Chapter 9

The evolution of sustainable development

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Introduction

A central principle of corporate social responsibility is that firms should treat their stakeholders in an ethical fashion and that this behaviour should embrace environmental, as well as economic and social considerations. The purpose of this chapter is to provide a theoretical exploration of the concept of sustainable development in its broadest sense and, in so doing, encourage researchers and practitioners to locate and progress with their corporate social responsibility work within a robust 'sustainable development' framework.

There is an increasing appreciation that Earth's ecological systems cannot indefinitely sustain present trajectories of human activity. The nature and scale of human activity is exceeding the carrying capacity of the Earth's resource base, and the resultant waste and pollution streams are exceeding the assimilative capacity. The contribution of the built environment and construction activity to this unsustainable human activity is substantial, and Lenssen and Roodman argue that:

> ...responsibility for much of the environmental damage occurring today – destruction of forests and rivers, air and water pollution, climate destabilization – belongs squarely at the doorsteps of modern buildings.
> (Lenssen and Roodman 1995: 95)

The prevailing 'vision', which is arguably preventing a sustainable future, is the failure to appreciate and embrace the reality that human well-being is a derivative function, secondary to the well-being of the Earth, and that ecological processes provide the biophysical context for human existence. Human activity and the natural world are thus viewed as being on a collision course.

The 'urgent and radical reform' to meet this challenge was influentially envisioned and contextually defined by the World Commission on

Environment and Development (WCED) as '…development which meets the needs of the present without compromising the ability of future generations to meet their own needs' (WCED 1987: 8).

This concept is particularly pertinent for the construction industry, as the construction industry has always played a major role in producing the built environment the society has required, and has played an important part in

the development of the human race. This ability has never been as important as it is now, when there is a growing consensus that appropriate corporate social responsibility strategies and actions are needed to ensure sustainable built environments and construction activity.

Model of societal–ecological system interaction

Description of model

Figure 9.1 presents a systems model of social system and ecological system interaction. The rationale and operation of the model is described below.

The finite *biosphere* suprasystem represents the Earth and encompasses all the elements of both the social and ecological systems. The *ecological* system contains sources and sinks. *Sources* are energy and natural resources, which make up *natural capital* and which are *utilised* (or *invested* in for future utilisation) by the *economic* system (a subsystem of the *social* system). The economic system serves, and is nurtured by, the ongoing development of *human capital* production and consumption. A distinction
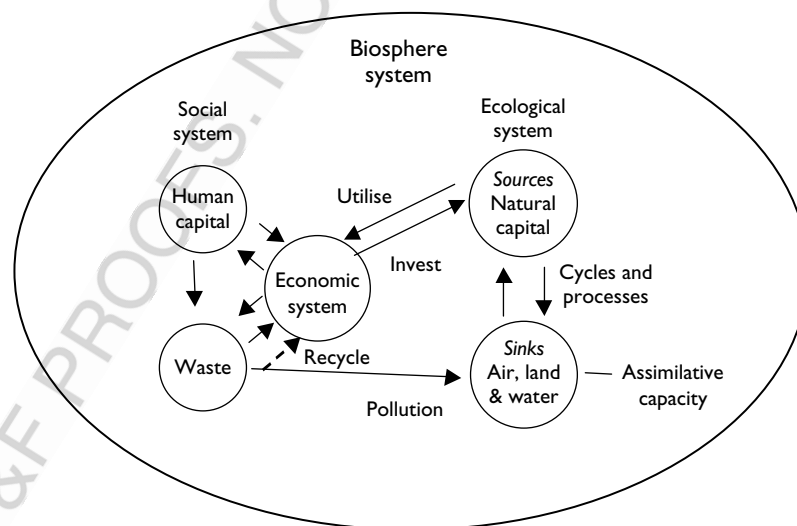

Figure 9.1 Model of interaction between ecological and social systems.

is made between exhaustible (or non-renewable) and renewable natural capital. Exhaustible natural capital (such as minerals and fossil fuels) consists of an initial stock which, from a human time perspective, is only very slowly renewed. Renewable natural capital (such as fish, forests, groundwater), in principle, is reproduced within the human time perspective although, increasingly it is becoming exhausted. The *sinks* are physical components of the ecological system (air, land and water) for the assimilation of materials and energy, which are transferred from the economic system back to the ecological system as *pollution* (from both production and consumption *waste* which has not been *recycled*). The source and sink functions are related in the sense that a higher extraction of resources, such as oil or coal, will mean more pollution and waste and increased pressure on the assimilative capacity of the ecosystem. The sources and sinks of the ecological system are linked by the natural services provided by the natural capital system (such as the maintenance of essential climatic and ecological cycles and processes), the quality of which is essential for supporting economic production and welfare. The system model is dynamic, with the composition and interaction changing through time, either because of natural system disturbance or because of internal ecological mechanisms.

