Sustainability and management control

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Introduction

Picture this: just as you are about to board a jet aircraft, you see a man busily prying rivets out of its wings. As you rush in panic down the steps, he calls out, "Don't worry, I've taken a lot of rivets out already and the wing hasn't fallen off." Are you reassured? This description is not original to us. In fact, it comes from the book cover of Anne and Paul Ehrlich's *Earth*. They go on to state:

> No sane person would want to travel on a plane whose airline did not have a 'progressive maintenance' program…and only a lunatic would want to ride on Spaceship Earth if the components of its ecosystems were being dismantled so fast that maintenance could not begin to keep up with repairs. Yet here we are — and we have no other spaceline offering transport.
>
> The free services which Earth provides to civilisation — the air we breath, the climates in which we live, fresh water, waste disposal, recycling of nutrients, control of potential pests and disease carriers, provision of food — are rapidly being eroded by man's destructive impact on the complex biological network of the planet. Humanity is living on its capital, while rapidly destroying the natural systems that are its principle source of income (Ehrlich and Ehrlich, 1987, inside book cover).

Earth, first published in 1987, not only illustrates an extensive range of examples of destruction and destructive forces, but also notes there are some hopeful signs that recovery and transition to a 'sustainable society' might be possible, if only Earth's 'opponent', *Homo sapiens*, would let up on its relentless battering.

In 1987 the concept of sustainability moved centre stage politically, and somewhat more recently onto the agendas of business leaders and managers. With the release of *Our Common Future* (WECD, 1987), 'Sustainable Development' and the oft-quoted "Meeting the needs of the current generation without compromising the ability of future generations to meet their own needs" has become the catch-cry of many politicians and business leaders alike.

Using Otley's management performance framework, we explore how management control systems might adapt such that businesses can contribute to sustainability rather than unsustainability. We explore if Otley's framework can assist in getting business managers to stop prying rivets out of the wings of our only aircraft – planet earth – and perhaps, where it is possible, even replacing them. We explore the limits and boundaries of such a framework in contributing to such adaptations. Before moving on to these issues, however, we first set out what we understand by the term 'sustainability' and an ecologically sustainable economy. By way of conclusion, we recommend that it would be premature to seek closure on possible approaches to the control of environmental and social impacts of economic entities. Rather, we acknowledge that until there is greater will and impetus to make changes on the part of governments, business decision-makers, and the rest of us affluent Western consumers, there is a need for an ongoing and open discussion about the role of economic organisations in a sustainable future.

What sustainability is and what it is not

In practice, the concept of sustainability is contested and ambiguous (Barbier, 1987, 1989; Bishop, 1993; Dixon & Fallon, 1989; Milne, 1996; Norgaard, 1989, 1992; Pearce, 1988, Redcliff, 1987; Sadler, 1988; Toman, 1992; Turner 1993; WECD, 1987; Zorvanyi, 1998), and our understanding of the concept is far from universally accepted. Echoing the remarks noted earlier by Ehrlich and Ehrlich (1987), Wackernagel and Rees (1996, p32-40) argue that sustainability is a simple concept that means: "living in material comfort and peacefully within the means of nature" (Wackernagel and Rees, 1996, p32). They suggest:

> Imagine a bucket being filled with water at a fixed rate. The water in the bucket is a capital stock that can be drawn upon only as rapidly as the bucket is being refilled. This balanced withdrawal rate is a form of sustainable income. Similarly, nature is a "bucket" that is continuously replenished by the sun:

> photosynthesis produces plant matter, the basis of all biological capital and most other life, and climatic, hydrological, and other biophysical cycles are solar powered too.
>
> Sustainability implies that nature's capital should be used no more rapidly than it can be replenished. However, trade and technology have enabled human-kind progressively to exploit nature far beyond sustainable levels so that present consumption exceeds natural income (the "interest" on our capital). This leaves the next generation with depleted capital and less productive potential even as the population and material expectations increase (Wackernagel and Rees, 1996, p34).

The idea that sustainability is about maintaining "natural capital", or "critical natural capital" intact and learning to live off natural income is held among many commentators (e.g., Daly, 1973; Ehrlich & Ehrlich, 1987; Gray, 1992; Dobson, 1998) who subscribe to what has now been termed "strong sustainability". Such commentators are clear that *something* needs to be sustained or maintained. An early example, the *World Conservation Strategy* (1980, IUCN) is clear about what it wishes to be sustained, and claims a necessary condition for achieving sustainability is the maintenance of "essential ecological processes and life support systems" and the preservation of "genetic diversity".

Strong or constraints-based definitions of sustainability emphasise not just an efficient allocation of resources over time, but also a fair distribution of resources and opportunities between the current generation and between present and future generations, and *a scale of economic activity relative to its ecological life support systems* (e.g., Daly & Cobb, 1989; Daly, 1992; Dobson, 1998; Low & Gleeson, 1998; Noble & Costa, 1999). Daly (1992), for example, in defining sustainability specifies: (1) rates of use for renewable resources that do not exceed their rates of regeneration; (2) rates of use for non-renewable resources that do not exceed the rate at which sustainable renewable substitutes are developed; and (3) rates of pollution emission that do not exceed the assimilative capacity of the environment. To these three, the OECD (2001) has added a fourth: avoiding irreversible impacts of human activities on ecosystems.

Such definitions suggest broader ecosystem-based approaches that require an understanding of cumulative environmental change (Canter, 1999; Costanza & Folke, 1994; Odum, 1982; Piper, 2002), and new and alternative decision-making arrangements and institutions (e.g., Young, 1992; Bryant, 1995). To give effect to sustainability, calls have come for cumulative effects assessments of economic activity based on regional ecological criteria (e.g., Rees, 1988; Canter, 1999; Piper, 2002), for ecological footprint analyses (e.g., Wackernagel & Rees, 1996), for precautionary decision-making principles (e.g., O'Riordan & Cameron, 1994), for bioregionalism (e.g., Sale, 1980, 1985; Welford, 1995; Harrill, 1999) and for more just, democratic and participatory decision forums (e.g., Bryant, 1995; Low & Gleeson, 1998; Young, 1992).

The above definitions and discourse, however, are not the only versions of sustainability. There exist other definitions and commentators who tend to be far more ambiguous about what it is that is to be sustained. In consequence, sustainability often gets confused with managing the social and environmental impacts of businesses and other organisations. *Our Common Future* (1987) contains references to 'sustainability', but the report couples 'sustainability' with 'development', and this seems to have opened up the possibility for much confusion and debate about what sustainability is and is not. Whether 'biophysical thresholds' or 'environmental bottom-lines' should act as constraints over social and economic matters, or be balanced or traded-off against them, has become widely debated in the legal, planning, geography, ethics, economics and environmental literatures (e.g., Buckingham-Hatfield & Evans, 1996; Johnson, 1996; Norton, 1989; O'Riordan, 1993; Sagoff, 1988; Turner 1993). Notions of sustainability that permit the balancing or the trading off of environmental values for social and economic values, of course, are far more consistent with existing business and economic activity. Those who accept that trade-offs are acceptable and/or inevitable, and this includes a great many business commentators (e.g., the World Business Council on Sustainable Development, the New Zealand Business Council on Sustainable Development), tend to subscribe to a version termed "weak sustainability". This version of sustainability also tends to downplay issues of equity and social justice, absolute levels

of material resource and energy use, and the scale of developments relative to the resource base, while playing up the gains to be made in more efficient use of materials and energy relative to the outputs being produced.

