etc. (32%)
6	The impact on our health of chemicals used in everyday products (32%)
7	Depletion of natural resources (26%)
8	Growing waste (24%)
9	Loss in biodiversity, i.e. the extinction of species, loss of wildlife and habitats (23%)
10	Agricultural pollution, i.e. use of pesticides, fertilizers, etc. (23%)

Esty & Winston (2009, 34) present a slightly different top-10 list based on a managerial perspective. Climate change is number one as well, but other items differ in their rank order, and disasters are omitted from the list. Instead "energy", a major controllable input factor for many firms and a primary source for climate change, has been added as second. However, such lists can only provide rough guidelines in any case. Industries and business models have very different impact profiles, and public perceptions of environmental issues change over time, too. Moreover, there are significant differences between countries and regions. Not all of these differences can be explained based on how much affected people are by a specific problem. For example, 41 percent of the Swedish population believe that the impact on health of chemicals used in everyday products is one of the five

[6] In the survey respondents were asked to name the five main issues they are worried about. The study was conducted from November until December 2007 with 26,730 citizens of the 27 member states. Lower rated anwers were: The use of genetically modified organisms in farming (20%); urban problems, i.e. traffic jams, pollution, lack of green spaces, etc. (15%); impact of current transport modes, i.e. more cars, more motorways, more air traffic, etc. (12%); our consumption habits (11%); noise pollution (8%); none of these (spontaneous) (1%); don't know (1%) (TNS Opinion & Social 2008).

most severe environmental issues, as opposed to only 26 percent of the Finnish population (TNS Opinion & Social 2008, 10). Not only does the perceived relative importance of environmental issues differ, the importance of environmental protection overall can vary substantially, too: While 89 percent of Swedes find it very important personally, only 47 percent of Finnish citizens share that view (TNS Opinion & Social 2008, 11). Such differences from country to country can become a severe problem for multinationals: Green value propositions may be compelling in one country, but not in another – even if they are geographically close and demographically (but not culturally) similar like Sweden and Finland. Similarly, the company's business practices may be considered acceptable in one country, but criticised harshly elsewhere – without an objective difference in the environmental impact caused.

Finally, even domestically the perceived urgency and gravity of environmental issues differs between stakeholder groups. Stakeholder groups are increasingly argued to be important not only in shaping the environmental agenda for businesses (Murillo-Luna et al. 2008), but also as a factor that influences the competitiveness of firms (Porter & Kramer 2006; Berchicci & King 2007; Harrison et al. 2010). Hence, it is worthwhile to insert a brief examination of the topic of stakeholder management (e.g., Freeman 1984).

3.3.3 Stakeholders Relevance for Environmental Management and Competitiveness

Stakeholders are "any group or individual who can affect or is affected by the achievement of the organization's objectives" (Freeman 1984, 46). Various categorisations of stakeholder groups exist (e.g., Henriques & Sadorsky 1999; Buysse & Verbeke 2003; Esty & Winston 2009, 65ff.). For example, Henriques & Sadorsky (1999, 89f.) distinguish between four broad groups of stakeholders: (1) *regulatory stakeholders* (governments, trade associations, informal networks, and competitors that shape the industry); (2) *organisational stakeholders* (customers, suppliers, employees, and shareholders); (3) *community stakeholders* (community groups, environmental organisations, and other potential lobbies); (4) *the media*.

The relative importance of each group depends on the firm's level of commitment: Henriques & Sadorsky (1999, 90) argue that the more proactive firms are, the more important they consider organisational and community stakeholders. The former are of course at the very core of business model considerations. Regulatory stakeholders will be of greatest importance to firms with medium environmental commitment, and the media are the main focus of reactive firms. The public at large (and thus also the mass media) tends to be especially influenced by negative incidents like environmental disasters.

In general, the public is swayed by emotional messages, like Al Gore's touching film (Guggenheim 2006) about climate change and himself combating the same has illustrated: It created enormous awareness among American citizens that scientists had largely failed to do so up to that point (Nielsen 2007). Since the

advent of the blogosphere and other internet-based phenomena, the media increasingly loses its delimitation (Esty & Winston 2009, 80). For example, NGOs increasingly exploit the potential of the internet to advance their mission. Yet, NGOs are quite heterogeneous as a group (Friedman et al. 2002). Depending on the focus and characteristics of the particular NGO it may either pick topics primarily based on public attention or scientific grounds, act hostile and ideologically-driven or be constructive and engage with corporations in a cooperative way to improve their environmental business practices (Dahan et al. 2010). Conversely, firms can take an antagonistic stance on NGOs or seek to increase competitiveness *and* environmental performance through cooperative approaches. The same is true regarding regulatory stakeholders; leading firms may be able to shape their regulatory environment rather than react to it (Buysse & Verbeke 2003).