The ecological system has a limited resource-creating capacity for the substances that the social system extracts and a limited assimilation capacity for the pollution and waste that society returns to nature. When the societal influence exceeds these capacities of nature, damage occurs. Sustainability, in the system terms set out in this model, is thus achieved when resource extraction from the ecological system occurs within the carrying capacity of the resource base and when waste transfer to the physical components of the ecological system does not exceed the assimilative capacity of the particular ecosystems.

This model thus clearly identifies the key issues as the organisation of production and consumption of the social system, the quantity and quality of ecological-system functions, and the dynamic interaction between the social system and the ecological system – in summary, the model captures the thesis that humans are dependent upon ecological systems, for '. . . without the services provided by natural ecosystems, civilisation would collapse and human life would not be possible . . .'(Ehrlich 1986: 239).

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At present, it is argued that the organisation of, and interaction between, the social and ecological systems is not sustainable and, unless rearranged, will lead to a permanent breakdown in human time-span terms, of supra-system resilience (the ability of the system to stay in dynamic balance) and integrity (the ability of the system to support services of value to humans). The next section will present evidence to support this claim by first, examining the present state of socio-ecological system interaction at a global level, and, second, identifying the built environment and construction industry contribution to this interaction.

Present state of socio-ecological system interaction

Global situation

Mounting evidence shows that the ecosystems of Earth cannot sustain current levels of economic activity, let alone increased levels. By the year 2025, the world population is projected to total about 8.3 billion people, or about 45 per cent more than the estimated current population of 5.7 billion. By 2050, the global population could be about ten billion (United Nations 2004). The population increase, coupled with a five-fold increase in global economic activity since 1950, is elevating the consumption levels of natural capital and the production of pollution and waste in excess of the replenishing rate of the ecological system's sources and the assimilation capacity of its sinks, respectively. For example, at the present rates of consumption, world reserves of oil, natural gas, coal and all minerals are predicted to be substantially depleted by the end of this century.

Built environment and construction industry contribution

The contribution of the built environment and construction to these trends is substantial. Between 1971 and 1992, primary energy use in buildings worldwide grew on average 2 per cent annually. The built environment accounts for about a third of total world energy consumption, including 26 per cent fossil fuels, 45 per cent of hydropower and 50 per cent of nuclear power. It is estimated that between 13 and 30 per cent of all solid waste deposited in landfills worldwide comprises construction and demolition waste (Bossink and Brouwers 1996). The construction industry, including building-material production, is probably the greatest consumer of natural resources, using between 17 and 50 per cent of the extracted resources, such as water, wood, minerals and fossil fuels. According to the Worldwatch Institute, building construction consumes 40 per cent of the raw stone, gravel and sand used globally annually, and 25 per cent of the virgin wood. Buildings also account for 16 per cent of the water used annually worldwide (Roodman and Lenssen 1995).

Summary

These global trends, to which the built environment and the construction industry is a substantial contributor, have fuelled the inevitable conclusion that '. . . the major cause of the continued deterioration is the unsustainable pattern of consumption and production, particularly in industrialized countries . . .'(Agenda 21, Chapter 4). A diverse range of commentators increasingly argues that there is a need for a fundamental re-conceptualisation of the interaction between social and ecological systems. The Brundtland Report framed the challenge by saying

the time has come to break out of past patterns. Attempts to maintain social and ecological stability through old approaches to development and environmental protection will increase instability.

(WCED 1987: 21)

It is argued that two principal elements are needed to bring about and maintain such a re-conceptualisation: an envisioning, motivating portfolio of goal orientations which can direct and shape the transition; and a conceptual framework to locate and integrate stakeholders' diverse policies and actions to generate the ability for appropriate, complementary progress. The portfolio of goal orientations has been loosely captured in the term 'sustainable development'. What this term means is discussed more fully in the next section.

Sustainable development

What is it?

The concept of sustainable development was contextually defined by WCED as quoted in the 'Introduction' section of this chapter (WCED 1987: 8), and, in its broadest sense, this influential definition has been widely accepted by many firms, institutions and governments across the globe. The goals embedded within sustainable development serve several important functions (described below) that vary according to the perspective of sustainable development advocated:

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• *Focus*. A given view of sustainable development will generate a distinctive set of goals that serve as guidelines for action, directing and channelling efforts and activities of relevant stakeholder participants. In this regard, a clear view of sustainable development provides focus for activity by prescribing what 'should be' done. This crucial role is set out, for example, in the need for

> . . . establishing a vision of sustainable development and clear goals that provide a practical definition of that vision in terms that are meaningful for the decision-making unit in question.
> (Hardi and Zdan 1997: 1)

It has been stressed that there is a need for an appropriate hierarchy of goals: aims at the general level (e.g. preserving and improving environmental quality); qualitative goals at the intermediate level (e.g. preserving the ozone layer); and specific quantitative targets at a more specific level (e.g. reduction of car pollution levels in a given city) (OECD 1997). Further, the lack of clear focus of this kind, for example, underpins the observation that more attention is needed on how sustainable

development can be translated into concrete goals and criteria at the level of sectors, regions and projects (van Pelt *et al.* 1990).