Sustainability at any level poses a number of challenges for businesses and their decision makers, but with constraints-based definitions, traditional measures of success that lead to the sustaining of the business, namely profit and efficiency, also come under scrutiny. As Milne (1996, p.151-152) notes:

> Sustainable outcomes require the rationing of scarce ecosystem capacities, and the presumption of such an approach is that the ecosystems are the going concerns, not the economic project. To recognise the limits of ecosystems, it seems appropriate to develop regionally-based initiatives in which the entity and going concern concepts are applied, not to companies, but to natural entities - to rivers, lakes and forests (Milne, 1996, p.151-152).

For practical and ethical reasons, sustainability implies and requires a level of collective decision making for the common good. It suggests one of our greatest problems, in terms of control, accountability and reporting for sustainability, is the organisational entity concept, and all the traditional paraphernalia of success that goes along with it. Defining sustainability as being about the progressive maintenance of the life-supporting capacities of the planet's ecosystems requires the subordination of traditional economic criteria to criteria based on social and ecological values, and this begs the question whether business decision makers operating within the constraints of a capitalist system are capable of making sacrifices of profit for future generations and other species (Gray, 1992; Milne, 1996; Gray & Bebbington, 2000). It also begs the question whether it is even fair to suggest that they should do so, or that there is any credence whatsoever in their own claims that they are able to do so (Gray & Milne, 2004). It also raises issues about whether within capitalistic societies it is possible or sensible to suggest feasible adaptations to organisations' management control systems that could lead to anything remotely resembling a contribution to an ecologically sustainable society.

Sustainability and Management Control

In seeking to determine the effectiveness or otherwise of an organisation's performance management framework, Otley asks researchers, managers and others to consider the following questions.

1. What are the key objectives that are central to the organisation's overall future success, and how does it go about evaluating its achievement for each of these objectives?
2. What strategies and plans has the organisation adopted and what are the processes and activities that it has decided will be required for it to successfully implement these. How does it assess and measure the performance of these activities?
3. What level of performance does the organisation need to achieve in each of the areas defined in the above two questions, and how does it go about setting appropriate performance targets for them?
4. What rewards[1] will managers (and other employees) gain by achieving these performance targets (or, conversely, what penalties will they suffer by failing to achieve them)?
5. What are the information flows (feedback and feed-forward loops) that are necessary to enable the organisation to learn from its experience, and to adapt its current behaviour in the light of that experience?

While this framework was never intended to analyse how management control systems need to be adapted to enable organisations to contribute to a sustainable economy, such an analysis will begin to show the limitations and boundaries of the framework. Moreover, such an analysis will help reveal whether it is Otley's framework that is limited, or rather the real problem lies in the way that business school professors, consultants, and management decision-makers might chose to interpret its questions. As the discussion progresses, we will be concerned with the extent to

[1] Rewards should be understood in the widest sense, and not be restricted to just short-term financial rewards, important though these may well be.

which business decision makers are able to make claims relating to sustainability, but, more importantly, with the question of how much further organisations might take their initiatives in pursuing sustainability. Accordingly, we are interested in new dimensions, elements and interpretations of organisational control that emerge when we move beyond outmoded and unhelpful ideas about economic growth, human progress and attendant ideas about what constitutes management control in business organisations.

1. Performance management and the sustainability agenda

Questions 1 and 2 focus on key success factors, how they might be achieved, and what measures to use to assess performance. We see two conceptual problems with these ideas that need to be overcome in the transition to sustainability. First, there is a need to develop a coherent alternative to the current notion of the discrete, tightly bounded "economic organisation". Second, ideas about what is 'success' or otherwise in the context of economic activity need to develop exogenously, within a social and economic framework informed by new values and ideas about sustainability.

'Success' and the 'business entity'

Our underlying belief is that current indicators of success show we are moving away from rather than towards a sustainable future. It is not necessarily that profit is bad, but rather that the current and predominant means by which it is generated, accumulated, and at what and whose expense, is bad. Current ideas about conventional measures of performance (GDP, financial profit and so on), and the activities they give rise to, *are* part of the problem. Not only do they fail to capture the realities of environmental damage and the quality of many people's lives, in many cases they positively encourage destructive acts against nature and people. Conventional ideas about "wealth", "profit making" and "economic entities" provide us with no system for understanding our cumulative impacts and our dependence on enormously wasteful throughput of materials and resources. As Hawken *et al*. (2002, p.14) explain:

> … the present industrial system is, practically speaking, a couch potato: It eats too much junk food and gets insufficient exercise. In its late maturity, industrial society runs on life-support systems that require enormous heat and pressure, are petrochemically dependent and materials intensive, and require large flows of toxic and hazardous chemicals. These industrial "empty calories" end up as pollution, acid rain, and greenhouse gases, harming environmental, social and financial systems. Even though all the reengineering and downsizing trends of the past decade were supposed to sweep away corporate inefficiency, the U.S. economy remains astoundingly inefficient: It has been estimated that only 6 percent of its vast flow of materials actually end up in products…. Overall, the ratio of waste to the durable products that constitute material wealth may be closer to one hundred. The whole economy is less than 10 percent – probably only a few percent – as energy-efficient as the laws of physics permits (Hawken *et al*. 2002, p.14).

Questions about organisational success, the means to seek it, and how to measure it, then, need extending and rethinking because they do not easily accommodate evolving ideas about economic activity in harmony with nature. The notion of an organisation or an "entity" is a legal and accounting fiction that seriously impedes our understanding that most human and economic activity is intimately bound up in (usually hostile) relationships with the environment (Shrivastava, 1994).

To date, one of the main changes in business organisations, as they have grappled with "sustainability", has been to take up the practice of social and environmental reporting, with the Global Reporting Initiative (GRI, 2000, 2002) emerging as something of a standard (Bebbington *et al*., 2003; Moneva *et al*. 2003)[2]. In some cases, the most genuine ones, such reporting is being

[2] The 'Global Reporting Initiative' scheme (GRI, 2000, 2002) claims to provide the basis of worldwide standardised, comparable, reporting on the sustainability of business organisations and has gained some momentum (ACCA, 2001; Adams, 2003; Gervais, 2002; Moneva *et al*., 2003; NEF, 2000).

used as a means to drive internal changes in organisational practices, most notably energy and waste management. While a first step, this new element of control systems thinking reflects at best an end-of-the-pipe approach focused on eco-efficiency (cf. Bebbington *et al*., 2003; Stone, 1995), and reflecting prevailing expectations about organisational rights to make increasing financial profits mediated only by relatively weak legislative and market drivers (cf. Schaefer et al., 2003, p.225; Howes, 2002; Gray & Milne, 2004). Indeed, if we reflect on our earlier discussion about sustainability, and its requirements for rates of renewable and non-renewable resource use, pollution emissions and irreversible impacts, we begin to see the limited nature of these first steps. As Hawken *et al*. (2002, p.*x*) explain:

> Eco-efficiency … is only one small part of a richer and more complex web of ideas and solutions. Without a fundamental rethinking of the structure and the reward system of commerce, narrowly focused eco-efficiency could be a disaster for the environment by overwhelming resource savings with even larger growth in the production of the wrong products, produced by the wrong processes, from the wrong materials, in the wrong place, at the wrong scale, and delivered using the wrong business models (Hawken *et al*. 2002, p.*x*).

