



Sustainability Innovation: Mapping the Territory

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Abstract

Innovation is a well-studied area of business behaviour, and is increasingly seen as a crucial element in the private sector's responses to the challenges of sustainability. However, what exactly is meant by innovation in a sustainability context is not very clear. This paper makes the case for a more reflexive and structured approach to understanding innovation for sustainability in order to understand what it shares in common with innovation more broadly, where it is unique, what the gaps are in our current knowledge, and what might be the consequence of these gaps. In building this understanding, we draw on theoretical and empirical studies, normative and non-normative approaches, and descriptive and instrumental analyses. We employ a framework that distinguishes between the enablers of sustainability innovation (SI), the different types of agent that influence innovation for sustainability and the intra-organisational processes that take place (especially within companies).

Introduction

Increasingly, business is referred to as an essential element in meeting the challenges of sustainability: not only to amend its behaviour so as to reduce negative impacts, but also to use its strengths to overcome barriers more effectively than other sectors of society are able to do. Innovation is one such area of perceived business strength, and now business and government are encouraged to think in terms of sustainability innovation to meet such demands as green technology, energy efficiency and social enterprise. It is often claimed that the challenges of sustainability require different approaches to (and perhaps new models of) business. Yet there has been little rigorous analysis of if and how sustainability requires new ways of thinking about innovation. The main purpose of this paper is to examine what we know about sustainability as the determinant of a genuinely different form of innovation, and to set out a framework for a more reflexive and structured approach to sustainability innovation in future.

To understand if sustainability innovation (SI) differs from other models of innovation, let us first consider what innovation means. When discussing whether innovation (in its broad sense) is qualitatively different from innovation applied for sustainability, it is important to have a clear sense of the boundary of the terms being used. One of the



broadest definitions of innovation states that it is “... the successful exploitation of new ideas” (DTI 2003). Unsurprisingly, exploitation in this context has become synonymous with introduction to market and so this definition is one that presupposes a market-based assessment for the outcomes of the innovation process. The bias in most discussions of innovation towards a commercial, for-profit setting with a market mechanism for price signalling and managing distribution should be acknowledged. Equally, this may be where innovation for sustainability distinguishes itself from innovation more broadly.

In terms of market led or company-based innovation there has been an acknowledged shift in recent years towards more dynamic and networked models of innovation (Chesbrough 2003) away from old linear models. This is well described by Rothwell in his five generations of innovation models (Rothwell quoted in Tidd, Bessant et al. 2001).

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None of the models of innovation, either descriptive or analytical, presuppose the set of goals which the process is trying to achieve. In that sense, there is no immediate difference between SI and innovation in its broadest sense. However, it is the context for sustainability that implies biases towards different types of innovation.

The term ‘sustainability innovation’ can be interpreted in a number of ways. The primary usage here is in terms of innovation explicitly directed at a sustainability goal – for example generating electricity with lower emissions than current power stations produce. The next usage is for innovation processes which do not have sustainability issues as their primary target (e.g. the innovation process for a FMCG company producing new consumer products) but which try to adhere to sustainability targets during their development, production and use. The final usage, which is not the focus for this paper, is innovation processes which are sustainable within the company. This usage is not linked to environmental or social goals: it is merely a statement that the company has an innovation renewal process which keeps their innovation engine running profitably.

--- Figure 1 about here ---

The areas shown in Figure 1 highlight the difference between projects which are explicitly targeting sustainability outcomes and those which do not but which adhere to sustainability principles in their execution. As indicated above, in most discussions of innovation there is an assumption that there is a market which is in essence deciding whether an innovation is successful or not – did it achieve profitability and widespread use? A potential issue for SI is therefore whether markets exist for those products and services which have explicit sustainability targets. A lack of demand in this category may imply the creation of demand through public intervention, if we believe that the environmental and social goals, if met, outweigh the costs of such intervention. For example, if regulation of industrial emissions were increased, as is beginning to occur for greenhouse gases as a government response to tackling climate change, a market for sustainability is effectively created or stimulated.



When discussing innovation there is invariably a moment when we need to try to be more specific about what is a change and what is an innovation. It is not possible to be proscriptive in this sense, as much innovation is seen as such after the fact, i.e. once it has been successful. However, there is broad agreement, if not clear definition, on the difference between incremental and radical or discontinuous change (Dahlin and Behrens 2005). This is important as we may need to manage the process of day-to-day change in a different manner to the kind of change that sweeps aside the existing rules of the game. For sustainability, it is the difference between the aggregation of multiple small changes to achieve a specific goal (for example, year on year improvements in car emissions) compared to a dramatic shift that reaches sustainability goals in a more direct fashion (such as being able to introduce a hydrogen infrastructure to make hydrogen fuelled vehicles a reality). A question surrounding SI is whether there is a bias towards one kind of change – can incremental change at a defined pace meet social and environmental goals in an acceptable timeframe?