Managing Green Business Model Transformations thus also means managing stakeholders. An obvious problem in managing stakeholders is that stakeholder groups have competing interests (Eesley & Lenox 2006). Mitchell et al. (1997) suggest analysing stakeholders based on three criteria for stakeholder salience: *power*, *legitimacy*, and *urgency*. Stakeholders that possess all three attributes are *definite* stakeholders that must not be ignored. A company needs to carefully consider its approach to *expectant* (two of three attributes) and *latent* stakeholders (one attribute) – especially as stakeholders may acquire additional attributes over time.

Esty & Winston (2009, 265f.) recommend checking current stakeholder prioritisation by allocating stakeholder groups to a matrix based on the current level of focus and their influence today and in the future.

Even the considerations described above, however, do not provide a sufficient basis for effective stakeholder management if (heterogeneous) stakeholder groups are defined too broadly. For instance, customers may need to be assessed in a more fine-grained manner in order to draw meaningful conclusions (Harrison & Freeman 1999, 484) – much in line with the business model concept as will be explained in chapter 4.

The merits of stakeholder theory are still subject to heated debates among academics (e.g., Freeman et al. 2004; Sundaram & Inkpen 2004). However, many scholars agree that stakeholder orientation in general terms is helpful to achieve corporate objectives. Yet, there is some causal ambiguity surrounding specific stakeholder treatments and the derived competitive benefits (Harrison et al. 2010, 69). The authors suggest that limiting factors to successful stakeholder management – or "managing for stakeholders", as they call it – includes "over-allocating value to stakeholders, an inability to measure value created using accounting measures, a lack of ability to translate knowledge into value-creating opportunities, measuring value creation over a too short time frame, and the potential for opportunism" (Harrison et al. 2010, 69). Firms can try to overcome these barriers, but it seems unlikely that detailed prescriptions of general validity for stakeholder management are possible; most firms will need to find their own, tailored approach. Ultimately, the justification of stakeholder management may have to remain normative rather than instrumental in nature (Donaldson & Preston 1995).

3.3.4 Possible Courses of Corporate Action to Tackle Environmental Issues

A company may be tempted to adopt the agendas of its most relevant stakeholders, trying to appease their demands for environmental measures. However, it is advisable to first develop a proprietary perspective on what should be done (Piet 1994, 43), and only then try balancing the various internal and external interests.

A useful starting point may be to consider the environment in terms of the environmental services it provides, i.e. the natural value it creates. The company can then take actions to conserve, substitute, or restore certain environmental services it affects. The World Resources Institute (WRI) distinguishes four types of ecosystem services (Millennium Ecosystem Assessment 2005): (1) *Provisioning* (of food, fibre, genetic resources, biochemicals, natural medicine, pharmaceuticals, and fresh water); (2) *Regulating* (of air quality, climate, water, erosion, diseases and pests, pollination, natural hazards, water purification, and waste treatment), (3) *Cultural* (aesthetic, spiritual and religious values, recreation and ecotourism), and (4) *Supporting* ecosystem services (e.g., primary production, soil formation, and nutrient cycling).

Gladwin et al. (1995) have categorised the potential range of sustainable behaviours into eight sustainability and operational principles and provide more than 40 related sample techniques that companies may consider (see table 3.2).

Table 3.2 Principles and sample techniques for sustainable development (Gladwin et al. 1995, 892)