The idea of an account of performance in relation to finite and integrally valuable natural capital and environmental services produced by the virtually ecologically illiterate for the purposes of stakeholder management (cf. Gray, 2001; O'Dwyer et al. 2003) in an attempt to sustain "the organisation" at all costs, makes no sense except in a world on a road to nowhere. Such a conception of the organisation, with rights (as opposed to responsibilities) to define what success is, is arguably implicit in Otley's first questions about performance management.

What emerges from this brief analysis is that current efforts of environmental or sustainability reporting are woefully inadequate means on which to form ideas about "success" in terms of the ecological logic needed to reorganise and 'control' economic activity. Long-term thinking, cumulative environmental impacts, multi-level analysis, and a proper understanding of the "economic organisation" as located within wider ecological and cultural systems, suggests we need radically different notions of "success" as an important step towards what we might term 'control for sustainability'.

Rethinking fundamentals

In a society that has decided or is deciding to move toward sustainability, the level on which discourse will take place will have shifted to a framework for understanding current problems and formulating a way forward (cf. Hawken et al., 2002, p.149). The corollary is that Otley's framework must (again) be extended and problematized to enable organisational thinking at the level of wider human institutional, cultural and ecological systems, and in order to rethink our fundamental ideas about success. Bebbington et al. (2003) illustrate the importance of this level of analysis in placing the development of environmental reporting practice in the context of regime change. They state, (p.11, emphasis in original) "A regime involves much more than *practice* – it also involves *beliefs* and the presence or otherwise of *formal legal* requirements."

Ideas about individual business 'success' would still prevail in a different socio-economic framework; but from an organisational perspective, the concern might be, for instance, with 'strategies' (which might be more appropriately termed 'principles' and 'obligations') businesses might strive for in a sustainable future. Such strategies would have to draw on a wider analysis and understanding to inform and allow business to behave *as if* natural capital were valued. For example, Hawken *et al*.'s (2002, p.321) vision is that:

> Today, the central issues for thoughtful and successful industries – the two being increasingly identical – relate not to how best to produce the goods and services needed for a satisfying life – that's now pretty well worked out – but rather to what is worth producing, what will make us better human beings, how we can stop trying to meet non-material needs, and how much is enough (Hawken *et al*. 2002, p.321).

The central strand, however, in a shared social and ecological framework will be the articulation of new values, reflected in a new entrepreneurial culture. Some researchers have suggested that as organisations in the existing socio-economic framework take on explicit value commitments linked to sustainability in place of the (nominally) value-free assumptions of conventional economics, business culture may shift (at least by degrees), providing an important context of reform (see Hayward, 1994, p.97, Birkin 2000, Ball, 2003, and cf. Schaefer et al., 2003). Birkin, (2000) and Hayward, (1994) argue reform is a necessary (if insufficient) first step, where we see "just how far existing economic practices might be pushed in an ecological direction…." (Hayward, 1994, p.88). Ball's (2003) study of a Canadian City Council, for example, showed a stepped-change in household waste recycling rates (from average rates for Canada to around 70%) and led to organisational life taking on a schizophrenic quality characterised by the presence of conflicting (economic v. ecological) value systems. This shift at the City Council is both commensurable with its traditional 'business' values; and, at the same time, provides different pressures to reform:

> There was also a significant drive that had been going on for some years in the city to recycle and reduce the amount of garbage that we had, and had been actively embraced by citizens for some years, and the notion of burning garbage was just anathema to citizens… … citizens would have had no part in it. Anyway, so I think once we decided, or it became evident that landfill was almost impossible, we were forced to look at what else might be…what else we could do then as a local solution to it … the pieces started to come forward as kind of a comprehensive program, and we realized the magnitude of what we meant by comprehensive programming. It really was going to change everything; both how we collect it and where, and what we did with it, and a number of things, the costs, and you know we were doing something that was going to fundamentally change how we were doing things (Comments from interview with a left liberal councillor, City Council) (Ball, 2003, p.8).

Yet, this first step (taken by some organisations within the last two or three decades) has done nothing to reverse any of the indicators of the destruction of natural systems, and, generally, little progress has been made in envisioning the *order of change* required in our socio-economic systems and its huge potential, if we are to move towards a sustainable economy. As Schaefer et al. (2003, p.211) note, for example, much of the "greening" advocated in the management and practitioner literatures is (still) only likely to influence change so long as it does not raise basic questions about the assumptions on which business organisations operate. Similarly, well-intentioned advocates of 'environmental accounting' attempt to mediate their good intentions for radical change via an appeal to the (orthodox) business case (see for example, Howes, 2002; and see Gray, 2002). In short, many advocates of sustainability become the courtiers of business, speaking to a business agenda of "weak sustainability", as business moves to capture and appropriate the agenda (Welford, 1997). By failing to talk about how to re-enchant our world, we fail both ourselves and future generations.

We also envision developing ideas about performance and 'control for sustainability' at other levels, including the level of whole systems of industrial production, or communities. To take an illustration: Hawken et al. (2002, Chapter 2) argue that current innovations in the automotive transportation industry could provide the basis of a fundamental shift in what we drive, and envision massive upheaval in the car, oil, steel, aluminium, electricity and coal industries, as well as successor industries. 'Efficiency' in this context relates to many forms of advanced resource productivity, with attendant changes in 'throughput': "materials would flow in closed loops, with toxicity carefully confined or designed out and longevity designed in…." (p.27). Yet ideas about 'efficiency' extend still further, so that as we move towards a sustainable future, we (p.40) "extend …gains in resource productivity by making any kind of car less necessary."

> With or without Hypercars, the problem of excessive automobility is pervasive…. Congestion is smothering mobility, and mobility is corroding community. People demand a lot of travel and have few non-automotive ways to do it. This effectively immobilizes everyone too old, young, infirm, or poor to drive – a group that includes one-third of all Americans, and whose numbers are rising. Street life and the public realm are sacrificed as we meet our neighbors only through windshields. As architect Andres Duany puts it, this

> stratification "reduces social interactions to aggressive competition for square feet of asphalt." (Hawken et al., p.40).