- *Constraints*. To the extent that a given set of sustainable development goals prescribes what 'should be' done, they also serve to prescribe what 'should not be done'. A given view of sustainable development that commits itself to certain goals reduces the amount of discretion it has to pursue other outcomes. The concept of 'accessibility space', for example, argues that the range of sustainable development trajectories available is restricted by a raft of physical, human and time constraints that vary depending on the goals being pursued (Bossel 1999).
- *Source of motivation and legitimacy*. Goals also provide a source of motivation and legitimacy for relevant stakeholders by justifying their activities. The work of the President's Council on Sustainable Development (1996: 4) in the United States, for example, '...gave [people] credibility to continue innovative projects for which they did not yet have widespread support'. . Similarly, it has been noted that a variety of organisations and institutions, with very different interests and objectives, utilise the notion of sustainable development to justify or rationalise particular strategies and actions as being in the global interest (Harvey 1996).
- *Measures of performance*. To the extent that sustainable development goals are clearly stated and understood, they offer a seedbed of appropriate measures or indicators for evaluating performance. This need, for example, is expressed in the argument that,

> if we genuinely embrace sustainable development, we must have some idea if the *path* we are on is heading towards it or away from it. There is no way we can know that unless we know what it is we are trying to achieve – i.e. what sustainable development means – and unless we have indicators that tell us whether we are on or off a sustainable development path.
>
> (Pearce 1988: 22)

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In summary, a clear understanding of different sustainable development perspectives will make more transparent the differing objectives, criteria and constraints guiding action, along with the underpinning sources of motivation and legitimacy driving and protecting the various sustainable development trajectories being pursued. There is thus a clear tension between the normative need for establishing a clear understanding of sustainable development from which consistent and coherent goals and actions can be stimulated and the reality of multiple, often discordant, views of sustainable development obstructing what these goals and actions should be. To try and better understand this tension, and thus tease out some guidance on how progress can be made to its resolution, there is a need to

understand why different stakeholders have such divergent, often incompatible, aspirations of sustainable development that can severely hinder progress at policy and operational levels. Two key strands will be followed. First, some of the principal components of the ideas that are generally shared by the majority of sustainable development perspectives will be identified. Second, the complex role of peoples' worldviews in shaping the focus and composition of these sustainable development components will be discussed.

Principal elements of sustainable development

A number of recurring elements which flavour, to varying degrees, the majority of the definitions of sustainable development can be articulated. For the purposes of contextualising these elements, sustainable development is viewed as:

> *Endurable*, *appropriate progress*, built on *socio-ecological system* principles, that are temporally and spatially *equitable* in its focus and *participatory* in its formulation and implementation.

Each of the components is discussed below.

- *Endurable*, *appropriate progress*. Most definitions of sustainable development appreciate that development must be within the carrying and assimilation capacities of the Earth (see 'socio-ecological system' below) and that it must be distributed fairly across spatial and temporal dimensions (see equity below). The term 'development' is generally viewed as progress in the quality of life through social and cultural progress, rather than the more traditional goal of increasing economic activity. Progress does not rule out growth but it certainly dictates the type of growth which is desirable. This view of development is consistent with the post-materialistic thesis that argues that societies are changing their cultural values towards 'quality of life' issues, away from material consumption and away from economic distribution conflicts (Inglehart 1997).

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- *Socio-ecological system principles*. The majority of sustainable development perspectives appreciates that the production and consumption demands of the social system must not exceed the carrying capacity of the resource base and that resultant waste and pollution flows must not exceed the assimilative capacity of the ecological system.
- *Equitable*. Fair distribution of benefits from development across intergenerational, intragenerational and spatial dimensions is a central consideration in most conceptions of sustainable development. Commentators contend that the resource use of each present generation is

depriving the right or possibility of future generations using the same resource (Pearce and Atkinson 1995). Intergenerational equity draws upon this tension to argue that the opportunity for quality of life must not diminish for future generations, requiring that future generations should have access to the same resource base as existing generations (Solow 1992; Weiss 1989).

Intragenerational equity is generally conceived as the elimination of poverty (Barbier 1987; Burayidi 1997; Dasgupta 1993); almost one quarter of the global population living in absolute poverty. The rationale behind this principle is that poverty has an adverse impact upon the environment and, thereby, jeopardises welfare and resources along with intergenerational equity, since natural capital will be diminished for future generations. Implicit within the notion of equity is spatial equity: sustainable development cannot be achieved in one nation or region at the expense of another nation or region (Bhaskar and Glyn 1995; Pearce *et al*. 1989).

- *Participatory*. This facet of sustainable development is closely linked to intragenerational equity. The essence of the argument is that if there is to be positive discrimination in favour of poorer groups and minorities, then such groups have to be closely involved in defining their own needs and engaging relevant decision-making authorities and processes. This consistent strand of sustainable development resonates strongly with the minority-issue literature which encourages participatory approaches to social problems (Rahman 1993).