Sustainability principles (operational principles)	**Sample techniques**	**Sustainability principles** (operational principles)	**Sample techniques**
1) Assimilation Waste emissions ≤ Natural assimilative capacity	• Pollution prevention • Natural products • Detoxification • Biodegradability • Low input agriculture • Synthetic reduction	**5) Conservation** Energy-matter throughput per unit of output (time 2) ≤ Energy-matter throughput per unit of output (time 1)	• Fuel efficiency • Mass transit • Cogeneration • Computer controls • Demand side mgmt • Smart buildings
2) Regeneration Renewable harvest rate ≤ Natural regeneration rate	• Sustained yield mgmt • Safe minimum standards • Harvest certification • Access restriction • Exclusive harvest zones • Resource right systems	**6) Dissipation** Energy-matter throughput (time 2) ≤ Energy-matter throughput (time 1)	• Depackaging • Durable design • Repair/reconditioning • Telecommuting • Bioregional sourcing • Dematerialization
3) Diversification Biodiversity loss ≤ Biodiversity preservation	• Biosphere reserves • Extractive reserves • Buffer zones • Polyculture farming • Ecotourism • Debt for nature swaps	**7) Perpetuation** Nonrenewable resource depletion ≤ Renewable resource substitution	• Solar energy • Wind power • Hydrogen fuel • Bioenergy • Hydropower • Geothermal energy
4) Restoration Ecosystem damage ≤ Ecosystem rehabilitation	• Reforestation • Mine reclamation • Site decontamination • Bioremediation • Species reintroduction • Habitat restoration	**8) Circulation** Virgin / recycled material use (time2) ≤ Virgin / recycled material use (time1)	• Closed-loop manufact. • Industrial ecosystems • Internal recycling • Waste recovery • Design for disassembly • Water recirculation

The listed principles and techniques may be used as a pool of ideas for continuous improvement or more radical redesigns of current business practices.

In addition, a multitude of decision support tools can help to operationalise environmentally sustainable business practices. These tools, in their entirety sometimes referred to as *sustainability accounting*, are diverse as they need to satisfy various information needs (e.g., physical vs. monetary, different timeframes, scope, and so on) (Burritt & Schaltegger 2010; Schaltegger & Burritt 2010). Some tools like *life cycle assessment* (LCA) (see Schaltegger 1997; ISO 2010) or *eco-efficiency analysis* (see Verfaillie & Bidwell 2000) are well-known, others less so. However, a general review of available decision support tools goes well beyond the scope of this work. Instead, specific management tools for Managing Green Business Model Transformations will be described, enhanced, or newly developed in chapter 9.

The size of the opportunity to protect, restore, or make more productive use of ecosystem services is potentially gigantic: Costanza et al. (1998) calculated a total annual value of US$ 16 to 54 trillion for these services – the world's GNP was US$ 18 trillion at the time. Of course, most of the underlying ecosystem services are not part of conventional markets. Therefore, calculated values contain large uncertainties and methodological issues. However, as the discussion about putting a price tag on CO_2 shows, at least some of these services that represent externalities today may soon become internalised cost in the future. Moreover, even without formal internalisation, if the efforts to protect certain ecosystem services are embedded in a convincing business model, certain customers and other relevant stakeholders can be expected to endorse it nevertheless. Chapter 7 will provide some examples of companies who managed to do so.

3.4 Corporate Environmental Strategies

More and more companies embrace active environmental business strategies (Esty & Winston 2009). Irrespective of the specific content, having an environmental strategy distinguishes firms from those that consider environmental management a purely operational (or even rhetorical) task (Baumgartner & Ebner 2010).

Researchers have suggested numerous models to classify companies in terms of their environmental management approaches (see Kolk 2002 for an overview of publications until 2000). Most proposed classifications describe a continuum and range from being non-compliant or reactive to proactive and/or visionary (Lee & Ball 2006, 381ff.). Yet, the image of linear progression towards environmental excellence has been criticised. Ghobadian et al. (1998) argue that the communicated attitude towards the environment does not necessarily match the firm's actual course of action. A company with *restrained commitment* may thus be viewed externally as advanced, but in reality restricts its efforts to mere compliance (lack of "walk the talk"). Other firms that show *speculative commitment* try to cut a corner in pursuit of a major opportunity and leapfrog competitors to environmental leadership. However, this engagement is opportunistic, and the firm will revert to old practices if the presumed opportunity does not fulfil expectations (Ghobadian et al. 1998, 19ff.). GE may be argued to match this type, although there is no

evidence to suggest that GE's initial commitment was not sincere (GE Ecomagination turned out successful, after all). Lastly, Ghobadian et al. (1998, 21) describe a company type with *conditional commitment* that applies more or less advanced environmental practices in different countries – depending on its respective interests.

Baumgartner & Ebner (2010) propose an even more fine-grained typology based on 21 sustainability aspects and four respective maturity levels (from poor to sophisticated). Identified sustainability strategies are argued to have distinct maturity level profiles, i.e. they require various minimum levels of maturity for each aspect in order to be implemented successfully.