Or, in Jacobs' (2000, p.100) terms, our or addiction to automobility, or (to take a more benign view) mistaken logic that road (and other) traffic can continue intensifying indefinitely, has left us in an economic and political vicious circle:

> Economic vicious circles are intended to solve problems, but they don't. The problems they're meant to solve persist; as solutions recede, the costs of temporizing continue to rise. We should become suspicious of activities displaying these characteristics and seek to cut vicious circles instead of indulging them – essentially the same advice given to drug abusers, compulsive gamblers, smokers, or other addicts. Economic vicious circles are economic and political addictions. The most effective ways to cut them are with bifurcations instead of continuing as is (Jacobs 2000, p.100).

The corollary of both analyses is the need for radical changes in how economic organisations have been responding to (Otley's) questions about 'key objectives', 'strategies' and 'success' in taking up the sustainability agenda. Both of these insights point to the need for control tools and systems (at different levels) that in (Birkin et al's 2003) terms challenge the *meaning* and measurement of 'success', so that fundamental business, community and personal goals can be re-evaluated. We need to find more meaningful, intentional and realistic analyses of economic activity than highly-abstracted accounting measures such as profit, loss, GDP, and so on. As people in economic organisations, as people in communities, and as citizens in bio-regions we need 'control' systems that permit us to ask, for example, within the constraints implied by cumulative environmental impacts, how much do we really need, and how much is enough?

In the context of Otley's framework and questions for business organisations about 'success', therefore, problems hinge on the failure (of many of us, at many levels) to articulate the problems of the dominant understanding of human progress, and to offer alternatives. Human development, as Hayward (1994, p.87) explains has become almost inseparable from a (now almost global) conception of economic "growth", which "is in many respects the antithesis of ecological ends". Arguably, the mind-set of the current capitalist system provides no reasonable basis on which even the most conscientious businesspersons could make reasonable decisions about 'success'. 'Success' through the prism of sustainability, therefore, must be seen in terms of the re-examination of the conventional understanding of growth (as reflected in the usual measures of economic success); the admission that our (Western) addiction to economic success may not be sustained environmentally and/or socially; and rejection of maximising behaviour in relation to the production of material goods, 'throughput', or over-use of natural resources, destruction of habitats, disturbing ecosystems and so on. Thus the necessary order of change is only really apprehended when we start with the most fundamental basics by which we live (Singer, 1997).

2. Organisational performance and target setting.

Apart from our belief that most conventional indicators of organisational performance and target setting are taking us away from sustainability, our focus here concerns business organisations' current perceptions of appropriate standards of performance and future targets for sustainability. We suggest that what is encouraged by way of change in the targets implied in the current generation of corporate accounting and reporting developments (and such developments are important because they are one of the main ways in which business is cajoled into taking up sustainability) is blatantly disproportionate to the necessary sense of urgency and scale of action implied by addressing the risks associated with ongoing environmental exploitation. While organisations seeking change for sustainability have to start somewhere, we are concerned that

these steps become entrée's for rapidly speeding up transformation rather than potent excuses for slowing it down.

Beyond 'exemptionalism' and eco-efficiency:

Taking stock of adaptations businesses have made so far in terms of 'how much performance' and appropriate 'targets' for taking up the sustainability agenda, our general conclusion is that the only value new accounting, reporting and 'control' frameworks (albeit that these are a largely positive rather than negative development) provide lie in getting organisations (and those who work in them, or otherwise care about what they are doing) to start to think about where they are 'at' now in the context of sustainability (see also Gray, 2001; 2002 for a discussion). Howes[3] (2002, p.18; see also Birkin, 2000 for a fuller discussion) suggests:

> For a company committed to moving towards environmental sustainability, the challenge is to try and determine/estimate what its environmentally-sustainable profits may be and hence to gauge to what extent it is really adding value and making the transition to becoming a more environmentally-sustainable enterprise. The development of a more complete, transparent and integrated accounts/accounting systems – systems that specifically take into account the most significant external environmental impacts resulting from a company's operations – is a prerequisite to enable a company to be able to do this (Howes, 2002, p.18).

While new ideas and tools for management control, as noted earlier, are essential in the context of a shift towards sustainability (Hawken et al., 2002; Tylecote, 1992), our argument is that the new accounting and reporting approaches are being introduced and managed in ways that aim to improve the financial as opposed to the 'environmental', or 'social', bottom lines. For example, 'environmental' accounting and performance reporting permits business, to tackle 'the environment' in the context of win-win scenarios, focussing on 'eco-efficiency' (incremental improvements in materials use and environmental impact [see Milne, 1996; Stone, 1995]), rather than justice, and carrying on regardless of the scale of their overall environmental impacts, and/or the post-consumer impacts of their products. That major automobile manufacturers can claim to embrace sustainability and eco-efficiency and yet continue to produce energy inefficient sports utility vehicles suggests they have a warped understanding of eco-efficiency.

Labelled "exemptionalists", Cairns (2001, p.148) argues that a great deal of us either believe or behave as if we believe that:

> …human ingenuity, technology, and creativity free humans from the laws of nature that limit and control other species (Cairns, 1999)…[and] that resources are infinitely substitutable and exhaustion of one will ultimately lead to the appearance of a substitute when there is enough economic incentive to do so. Thus, humans are the ultimate resource and the species is not limited by finite natural resources (Cairns, 2001, p.148).

Sustainability requires we move beyond such beliefs and assumptions, and similarly, thinking that win-win eco-efficiency will do very much to 'control' environmental impacts and problems is also fallacious, since it encourages greater absolute material and energy throughputs, and if these are the source by which profits are made, it will almost certainly do so without genuine changes in beliefs about "success". Eco-efficiency as McDonough and Braungart (1998, p.4) note:

> …works within the same system that caused the problem in the first place…It presents little more than an illusion of change. Relying on eco-efficiency to save the environment will in fact do the opposite – it will let industry finish off everything quietly, persistently, and completely (McDonough and Braungart, 1998, p.4).

In order for businesses to pursue sustainability initiatives further, management control systems now need to be adapted to take on more radical ideas: ideas about a proportionate response to growing human pressures on the environment:

Emerging concepts for a sustainable future

[3] Howes (2002) details and reports on a methodology for quantifying companies' 'environmentally sustainable profits' developed by the 'sustainable development' organisation Forum for the Future (a UK charity) in association with the UK Chartered Institute of Management Accountants (CIMA).

Getting us beyond the change-but-no-change variety of environmental or sustainability reports are emerging ideas and tools for understanding 'the entity' and its relationship with nature. Generally, we see the value of using these 'ecological accounting' tools as a start in bridging the gap between conventional economism and currently inaccessible ecological thinking. Birkin (1996), for example, develops the notion of 'Burden to Base' as a key relationship (Birkin, 1996, p.247-249):

> …the word "capital" could be substituted by the word "burden"…. This substitution acknowledges fundamental ecosystem dependence…. To support the burden, a base is required within the ecosystem… following on from the burden to base relationship, wealth can no longer just be mystically 'created', it will have to be appropriated…Representations of the four categories of burden to base could then be incorporated in a "balance sheet". This balance sheet would include scientific assessments, social reports and aesthetic judgements as well as economic measures. Such an account would seek to explain critical issues as fully as possible (Birkin, 1996, p.247).