The common principal elements of sustainable development have been outlined. In any given conceptualisation of sustainable development, however, the emphasis on and the combination of these elements will differ, which will, in turn, produce different goals and policies. To understand why different stakeholders have different conceptualisations of sustainable development, it is critical to understand how they perceive the environment, their relationship with it, and their interactions with each other. These perceptions are very much shaped and filtered through stakeholders' 'worldviews'. The concept and role of worldviews will now be discussed.

Sustainable development and worldviews

The nature and role of worldviews

Worldviews are understood to be '. . . the constellations of beliefs, values and concepts that give shape and meaning to the world a [stakeholder] experiences and acts within' (Norton 1991: 75), providing

> . . . a system of co-ordinates or a frame of reference in which everything presented to us by our diverse experiences can be placed. It is a symbolic system of representation that allows us to integrate everything we know about the world and ourselves into a global picture, one that illuminates reality as it is presented to us.
>
> (Aerts *et al*. 1994: 39)

Worldviews play a major role in complex decision-making, particularly in complex, ambiguous and subjective issues (Jolly *et al*. 1988). Stakeholders' worldviews are thus critical in helping them determine which elements of the sociological and ecological systems are important to heed when formulating objectives, policies and actions (Gary and Belbington 1993). Research has supported the view, for example, that stakeholders' values, beliefs and attitudes shape their environmental norms (Stern and Dietz 1994).

Interaction and understanding (though not necessarily mutual acceptance) of worldviews is thus required to develop a discourse of shared terms and language that are needed in order for analysis, debate, negotiation and problem-solving to occur (Dryzek 1997). The need for dialogue of this nature is firmly located within the relevant literature, with it being argued that the basic causes of conflict between stakeholders are the differences in their knowledge and values (Dorcey 1986), and that these shape the way information is gathered, perceived and acted upon by these various groups (Simmons 1993). Thus, it is argued, for example, that in order to incorporate all the appropriate components of sustainable development, the identification of criteria and indicators of sustainable development must not only be approached by scientific means, but also include perceptions and values set by society as a whole (Cairns *et al*. 1993; Young 1997) and by individual stakeholder groups (Schwartz and Thompson 1990; Thompson *et al*. 1990; Vreis 1989). (This understanding, in part, has focused attention on the need to create and manage a participatory dimension to sustainable development, to ensure that all relevant stakeholders are closely involved in defining their own needs and engaging relevant decision-making authorities and processes.).

To investigate the concept and role of worldviews, numerous commentators have categorised similar worldviews into groups and located these groups along continua or in frameworks. Such continua can be usefully bundled together to form two 'worldview' umbrella clusters: the currently dominant 'neoclassical' worldview, and the 'ecological' worldview espoused to varying degrees in the sustainable development movement. (The argument that the 'neoclassical' worldview is currently dominant is supported in the discussion below.) This process enables a more integrated discussion to take place, with otherwise fragmented ideas being interwoven to develop a more holistic, systemic understanding of stakeholder

worldviews. Further, the discussion will follow three interdependent lines of enquiry:

- The different positions engaged by the neoclassical and ecological world-views on the *relationship between human beings and the environment* will be examined. This will provide the ethical context that motivates and legitimises.
- The opposing standpoints articulated by the neoclassical and ecological worldviews on the *relationship between the firm and the environment*. The organisational behavioural norms provide insights into
- The differing views taken by the neoclassical and ecological worldviews on the *interaction between social capital and ecological capital*. The nature and scale of this interaction is a key determinant of whether system interaction is sustainable or not.

Relationship between human beings and the environment

Neoclassical worldviews adopt the anthropocentric ethic, namely, there is a fundamental dualism between human beings and the natural environment (Pauchant and Fortier 1990). This ethic grants moral standing exclusively to human beings and considers non-human natural entities and nature as a whole to be only a means for human ends.

In contrast, ecological worldviews reject the anthropocentric premise that human beings occupy a privileged place in the biosphere. Rather, they adopt an ecocentric ethic that morally enfranchises, to varying degrees, living and non-living things. Commentators argue that the anthropocentric-based neo-classical worldview must be recognised and eradicated before fundamental changes can take place towards an ecocentric nurtured ecological worldview (Oelschlaeger 1991).

The anthropocentric ethic is, however, the dominant ethic at present (Midgley 1994). Indeed, the Rio Declaration at the Earth Summit asserted the claim that 'human beings are at the centre of our concerns' (United Nations Conference on Environment and Development 1992). This appreciation of the neoclassical worldview dominance provides significant insights into what guides and motivates the relationship between the firm (taken to be the vehicle for stakeholder influence) and the ecological system is discussed in the following section.