Finally, while a company-based perspective will provide one answer there is a need to consider national and international perspectives. The concept of a national system of innovation, which emerged in the 1980s (Freeman 1987), is still much in use. However, there is an emerging literature on the internationalisation of innovation systems (for an overview see Carlsson 2006). While acknowledging national level analysis is still important, for example to understand country advantages in attracting R&D, these studies indicate an internationalisation of innovative activities and a lack of clear understanding of the degree to which supporting institutions and systems have become truly international. This is important when considering sustainability as many of the issues are international and require a degree of coordination to achieve specific ends. If internationalised innovation systems are appearing it may be possible to take advantage of them for sustainability ends.

Sustainability Innovation

Whereas in previous decades, the reported focus of innovation has been mostly on global information, restructuring, and digital technology, currently there is a growing interest products and services offering new features and functionality to meet emerging needs around sustainability (Kanter 2006). This applies as much to corporate giants such as General Electric (whose ecomagination initiative addresses health care, water, and sustainable energy needs) and IBM (which seeks to tackle social problems through its technology solutions), as to small-medium sized enterprises such as ABT Insulpanel and Harvest Wind.

This latest wave of innovation is often framed in terms of entrepreneurial solutions to societal challenges. Among these is the challenge of sustainability, and in particular the application of private enterprise solutions to allow the current generation of humans to meet its needs without compromising the ability of future generations to meet theirs (WCED 1987). Moreover, it is not simply meeting the needs of a few; rather, sustainability innovation in its various forms comprises value propositions that target neglected, disadvantaged or otherwise suffering segments of society (Obsberg in SustainAbility 2007).



As with any new wave of innovation, enthusiasm spills over into the literature describing SI's unique features and the superior contributions it makes compared to its forebears. Whether the entry point is clean technology, environmental entrepreneurship, cradle-to-grave thinking, fairtrade, the Bottom of the Pyramid, or social entrepreneurship, the strands of sustainability innovation share a belief not only in the value of the predicted outcomes, but in the originality of their approach to innovation. It is likely that many of the SI solutions, especially technologies, are still in the early stages of the Gartner (2007) Hype Cycles, i.e. at the "technology trigger", "peak of inflated expectations" and "trough of disillusionment" stages, rather than the "slope of enlightenment" or "plateau of productivity".

Explaining what that originality consists of, however, is not immediately obvious. At one level, the models have not been subject to rigorous analysis so that the evidence of the actual outcomes either in business terms or the sustainability benefits is mostly anecdotal and unsystematic (Blowfield 2007). But in the context of this paper, more important is the evidence that SI represents a new way of looking at innovation and entrepreneurship, distinct from previous waves.

This is significant because as the Davos 2007 edition of *Business Week* declared, the world where socially responsible and eco-friendly practices boost the financial bottom-line is closer than people might think. Yet, if the only difference between 'conventional' models of innovation and SI is the goods and services produced, at best SI may not justify the cheerleading emanating from the likes of the Skoll Foundation, Ashoka, and Fast Company, and at worst it may prove damaging, encouraging the unsubstantiated belief that private sector interventions are an efficient (perhaps even morally preferable) way of tackling sustainability challenges.

Already Kanter (2006) has stressed the importance of remembering the lessons from previous waves of innovation with regards to strategy, structure, process, and skills. Her observations on innovation within major companies also highlight that there is a difference between companies that are looking to SI to enrich existing businesses and those (typically smaller) companies for which SI is about new ventures leading into new realms.

Another distinction is that between the company as entrepreneur and the individual. Reflecting a well-established bias in popular business media, there is a marked tendency to talk of individual social and environmental entrepreneurs to the exclusion of organisational and other managerial factors that conventional innovation theory demonstrates as essential to success. A good example of this is the repeated mentions of social entrepreneur Muhammed Yunus as winner of the 2006 Nobel Peace Prize in SustainAbility's (2007) overview of social entrepreneurship, and the failure to mention that the Grameen Bank, an organisation he helped found, was co-winner of that award.

These are just some examples that point to the need for a more reflexive and structured approach to understanding SI in order to understand what it shares in common with innovation more broadly, where it is unique, what the gaps are in our current knowledge, and what might be the consequence of these gaps. In building this understanding, we



draw on theoretical and empirical studies, normative and non-normative approaches, and descriptive and instrumental analyses. We employ a framework (Figure 2) that distinguishes between the enablers of SI, the different types of agent that influence SI and the intra-organisational processes that take place (especially within companies).