Perhaps more practical (and indeed, gaining some currency), is the 'ecological footprint' (Wackernagel and Rees, 1996). The 'ecological footprint' uses the idea of an 'Earthshare' which is based on the total amount of productive land on the planet divided by the total global population. Estimates of footprints for average citizens of America, Europe, etc, show they require vastly greater areas of land to support their lifestyles (and so have vastly greater footprints) than those in Asia and Africa. "Footprints" are useful indicators of inequality, and provide some idea of human "pressure" on nature, but they do not provide direct indicators about the (deteriorating) state of the environment.[4] Generally, the idea is that reducing the size of footprints leads to improvements in environmental quality, or at the very least reduces the levels of degradation. Some adaptations using the footprint concept have occurred in New Zealand, where attempts are made by several organisations to calculate their "carbon footprints" using imputed carbon dioxide (CO_2) metrics for travel, electricity use, and so on.[5] Again, the general idea is that organisations do better when they reduce the size of their carbon footprints, although in organisations seeking to grow this becomes somewhat of a challenge. An interesting variation, therefore, as been the notion that (expanding or non-reducing) carbon footprints can be "offset" with investments in growing forest or regenerating vegetation.[6]

Related to footprints are the concepts of Material Inputs (incl. Energy) per Unit of Service (MIPS), and the "ecological rucksack" it gives rise to; Surface Area per Unit of Service (FIPS); and Eco-toxic exposure equivalent per Unit of Service (TOPS) (Factor-10, 1999). Associated with Schmidt-Bleek (1993) and the Factor-10 Club (see, www.factor10-institute.org), these concepts are intended to foster dematerialisation, and provide a way of understanding that harm to the environment is not just associated with pollution but also with resource extraction and resource productivity, since ultimately all resources end up as pollution and wastes.

"Ecological rucksacks" are calculated for end-use products, and seek to assess the amount of raw materials used (including energy) in producing, transporting, consuming, and finally disposing of an end product less the weight of that end product. So, for example, it has been calculated that 1kg of finished personal computer carries an ecological rucksack of 200 kg of materials. Rucksacks

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[4] The Best Foot Forward's (BFF, undated) analysis of the Isle of Wight's (UK) footprint, for example, estimates each islander consumes about 2.5 times the sustainable average Earthshare. It presents a detailed analysis of the 'supply-consumption-disposal' chain on the Island, and begins to bring an understanding of the collective impacts of the islanders' and their tourist visitors' material consumption, as well indicating some (albeit short-term and incrementalist) alternatives. It notes, for example, 13,000 of the 34,000 tonnes of milk produced are consumed locally on the Island. There is an additional 5,000 tonnes of local demand. This could be satisfied by island-produced milk rather than being imported, thus reducing the environmental impact of transporting this amount. This would reduce the Island's Footprint by 100 ha… (p.38)

[5] See, for example, http://www.landcareresearch.co.nz/research/sustain_business/EBEX21

[6] The basic idea is that growing vegetation "sequestrates" carbon from the air, and this can be used to counter the emissions of carbon released by the organisation. On a global scale, the Kyoto Protocol is based on similar notions, with nations receiving carbon credits for growing forests.

can also be calculated for base materials (e.g., metals, plastics, glass, cement). MIPS calculations seek to relate the material inputs to "service" outputs, and note improvements can come from either less material inputs or improved services from given inputs. Related to MIPS and rucksacks, is the notion of "products as services", and of divorcing "use" from "ownership" (see, www.product-life.org). The idea here is that if producers do not transfer ownership of final products, but merely rent them, they have continuing incentives to design products that minimise material and waste streams, are long lasting, and/or that can be easily recyclable. A famous instance of this kind of thinking is Interface Inc – a U.S. manufacturer that "leases" floor coverings (see, www.interfaceinc.com).

Like footprints, "success" comes from lowering MIPS and rucksacks, and the point about Factor-10 is that the goal is to lower these values by a factor of 10. Importantly, though, improvements in dematerialisation need to come at the level of economies and ultimately the planet, and not simply on the basis of individual products – a tenfold decrease in material inputs per computer is little use, if it coincides with a greater than tenfold increase in consumption of these products. And this problem of "rebound" or "boomerang" (see, for example, Factor 10, 1999; McDonough and Braungart, 1998; Hukkinen, 2003) tends to be encouraged by gains in resource productivity because the efficiency gains tend to create competitive advantages which in turn lead to greater investments and expansion.

Even avoiding the problems of rebound, some believe dematerialisation is not sufficient because while it reduces absolute levels of resource use, it still involves waste and toxic emissions, just *less* of them. For McDonough and Braungart (1998, p. 2) what is required is nothing short of *design* for the next industrial revolution, in which we learn to recognise that simply slowing down cradle-to-grave life cycles is not sufficient, and in which we seek to design products that work within cradle-to-cradle life cycles.

> If people are to prosper within the natural world, all the products and materials manufactured by industry must after each useful life provide nourishment for something new. Since many of the things people make are not natural, they are not safe "food" for biological systems. Products composed of materials that do not biodegrade should be designed as technical nutrients that continually circulate within closed-loop industrial cycles – the technical metabolism (McDonough and Braungart, 1998, p. 2).

"Success", then, for McDonough and Braungart, is reached when we no longer produce any "unmarketables" – products that pose hazards, or cannot safely or economically be recycled, and when we keep separate "products of consumption" from "products of service". The former are made from organic nutrients that can be returned to nature with no harm, while the latter are made from "technical nutrients" –designed to circulate in industrial cycles forever.

Social 'accounting' targets: beyond stakeholder management

These ideas about more meaningful, intentional and realistic analyses of entrepreneurial activity, and the idea that many other people need a say in whether or not organisational responses are proportionate to sustainability gaps, are embodied in the ideal of social accounting. The role of social accounting has been identified, for example, "in its creation of … social visibilities and exposure of values and priorities that become inputs to wider democratic processes of discourse and decision-making (Boyce, 2000, p.53). Or, as (Gray, 2001, p.11) puts it, in the context of existing capitalistic mind-sets, "… social accounting should hurt. If it doesn't raise difficulties, cause un-welcome re-examinations of the organisation and so on, then it is probably not good social accounting." In contrast to such ideas, however, adaptations businesses have made to date with reference to wider (anthropocentric and ecological) interests than their own, have tended to focus on 'stakeholder management' (see for example, O'Dwyer, 2003; Gray, 2001, 2002; Owen and Swift, 2001).

We should acknowledge that business involvement *at any level at all* in the development of 'social' accounting and reporting represents a significant advance on the view the only

responsibility of the firm is to maximise shareholder profit (Friedman, 1970), or 'shareholder value' (Mintzberg et al., 2002). Nonetheless, change is at the margins, with companies otherwise striving for early closure on engagement with questions which challenge basic assumptions about 'how much performance' or the 'targets' for what they do, and questions of in whose interests they do it (cf. Gray 2001; Neu et al., 1998; Owen and Swift, 2001; Schaefer et al., 2003). While ideas about eco-efficiency have gained some acceptance in the business community, eco-justice seems a bridge too far, and some of the new environmental or sustainability reporting schemes simply allow companies to side-step the problem of considering any 'social' strategies or obligations (cf. Howes, 2002; Ball et al., 2003; Moneva et al. 2003).