Relationship between the firm and the ecological system

The neoclassical worldview legitimises, through its anthropocentric ethic, the means whereby rational, self-interested agents can optimise and exploit the social system and ecological system for their own end. It has been commented on, for example, that this worldview shapes the observation that 'traditional organizations serve only their own ends. They are, and indeed

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are supposed to be, selfish' (Trist 1981: 43); firms are more likely to pursue an economically advantageous course of action when confronted with a choice between environmental preservation and economic development (Axlerod 1994). In particular, the dominant drive would seem to be towards profits and profit maximisation. This is justified by neoclassical economists:

> . . . few trends could so thoroughly undermine the very foundations of our free society as the acceptance by corporate officials of social responsibility other than to make as much money for their stockholders as possible.
>
> (Friedman 1963: 133)

Further, neoclassical economic welfare arguments largely ignore intergenerational equity issues, tending towards utilitarian assessments that celebrate aggregate growth.

The anthropocentric ethic generates 'simple thought' (Morin 1992), which produces organisational policies and actions that have difficulty understanding and perceiving that they are nested within a broader biosphere (Bateson 1972). Such firms do not give adequate consideration to how their activities will have an impact on, alter, or interfere with the complex behaviour of the biosphere's constituent social and ecological systems (Dunlap and Catton 1993). Indeed, commentators have (perhaps cynically) concluded that even

> . . . marginalist reformers . . . [do not] . . . consider the dominant ideology of present forms of capitalism and they lack the imagination and creativity to develop the real strategies which will bring about the fundamental change which is needed. . . . They merely scratch the surface of the problem and quickly paper over the cracks with industry-centred and profit-centred solutions.
>
> (Welford 1995: 2–3)

It is increasingly apparent that neoclassical economics does not reflect social, economic and environmental realities in a world of limited resources (Friend 1992). At its most basic form, neoclassical economics treats nature as an infinite supply of physical resources (i.e. raw materials, energy, soil and air) to be used for human benefit, and as an infinite sink for the by-products of the consumption of these resources, in the form of various types of pollution and ecological degradation. This throughput aspect of the flow of resources from ecological system sources into the economic system and the flow of wastes back into the ecological system does not enter into economic thinking, as it is believed to be infinite in extent (Daly 1989). Thus, there is no explicit biophysical 'environment' to be managed, since it is irrelevant to the economy. Externalities highlight what can be termed 'market failure'; that is, the market does not capture the full environmental implications of social system–ecological system interactions (Rees 1990). The neoclassical worldview thus

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generates a market that consumes and substitutes ecological capital for social capital, and this adverse interaction has become a major contributor to current environmental problems (Welford and Gouldson 1993).

In contrast, ecological worldviews argue that firms and industries as a whole need to take a much broader view of the business environment to embrace (a) the ecology of the planet Earth; (b) the world economic, social and political order; and (c) the immediate market, technological and socio-political context of organisations (Davis 1991; Stead and Stead 1992). The above factors are systemic – interconnected and interdependent – and need a new kind of systematic, or ecological, thinking to be understood and solved (Callenbach 1993).

This discussion has drawn upon the neoclassical ethic to explain its role in legitimising and motivating firms to exploit the ecological system in an unbalanced fashion. The key issue is the degree to which firms substitute social capital for ecological capital in their exploitative endeavours. This issue is discussed in the following section.

Relationship between social capital and ecological capital

The clear implication from the previous discussion on the interaction between the firm and the environment is that the fundamental assumption in neoclassical worldview states substitutions can be made between social and ecological capital. The diversity of sustainable development worldviews on this issue can be fruitfully located along a 'weak' sustainability–'strong' sustainability continuum (Pearce *et al.* 1989; Pezzy 1992). Both are based on the concept that humanity should live on the 'interest' of its ecological capital, preserving the capital for future generations (Daly and Cobb 1990). The ecological capital comprises source and sink resources.

Neoclassical worldviews tend towards 'weak' sustainability, contending that resources (both in the ecological system and in the social system) are substitutes for others (solar energy for oil, for example) and allow substitutions as long as the combined social and ecological capital is not diminished. Neoclassical worldviews assume a high level of resource substitution, particularly through technological development and the price mechanism that increases resource cost as it becomes relatively scarcer (Dasgupta and Heal 1979; Solow 1974).

In contrast, ecological worldviews embrace 'strong' sustainability. Under strong sustainability, both ecological and social capital should be independently maintained in physical/biological terms (Brekke 1997). The motivation for this view is either the recognition that ecological resources are essential inputs into the social system that cannot be substituted for by social capital, or the ecocentric ethic acknowledgement of environmental integrity and rights in nature. In either case, it is understood that environmental components are unique and that environmental processes may be irreversible (over relevant time horizons) (Pearce and Atkinson 1995).

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Summary and worldview framework

This discussion of neoclassical and ecological worldviews has shown two contrasting ways of perceiving and understanding the interaction between social system and ecological system. The argument has been developed that the concept and operationalisation of sustainable development is located within different stakeholders worldviews, within which ethical positions guide, shape and legitimise firm behaviour, and the scale and form of interaction between social system and ecological system. All stakeholders operate to a greater or lesser extent in keeping with the neoclassical worldview, although the ecological worldview is emerging as a viable and necessary alternative. Further, it is clear that the current diversity of worldviews is unlikely to change, except in focused areas, and that this should ideally be appreciated and accommodated, rather than viewed as a source of debilitating confusion.