Apart from maturity-based typologies, firms can also be distinguished from others with respect to the relationship of sustainability activities to the core business, their target, and the expected benefits. Halme & Laurila (2009) propose three corresponding corporate responsibility (CR) types: *philanthropy*, *CR integration*, and *CR innovation*. Obviously, the last strategy is the most likely to produce new green business models. However, even philanthropic activities may eventually generate green business models if they are somehow related to the firm's capabilities (e.g., compare Google 2010a). CR integration, i.e. efforts to make existing business operations more sustainable, can originate green business models if changes are radical rather than incremental in nature.

For the purpose of this work, the distinction between operational, incremental and strategic, radical approaches (e.g., Steger 2006, 427) is thus of particular interest. To illustrate the difference the case of Wal-Mart can be used: The decision of Wal-Mart to design future stores to be 25 to 30 percent more energy efficient and retrofit existing ones (Wal-Mart 2009b, 20) can be assumed to have been based on a sound business case in the wake of high and rising energy prices. But despite the considerable absolute investment required, this change is not fundamental to its business model. The success of this measure is not pivotal to the success of Wal-Mart as a whole. In contrast, its decision to "green" its supply chain may be just that. For example, Wal-Mart now requires its suppliers' to report on waste, water and energy use. It also introduced an initiative in 2007 to reduce suppliers' packing by 5 percent by 2013, claiming that it could save Wal-Mart's supply chain US$ 3.4 billion (circa € 2.5 billion) until 2013 (Wal-Mart 2007). Furthermore, Wal-Mart aims to make the sustainability performance of its (increasingly green) products transparent to consumers through a "sustainability index" (Wal-Mart 2009a). If a success, Wal-Mart's changes could save it billions and boost its revenues. If not, Wal-Mart may permanently hurt its own cost base and severely threaten its low-price value proposition. Each of these supply chain measures may not seem revolutionary at first glance, and do not yet qualify Wal-Mart's business model as being "green" (see chapters 5 and 7.10). Nevertheless, the changes do alter the existing business model logic, and even affect the entire retail industry (Rosenbloom 2010). In this context, it is interesting to note that the

slogan "Always Low Prices." has meanwhile been replaced by "Save money. Live better." – after previously remaining unchanged for 19 years (Mui & Rosenwald 2007).

As mentioned above, management is generally more focused on operational, incremental sustainability management – despite the much higher impact of radical transformations. In addition to the described difficulties in building the business case, such transformations require special expertise, mindsets and decisions beyond business-as-usual (Steger 2006, 432). Furthermore, the potential collateral damage of large transformations to organisations can be significant. In an interview with the Harvard Business Review, Nestlé CEO at the time Peter Brabeck-Letmathe states: "You cannot underestimate the traumatic impact of abrupt change, the distraction it causes in running the business, the fear it provokes in people, the demands it makes on management's time." (Wetlaufer 2001, 113).

Green Business Model Transformations are, by necessity, radical in nature. As a result, they will rarely rise from reactive or defensive environmental strategies. It is also hard to imagine that a company can sustain a Green Business Model Transformation and at the same time uphold a strategy of restrained commitment. Even if the company managed to keep up green appearances and keep external pressure low, cynicism will likely spread within the company.

It is therefore crucial that the environmental strategy is well-aligned with the general business strategy (Butner & Gregory 2009), and not to consider the transformation an independent undertaking. Hence, Green Business Model Transformations may need to coincide with a strategic reorientation towards environmental sustainability.

Florida (1996) found that, within a manufacturing context, the ability to reap financial benefits from a proactive environmental strategy is path dependent and intertwined with a broader set of capabilities (related to innovation, productivity, etc.). Moreover, environmental strategies can be hard to reverse if they encompass high complexity and significant tacit knowledge (Rugman & Verbeke 1998, 368f.). Many Green Business Model Transformations possess these characteristics. Hence, not only are some companies better positioned initially than others to pursue such a transformation, but it can be considered what Rugman and Verbeke call a "green gamble" (Rugman & Verbeke 1998, 368).

As the industry survey in chapters 7 and 8 will demonstrate, however, the range of potential green business models is large enough to provide viable opportunities for many different kinds of companies. Moreover, business models as a concept for management science help to increase the odds that the "green gamble" turns out to be a "green winner".