O'Dwyer et al.'s (2003) recent study of 'less economically powerful' stakeholders' attitudes to corporate social disclosure (CSD) lead them to conclude that there is strong demand for periodic, regulated, standardised, audited and accountable CSD. Current CSD, however, is "widely perceived as little more than an untrustworthy symbolic stakeholder management exercise with little concern for 'true' accountability….". They note (p.17) that amongst interviewees "[t]here was…a clear consensus that current CSD was motivated by corporate self-interest and stakeholder management rather than a genuine interest on the part of companies to account to less powerful stakeholders." In short, based on prevailing ideas about their responsibilities toward a wider community, companies continue to exploit the absence of accountability systems that would otherwise regulate their social, environmental and economic performance. Indeed, against the magnitude of the social problems with which many business organisations are inextricably linked, one must see their attempts to report on their social impacts as nothing short of yet further perverse abuses of their substantial power.

> For the poorer two thirds of humanity living in the South, nature's capital is their source of sustenance and livelihood. The destruction, diversion and takeover of their eco-system in order to extract natural resources or dump waste generates a disproportionate burden for the poor. In a world of globalised, deregulated commerce in which everything is tradable and economic strength is the only determinate of power and control, resources move from the poor to the rich, and pollution moves from the rich to the poor. The result is global environmental apartheid. … (Shiva, 2001, p.112)

Notwithstanding the need for political action on the 'development gap' between the worlds nations and the 'poverty gap' that is still pervasive in the developed world, if corporate attempts to target, measure, control and report on their social performance is to have any meaning beyond public relations puffery, there is an urgent need to seriously engage with the social ramifications of organisations' inputs, processes and product outputs. Conducted with genuine concern *for stakeholders*, 'stakeholder dialogue' as an element of the organisation's control system is valuable, and what is now needed is a corporate response of a different order to 'stakeholder management'.

> Social wounds cannot be salved nor the environment "saved" as long as people cling to the outdated assumption of classical industrialism that the summum bonum of commercial enterprise is to use more natural capital and fewer people…. The true bottom line is this: A society that wastes its resources wastes its people and vice versa. And both kinds of waste are expensive. (Hawken et al., 2002, p.55)

3. Rewards for achieving the targets.

For Otley, motivation is a key issue in the design and operation of management control systems. In the current capitalistic mind-set, economic conceptions of success dominate organisational life and individual behaviour. Economic considerations will continue to be important in the transition to sustainability, but as Otley notes, the reality is that people in organisations have complex motivations. The transition to sustainability implies a number of issues for how people are motivated at work, deriving from changing financial considerations for individual enterprises, but also linked to wider debates stimulated by the growing stresses of socially unsustainable trends.

Financial motivation

The transition suggests a changing economic framework or regime (cf. Bebbington et al. 2003), within which business behaviours will be rewarded or penalised differently. Sustainability is arguably beginning to guide pubic governance (and business strategy), and the need for economic regime change is beginning to be recognised (at least in Europe). In the UK, for example, we are beginning to see the introduction of ecological tax reform, which will in essence attach a 'price' to environmental damage (examples in the UK include the climate change levy and landfill tax). In the context of a changing economic regime, at the level of the individual enterprise's control system, we envision the development of better (reformed) accounting tools and methods which pay "due attention to the environmental inputs and outputs of economic systems" (Hayward,1994, p.90), providing a fuller account of ecological factors.

In the transition, it will also be necessary to re-examine ecologically perverse financial incentives, such as "all manner of subsidies doled out to the fossil-fuel industry, ranging from cheap access to oil on government land to the ongoing American military presence in the Middle East…." (*Economist*, October 25 2003, p.11). More generally:

> Hundreds of billions of dollars of taxpayers' money are annually diverted to promote inefficient and unproductive material and energy use. These include subsidies to mining, oil, coal, fishing, and forest industries as well as agricultural practices that degrade soil fertility and use wasteful amounts of water and chemicals. Many of these subsidies are vestigial, some dating as far back as the eighteenth century…(Hawken et al., 2002, p.13)

Jacobs (2000, p.100) similarly indicates the need to recognise that such subsidies exacerbate economic vicious circles:

> …the cod fishery and its workers were subsidized … in Canada, ever more heavily during the years cod were declining. Had it been possible to add subsidy costs into cod prices, cod would have been priced out of the market before cod stocks collapsed. Subsidies were intended to support the industry and its workers, and they did. The price of automobiles doesn't begin to pay for their many indirect costs: waste of land and energy, loss of amenities, and the expenses of traffic enforcement, pollution, and accidents caused by uninsured drivers (Jacobs, 2000, p.100).

Paradoxically, but perhaps unsurprisingly in the context of 'stakeholder management' (see our earlier discussion), certain clear losers (at least, those not prepared to make radical changes) in the transition to sustainability regularly emerge as leaders in environmental or sustainability accounting and reporting.[7]

In the relatively near future, governments may begin to understand the need to financially reward companies that opt for new technologies for environmental sustainability, and the need to modernize the economy in the context of the challenges of sustainability (cf. Christie and Warburton, 2001; Hawken et al., 2002; Murray, 1999). Ideas about what constitutes success for individual enterprises should therefore be linked to whether they are potential winners or losers, depending on their capacities to exploit future growth markets and technologies which we can envisage as emerging – for example, renewable energy; organic and low-impact farming; public transport; waste recycling; repair and reuse of products. Notable losers would include the fossil-fuel intensive energy generation and fossil-fuel intensive vehicles production sectors, which will have to radically restructure (see Hawken et al for a discussion). At the level of organisational

[7] See for example the Association of Chartered Certified Accountants (ACCA) Sustainability Reporting Awards (http://www.acca.co.uk/sustainability/awards/?session=ffffffffefffffffc28288ca3f9cf7adb966ef1fd56ea99d8b36b0103e758470: accessed 27/10/03)

control systems, ideas about a changing economic future and the organisation's place in it will feed into the organisation's discussion of success factors (see point [1] above).

Beyond 'exceptionalism' and redefining rewards

Whilst economic incentives and penalties will be important in the transition to sustainability, the mind-set of current capitalist thinking will also have to undergo transformation. A partial factor in this is potentially the growing pressures associated with socially unsustainable trends attendant upon the current Western economic growth model. As we have noted companies are implicated in the socially unsustainable 'poverty gap' which increasingly characterises the economically 'developed' nations. As Christie and Warburton (2001, p.6), who write on behalf of the 'Real World Coalition' (a coalition of UK not-for-profit organisations campaigning on what they recognise as causally-linked but distinctive policy constituencies of sustainability[8]) (2001, pp.viii-ix) summarise:

> … for the last two decades, economic change in the industrialized world has, in many cases, widened the gap between the richest and the poorest groups, compounding the disadvantages suffered by people on low incomes and leading to growth of a 'super-class' … of hyper-affluent people (Christie and Warburton, 2001, p.6).