The neoclassical and ecological worldview matrix, shown in Figure 9.2, is proposed as a simple, but effective, typology which allows the worldviews embodied in definitions of sustainable development to be categorised.

The framework categorises different definitions of sustainable development along a sociological continuum from 'neoclassical worldview sustainability' (DPS – dominant product/service sustainability) to 'ecological worldview sustainability' (EBS – ecosystem benefit sustainability). The different categories are discussed below:

1. *Dominant product sustainability* (DPS) results in a narrow range of ecosystem products defined as economically valuable by existing markets. The rationale is economic efficiency rather than aesthetic value. Economic gain or provision of a vital product justifies sustaining the dominant product.
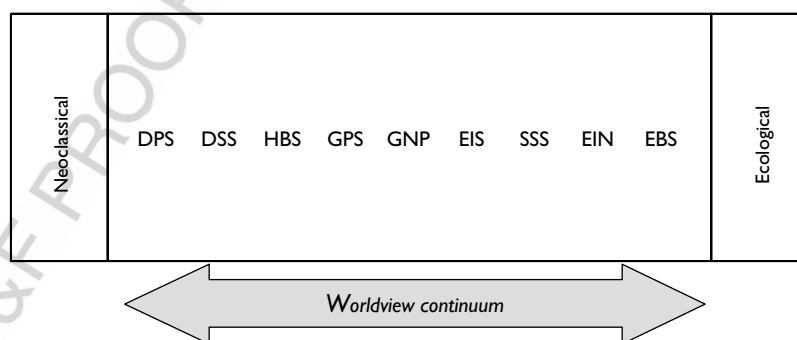
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Figure 9.2 Worldview framework.

2. *Dependent social systems sustainability* (DSS) is orientated towards specific human social systems, such as communities, occupations or families, that depend on an ecosystem and its products. The rationale represents a value judgement that asserts an anthropocentric priority of designated social systems.

3. *Human benefit sustainability* (HBS) maintains the flow of diverse human benefits that result from intensive resource management. In contrast to dominant product sustainability, this type emphasises a greater range of resource products and contributions to the larger society rather than to targeted resource-dependent social systems. Resources are valued on both economic and non-economic criteria. The rationale represents the idea that ecological systems should be managed to yield the maximum good for the greatest number of people.

4. *Global product sustainability* (GPS) emphasises the flow of unique or increasingly valuable natural resource commodities produced by local ecosystems for the international market. The dominant rationale is that nations and their ecosystems are encouraged to produce specialised goods for the global market place. This rationale attempts to balance the diverse needs of international consumers with the ability of local ecosystems to produce unique or increasingly valuable natural resource products for the global village.

5. *Global niche preservation* (GNP) sustains some specific local ecosystems judged as integral to the larger goal of sustaining the entire Earth. This global perspective has led to wilderness preservation, marine sanctuary protection, and efforts to identify and safeguard endangered species. The dominant rationale is that both ecosystems and human populations occupy interdependent global niches, and that humans have no right to destroy ecosystems.

6. *Ecosystem identity sustainability* (EIS) is orientated towards a general land use or ecosystem type, such as forest, desert, estuary or wetland. The dominant rationale is a long-term commitment to sustaining resources within a broad land use. Implicit is the principle that it is better to sustain existing ecosystem identity than to convert to a radically different pattern or use.

7. *Self-sufficient sustainability* (SSS) supports long-term natural resource ecosystem integrity, as characterised by relatively balanced, self-sustaining ecosystems. Such ecosystems, needing little human intervention, may nonetheless yield products for human use. However, because of the less intensive management, sustainable output levels are likely to be significantly lower than under human benefit sustainability. The rationale is an ecocentric ethic that asserts that humans have no right to intervene in ecological system evolution. A secondary rationale focuses on the lack of scientific knowledge about how ecosystems function; allowing ecosystems to operate without human intervention assists in clarifying how complex ecosystems sustain themselves.

8. *Ecosystem insurance sustainability* (EIN) is concerned with ecosystem diversity. Specific ecosystems, plant species or animal species are divided into two categories: the first continues to supply traditional products for use, whereas the second is protected in a more natural condition as a genetic storehouse. The dominant rationale is of ecosystem disaster, occurring either cataclysmically or through the gradual reduction of ecosystem diversity because of human intervention.

9. *Ecosystem benefit sustainability* (EBS) focuses most strongly on ecological systems rather than social systems. Natural ecosystems as free from human intervention as possible are targeted, even if their condition falls below the threshold of self-sufficient sustainability. The principal assumption is that nature exists for its own benefit rather than for humans, and that nature has its own intrinsic value.

This framework can assist those in developing corporate social responsibility strategies to enable different stakeholders to better understand each other's particular needs and aspirations, thereby creating the necessary common foundation and language to facilitate the development of 'win-win' solutions that engage and motivate all relevant stakeholders.