And similarly, but perhaps more surprisingly from the mainstream management literature:

> In 1989, the United States had 66 billionaires and 31.5 million people living below the official poverty line. A decade later, the number of billionaires had increased to 268, whereas the number of people below the poverty line had increased to 34.5 million… the United States [ranks] highest both in gross domestic product and poverty rates… (Mintzberg et al., 2002, p.72)

Both of these sets of commentators are similarly concerned with the attendant creation of a 'superwealthy' class, entitled to a disproportionate share of the Earth's resources, which Cairns (2001) refers to as the notion of "exceptionalism" to connote a belief in such entitlements.[9] For example:

> In March 2000, Barclay's Bank [UK] announced thousands of job cuts along with closure of hundreds of bank branches, leaving many communities without access to banking services. This sounds like the behaviour of a firm in deep trouble. But, far from being in crisis, it was at the same time posting record profits, and announced also that its Chairman's salary had quadrupled to £1.75 million in the previous year. (Christie and Warburton, p.14)

Similarly, in the North American context, Mintzberg et al. (p.72) go on to illustrate the failure of the trickle-down effect of the neo-liberal economics of recent decades to materialise, widening the gap between rich and poor in the US, arguing that it is time to stop relying on this particular homily in order to appease our consciences.

> In the past 15 years, we in North America have experienced a glorification of self-interest perhaps unequalled since the 1930s. It is as if, in denying much of the social progress since then, we have reverted to an earlier and darker age. Greed has been raised to some sort of high calling; corporations have been urged to ignore broader social responsibilities in favor of narrow shareholder value; chief executives have been regarded as if they alone create economic performance. Meanwhile, concern for the disadvantaged – simple, old-fashioned generosity – has somehow been lost. (Mintzberg et al., 2002, p.67)

Arguably, at a number of levels, the perverse relationship between social (and environmental) well-being, and the crude economic incentives which have been used to motivate managers to accumulate far more economic capital than they could ever reasonably need is now apparent.

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[8] See http://www.realworld.org.uk/index.html: accessed 27/10/03.

[9] Cairns (2001, p. 148) suggests: "Exceptionalists believe that some humans are vastly exceptional to most humans and, as a consequence, are entitled to a markedly disproportionate share of the planet's resources. Without question the superwealthy are different from the ordinary citizen in some regard, having contributed to a sizeable technological advance or having exceptional financial acumen, or both…"

When we view issues of motivating people in organisations through the prism of sustainability in contrast to the morally-and spiritually un-ambitious economism of the last few decades (cf. Hayward, 1994; Shearer, 2002), we have the opportunity to ask rather more creative questions about what we do at work, how we do it, and the possibility of intrinsic (in addition to financial) rewards. For example, linked to an acknowledgement of "the deep dissatisfaction with the 'stress and spend' culture of Millennial Britain" (Christie and Warburton, p.2), we might begin to ask how the demands of work can be reconciled with the pervasive sense that community life and families and individuals are being damaged by the way we organise economic activity. A much-needed antidote to exhortations to the oxymoronic idea of 'continuous (economic) improvement', we suggest, is the idea of 'enough' performance:

> Like the other easy assumptions of this syndrome of selfishness, lean and mean is supposed to offer it all: lower costs, higher productivity, flatter and more flexible structures, more empowered workers (with their bosses gone) and happier customers…. Sure all this can happen, but once again it is a half-truth. The other half comprises burned-out managers, angry workers, quality losses in the guise of productivity gains and disgruntled customers…. Maybe it is time to develop healthier organizations by cleaning up our attitudes. We need economic sustainability too, in addition to social and environmental sustainability. (Mintzberg et al., 2002, p.72)

If we are going to live in a socially sustainable future, and work in socially and environmentally sustainable economic organisations, a necessary adaptation to control systems is a reward system that reflects long-term thinking about the interests of the environment and society and practical alternatives to 'stress and spend'. This would emphasise potentialities and welfare, individual and collective, heeding natural limits. We might want our ideas about what we do at work to be driven, for example, by ideas about prosperous, safe and supportive communities, and a healthy environment for all of us. Of course, this raises questions about how serious debate about long-term thinking can be motivated in relevant communities – particularly in the context of a business culture which is based on short-term thinking, and a polity/citizenry which fails to (or prefers not to) face up to the consequences of much of its present habits of consumption. Yet, recent interest in such concerns as 'work life balance' (for example Nord et al., 2002) and the rewards to the 'superaffluent' class reflect growing concern linked to the paradoxes of affluent Western organisational life. Christie and Warburton (2001, p.3) note that:

> Repeatedly, researchers have identified a tension between the demands of work and the claims of family life, a growing divide between official yardsticks or progress and citizens' anxieties and priorities and a search for more meaning in life than 'consumer choice' can provide. At the same time, there is no doubt that we live in historically exceptional times of good fortune and plenty… (Christie and Warburton, 2001, p.3)

Indeed, it might eventually come to be something of a relief that our potential can be measured in terms of something more than the quantity of goods our incomes allow us to consume or how productive we can be made to be (cf. Hayward, 1994, p.92).

4. Information flows for sustainability.

In this final section considering Otley's framework, we focus on what we see as the most outstanding deficiency in organisational control systems essential for achieving sustainability: ecological illiteracy (see Orr, 1992). Generally, we see ecological literacy at the level of individual enterprises as the capacity to comprehend environmental conditions, the damage their individual and collective human economic and industrial processes are causing, and an appreciation of how such damage means (as Jonathan Porritt has put it[10]) that our survival

[10]*Moving Sustainable Development Centre Stage*, Speech given by Jonathan Porrit (Chairman UK Sustainable Development Commission, and Programme Director, Forum for the Future), 24 May, 2002, www.culture.gov.uk/PDF/ sustainable_heritage_porritt_speech.pdf)

prospects are dodgy. At one level, the 'information flows' that might feed into organisational control systems in the context of ecological literacy are all too apparent; or as Jacobs (2000, p.94) puts it: "These days, ecological loops and intersecting loops are constantly being identified and measured. But there's a sad and desperate reason for so much interest. We're cutting such loops at a terrible rate. Well, at least knowing what we're doing is one prerequisite to doing better." Yet such knowledge is not captured within (in Otley's terms) arrangements for performance monitoring, let alone being treated as the basis of learning and change. In spite of attempts by business to take up the sustainability agenda, via take-up of initiatives such as environmental, social or sustainability reporting, there has been no real attempt to develop capacity in ecological literacy.[11]

An important step in developing ecological literacy will be the development of a capacity in individuals in organisations to relate environmental (and attendant moral) issues that they are aware of in other roles (perhaps as private citizens, or as parents, say) to their work contexts. Schaefer et al., 2003 (p.212) suggest that in the current capitalist mindset, managers are, in contrast, more likely to wait for specific legislation before they relate issues of, for example, ozone depletion or climate change to their work context. Such duplicity is practically and ethically unacceptable. In part, literacy in this sense should also develop as organisation discourse is given new meaning in response to stakeholder dialogue. A further possibility lying somewhere between these two possibilities and indicated in studies of environmental accounting in action, is that there are different social or political groups within organisations (cf. Ball, 2002; Dey, 2002; Larrinaga-Gonzalez and Bebbington, 2001) with an ongoing role in championing the 'greening' of the organisation (see also Schaefer et al., 2003).

We also see the implementation of better accounting and control tools for sustainability, such as the ecological footprint, as a partial enabler of the development of ecological literacy (see section [2] above). There are, at the same time, examples of initiatives to develop 'control for sustainability' which are necessarily emerging at levels beyond the defined boundaries of corporate activities and operations, partially reflecting Milne's (1996) ideas about regionally based initiatives, and switching the entity and going-concern concepts from companies to natural entities. The 'Cities for Climate Protection' campaign of the International Council for Local Environmental Initiatives (ICLEI), for example, draws around five hundred local governments internationally into a common performance agenda to reduce global warming and air pollution emissions, with the benefit of improving community "livability"[12]. At the level of communities, this initiative implies cutting emissions throughout the community – so that action would be coordinated, drawing in households and enterprises, as well as the local government authority. And in New Zealand, there are several examples where concern for the long term ecological health of such entities as lakes and rivers is leading to community level initiatives to cease certain land use and other activities, including those generating economic returns.[13] As people in organisations begin to use better tools, and engage in issues of un-sustainability at other levels, their ecological literacy should develop.

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[11] Indeed, one of us once asked a member of a 15-strong head office corporate environmental management team of an organisation employing 40,000 people, and a leading environmental reporter at that, how many fulltime ecologists they employed. The answer, perhaps unsurprisingly, was none!

[12] See http://www.iclei.org/co2/, accessed 28/10/03; and see Ball, 2002)

[13] See, for example, the long term strategic plan developed to protect Lake Taupo, *Protecting Lake Taupo: A Long Term Strategic Partnership* (2003) at www.ew.govt.nz/policyandplans/taupo/index.htm, in which community involvement in seeking solutions to reduce nitrogen levels in the lake by 20% over the next 10 years has included the abandonment of certain farming practices. Similarly, see the *Fiordland Marine Conservation Strategy* (2003) that was produced by the Guardians of Fiordland's Fisheries and Marine Environment Inc. to protect the ecological, economic, spiritual and recreational basis of New Zealand's South Island sea fiords (see, www.fiordland-guardians.org.nz/documents.htm).

A further driver of ecological literacy is the re-evaluation in technical terms of organisational activities and operations within the context of a discourse about a sustainable future, linked to a better understanding of present environmental crisis, as well as different legislative or regulatory pressures. The waste management industry is a good example of this possibility (see for example, Murray, 1999 and Ball et al., 2003). Existing ideas about the instrumental value of some core business functions will be challenged (for example, conventional accounting), and there will be a necessity for people to combine functional expertise. For example, Murray (1999, p.130) indicates that in the waste management business, getting accurate 'environmental' data may require as much attention as financial accounting. In contrast Forum for the Future has noted 'gaps' in current capacity of organisations to respond to the demands of sustainability (cited in Christie and Warburton, 2001, p.33):

> Few work-forces have encountered even the most basic scientific principles that underpin environmental sustainability at any stage of their education or training, and many organisations are structured so as to prevent the integrated, cross-disciplinary approach that is at the heart of identifying and implementing sustainability solutions (Christie and Warburton, 2001, p.33).

Of course, precisely the same comments apply to the very vast majority of our colleagues working in business schools around the world. Not only do educators of tomorrow's business managers not engage with their peers in the sciences and humanities, they rarely engage with the literature and ideas of such disciplines. And this, too, is in part due to the increasingly stringent and narrow performance management frameworks that academics are now subjected to. Ecological literacy is, perhaps, the most important dimension in the adaptation of control systems in the transition to sustainability.

Conclusions

For those with some concern for business and 'the environment', but who are still imprisoned or perhaps struggling to get out of the mind-set of late industrial capitalism, this chapter's attempt to reconcile 'management control' with the demands of sustainability will seem as some fantasy world might. The orthodox economist's and accountant's attempts to represent the world, largely devoid of its environmental and social stresses, in the abstract terms of profit, growth and 'development' are probably so familiar in their minds that they are plain common sense, taking on the quality of unassailable truths. The problem of how these truths (and the underlying beliefs) that prevail in the business and business school communities may come to be understood, instead, as institutional, cultural and personal barriers to fuller take-up of sustainability will continue to motivate us, as it has motivated us to write this chapter.

We know that social structures depend on our attitude and belief systems. Economic conceptions of human existence are not unassailable beliefs. The stumbling attempts by business to take up sustainability (indicated in this chapter in terms of developments in the new accountings for the environment or sustainability) reflect the possibility that this agenda is potentially potent in its ability to present alternative values and beliefs about economic activities and behaviours. At the same time, environmental and social stresses will continue to manifest themselves. Governments will regulate. Things could change for the better. We cannot know how, but things will certainly change somehow.

In spite of our (and many others') continuing efforts, what is missing is the ability to strip away the rhetoric and appearance of 'business as usual' and to present coherent alternatives to systems driven by the economic self-interest of the relatively few, at a potentially staggering (if not fatal) cost of the many. Whilst a certain flavour of the sustainability agenda is being reflected in new institutional elements, these elements add up only to a blatantly disproportionate response in comparison to the necessary adaptations to systems for 'control for sustainability'. Premature closure on issues of how business will need to change is emotionally comforting, perhaps, but there is still an urgent practical and ethical need to describe and apprehend the world and the place

of our individual and collective enterprise within it, in ways which do not exclude relationships with the reality of the precious natural and cultural systems on which we all rely.

The next logical step is to carve out a business teaching, learning and practice agenda that takes as its starting point some of the principles we have tried to outline in this chapter in our discussion of the appropriate changes to management control systems. In particular, a guiding principle must be that business responds proportionately to the social and environmentally unsustainable trends it is implicated in, breaking out of a propensity towards creeping incrementalism and short-term responses. There needs to be a discourse of the order of challenge which sustainability poses, and of appropriate values for organising in order to meet our needs. And work to must go on to develop more ecologically and socially sophisticated management control systems and approaches, with businesses setting their sights higher than the remedial class for ecological literacy.

Otley's framework has been helpful to us in attempting to set out a range of finer questions about the complexity of the sustainability agenda, and what it means for business. But whilst it might help in framing a useful set of questions to inform an agenda for current and potential organisational leaders, we are not confident that its questions would, outside the context we have been at pains to establish in this chapter, necessarily challenge basic assumptions about what business does, and in whose interests it does it. Rather, this chapter has argued for an ongoing debate within the business and business school communities, linked to the development of a common framework for sustainability.

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