Holistic, systemic framework

Introduction

The discussion to date has explored the significant influence of stakeholder worldviews on the *goals* of sustainable development. Goals set out a broad vision that different stakeholders aspire for, but this in itself is insufficient to make any substantial or coherent progress. Goals provide an essential starting point, but need to be translated into, and operationalised by, appropriate indicators so that progress towards these goals can be measured and guided. It is argued that before this can be done, there is a critical need for an appropriate holistic systems-orientated framework to locate and integrate stakeholders' diverse policies and actions to generate the *ability* for appropriate, complementary progress.

The next section will first discuss the need for a conceptually rigorous, but practice-orientated framework that facilitates the identification and integration of key sustainable development indicators.

The need for an appropriate framework

The interrelations between the social system and the ecological system are extremely complex and systemic in nature. There is a need, therefore, to use

a framework that provides direction, consistency and coherence in the progression of sustainable development goals and indicators. The contribution that such a framework will make is expressed in the claim that:

- in the longer term, [it will help] to develop a more sustainable construction industry, embracing all aspects of manufacture, design, construction, use and disposal of the built environment.

- in the shorter term, [it will help] to clarify the actions required to improve the sustainability of construction.

(DETR 1998: 1)

Dynamic PSR model

Systemic nesting of scales

The first important task is to contextualise the framework within an appropriate portfolio of scales. A key question for sustainable development, for example, is over what space is sustainable development to be achieved, and over what time period? Spatial boundaries can be determined: global, national, regional, and so on, but it must be appreciated that these boundaries are socially or politically contrived, and are, in actual fact, systemically interlinked. It has been argued, for example, that the specific regional, environmental and economic structure determines the sensitivity of a region to external environmental and economic forces (Siebert 1995). Similarly, the time scale over which sustainable development occurs differs depending on whichever system is under consideration.

The key issue being made here is that appropriate deliberation should be made on what point of a given scale is sustainable development being considered, and what the implications of interactions between multiple scales are. The primary consequence of this nested context is that any management decisions will affect several scales (higher and lower levels) (Boureron and Jensen 1994). Therefore, it has been argued that ecosystem patterns and processes need to be studied at varied spatial and temporal scales or within 'ecological time frames' (Reichman and Pulliam 1996).

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Drawing upon these spatial and temporal scale debates, Figure 9.3 presents a framework (Barrett *et al.* 1998) that can infuse the Dynamic PSR model with the required systemic focus and linkage across a range of pertinent scales. Moving from Level A to Level D involves increasing spatial areas and time frames, as well as increasing complexity and effort, and need for collaboration and integration with third parties outside the industry. This framework identifies the different scales (and the linkages within and between them) that need to be actively investigated and managed for the progress of sustainable development.
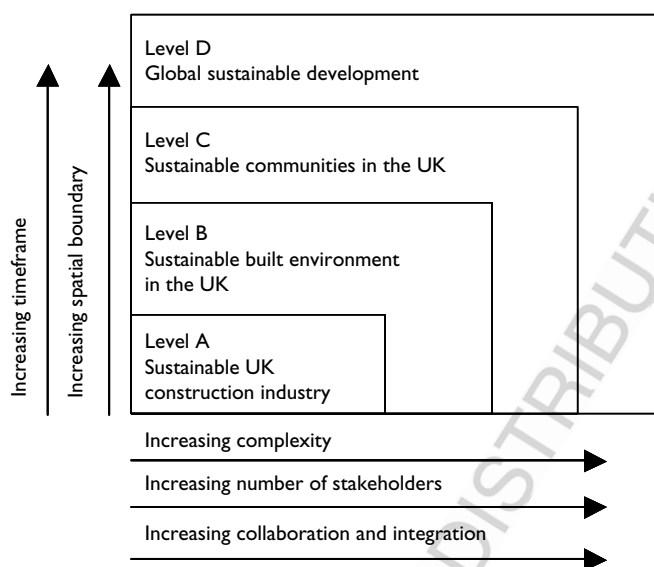
Figure 9.3 Systemic nesting of scales.

Basic framework

The dynamic PSR model explicitly links pressures, states and responses in a cycle. This is shown in Figure 9.4. Intuitively it makes sense that pressures create states, that in turn demand responses, which in turn have an effect on the original pressures.

Further, the definitions of the PSR boxes are modified to capture the learning and improvement dimensions to the model:
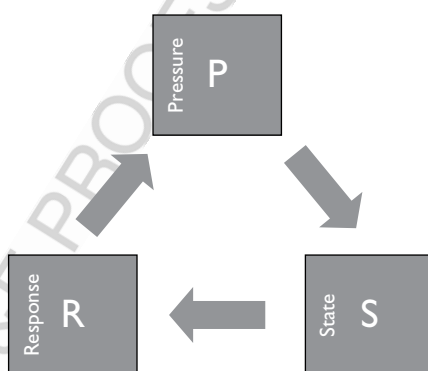

Figure 9.4 Basic rearrangement of PSR framework.

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- *Pressure* – drivers for change, from a range of possible sources, such as: regulation, markets, social, technical. Pressures are viewed as ranging from strong to weak.
- *State* – the level of understanding and willingness of relevant actors within the industry to act, viewed as ranging from 'unaware' to 'aware, but not active' to 'aware and active'.
- *Response* – actions taken in practice, viewed as ranging from zero (passive) to positive and negative actions on either side.

Units of analysis

It is crucial, if the model is to make sense, that it is used in such a way that, at any one time, the same stakeholder's perspective is used for P, S and R and that the issue or objective in question is also kept constant. For example, an analysis could be done of the construction industry as a whole (stakeholder) in relation to environmental issues generally. The focus on stakeholder and/or issue can be difficult due to the intrinsic variety of stakeholder perspectives on and ecological complexity of sustainable development; but any slippage on this makes it inconsistent with the proposed cause–effect cycle of the model.

The need for consistency on stakeholder/issue may be considered restrictive, but it is strongly proposed that the *same framework* can be and should be used flexibly at different levels of abstraction. For example, a study could be done of the construction industry as a whole (stakeholder) in relation to environmental issues generally. Equally, a study on waste minimisation (issue) from a contractor's perspective (stakeholder) could be supported by the framework. The key point being made here is that by keeping a consistent framework, particular stakeholders can make sense of their situation (for example, in relation to their supply chain partners) *and* the possibility of combined analyses is opened up. For example, the impact of a particular regulation could be followed through a number of exercises to understand different responses by different parts of the industry. This approach has the advantage of flexibility and consistency. It can be empowering for particular groups of stakeholders and enable strategic syntheses to be developed, extending to international comparisons. The possibility of infinite applications can be addressed at a strategic level by choosing key issues and stakeholders to focus upon.

Gap analysis

The operationalisation of the *dynamic PSR model* is fruitfully achieved through viewing the model as a gap analysis framework. Interrogation of the model reveals two categories of gaps. Those related to P, S and R and those related to the relationship between P, S and R. These gaps are shown in Figure 9.5 and defined in broad terms in Table 9.1 (Barrett *et al.* 1998).
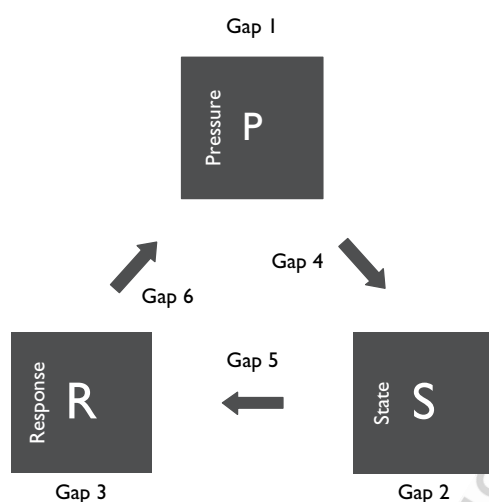
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Figure 9.5 Framework for change.

Table 9.1 Gaps in knowledge and understanding and their implications.

Gap	Lack of knowledge about . . .	Generic questions raised
1	*Pressures*, in terms of drivers for change	What are the relevant drivers for the given issue and how strong are they from the point of view of the players?
2	*States*, in terms of players' level of understanding, willingness to act	What is the profile of the players' level of understanding and willingness to act on the given issue?
3	*Responses*, in terms of actions taken by players	What is the profile of the players' responses to the given issue ranging from passive to positive or negative?
4	The relationship between *Pressures* and *States*	Is there a mis-match between the strength of drivers and the level of understanding and readiness of the players to respond on the given issue?
5	The relationship between *States* and *Responses*	Is there a mis-match between the level of understanding and readiness to act of the players' and their actual actions, both positive and negative?
6	The relationship between *Responses* and *Pressures*	Is there a mis-match between players' actions and the original intentions of the drivers for change?

The learning and improvement cycle dimension of the dynamic PSR model provides a *mechanism* for *systemic understanding* to guide decision-making and action, and the gap analysis dimension provides a *process* to drive and support the necessary *effective change* for sustainable construction.

Conclusion

In this chapter, the substance of the sustainable development challenge, which is increasingly embedded in corporate social responsibility endeavours, has been explored, identifying, in particular, the importance of appreciating and accommodating diverse stakeholder worldviews, and the need to develop and operate a system-orientated framework to guide decision-making and action. The corporate social responsibility agenda is located predominantly within a neoclassical context that celebrates short-term profit generation and hedonistic client satisfaction. This context will, inevitably constrain the motivation and capability of the majority of stakeholders – policy-makers, firms and clients alike – to bring about sustained, meaningful corporate social responsibility. Far greater international and national policy-driven enforcement is arguably the key way forward – the early shoots of which are beginning to emerge as a result of the global warming agenda gaining legitimacy. But whether these early shoots can withstand the entrenched ambient conditions of neoclassicalism is far from certain. This chapter culminated in the presentation of the dynamic PSR model as a potentially fruitful framework to develop appropriate corporate social responsibility strategies.

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