--- Figure 2 about here ---

Enablers of sustainability innovation

Government

Like any area of innovation, SI is reliant on a favourable enabling environment. In the broadest sense, SI has emerged amidst a policy environment that has generally looked kindly on the idea of private sector solutions to societal issues (Shaw 1999; Jenkins 2001). This can be interpreted in terms of a policy vacuum, the emergence of national and regional regulatory frameworks, and the shifting nature of non-mandatory commitments on the part of corporations. For example, in relation to international policy, it has been widely observed that more importance has been attached to the regulation of trade – notably through commitment to the World Trade Organization – than to regulating the global commons or international human rights (Waters 2001; Narlikar 2005). At the same time, in some areas there has been a toughening of regulations such as the EU's Waste Electrical and Electronic Equipment (WEEE) Directive dealing with end-of-life issues for electronic products, and its Pollution Prevention and Control Directive which raises the bar on controlling industrial pollution.

The tenor of government debates may also spur interest in SI, as with the interest being generated around the British government's Business Taskforce on Sustainable Consumption and Production (CPI 2007). Equally, issues such as environmental management, the business-society relationship, and other dimensions of business behaviour relevant to SI have found their ways into company policies. For example, General Electric not only mentioned sustainable development as an area of future growth, it made this the focal point of its 'ecomagination' strategy which spells out hard targets for investment and returns (Blowfield and Googins 2007), while companies such as Marks & Spencer that are making sustainability central to their business strategies are publishing policies that invite public scrutiny and accountability.

An element of such policies can be a commitment to the various voluntary standards, agreements and codes of practice that since the 1980s have become an increasingly important approach to governance (Jenkins, Pearson et al. 2002; Liepziger 2003). For example, the Equator Principles set out social and environmental specifications for private investment in development projects worldwide, while the United Nations' Principles for Responsible Investing is one of several initiatives aiming to persuade investors to think of matters other than the bottom line when placing their money.

However, the fact that there is a broadly supportive regulatory and policy environment does not by itself tell us about how this is actually affecting SI. The models of innovation systems of the kind developed by Rothwell (Tidd, Bessant et al. 2001) have not been



tested or revisited in the context of SI, and in contrast with the relationship between policy and innovation in general (e.g. Porter 1990), any causal link between policy or specific legislation and SI has yet to be identified. Equally, what types of public sector policy or regulation are most necessary and beneficial have yet to be determined.

The rich debate around the 'Porter hypothesis' about the relationship between regulation and innovation in general has not been linked to SI, and there is good reason to suppose that what is currently portrayed as a favourable enabling environment may not be the optimal environment SI requires. For example, although OECD governments have been committed for decades to ensuring the prices people pay for products and services reflect the full social and environmental costs, and European governments at the national and EU level are committed to sustainable consumption and production through the 2000 Lisbon Agenda, they have been weak and inconsistent in giving consumers the information to make rational sustainability-based decisions for fear this would normally lead to higher prices (CPI and PwC 2007). This means that the conditions that might be most beneficial to SI (i.e. a level playing field where all competitors internalise their costs equally) have not been created.

Finance

The relationship between finance and innovation is particularly important in this regard. One of the common lessons of innovation in general is that the entrepreneur needs access to affordable capital, and should certainly not be 'punished' for being innovative. Yet, in addition to the normal hurdles SMEs face in accessing capital, SI companies and others adopting a market-based approach to addressing social and environmental needs would seem to face an additional difficulty in that they tend to speak in terms of long-term benefits and returns (Hammond, Kramer et al. 2007). This is an area of growing interest, and one where academic enquiry is perhaps being outpaced by actual developments in the business world.

Although there is a growing literature on Socially Responsible Investment (e.g. Hudson 2006), this may not be a significant source of SI capital because SRI treats innovation as only one of a bundle of criteria used in assessing companies, and while sustainability issues are accepted as value-adding drivers, innovation is a very small piece of that (typically with an exclusive interest in environmental not social innovation) (e.g. Hartmann and Goodall 2006; Kiernan 2006). Financial firms such as Henderson Global Investors have broadened the term SRI to mean 'sustainable and responsible investment', and focus on what they consider the technologies of the future. Along with the emergence of sustainable development-related indices such as FTSE4Good and the Dow Jones Sustainability Indices from within the conventional investment world, these are examples of how sustainable development is starting to be integrated into mainstream analysis.

Green venture capital is well-established, especially in the US where the amount invested in green technology companies rose thirty-five percent in 2005 to a total of US\$1.6bn in 2007 (Randjelovic, O'Rourke et al. 2003; O'Rourke 2005). Proven venture firms like Kleiner Perkins Caufield & Byers, which funded Google and Amazon and has created a



US\$100m fund for green technology companies, are investing heavily in clean and green innovators. Attracted by trends such as rapid growth in renewable energy and green building materials, roughly ten percent of North American venture capital now goes into green technologies, while more than £660m has been invested in European clean technology since 2001. Over 50 AIM-listed companies are focused on renewable energy, and biofuel companies alone have raised £300m (Blowfield and Murray 2008 forthcoming). Additionally, corporate venture capital (i.e. from within the company) offers a way for mainstream companies to invest in innovation, as has happened to some degree with energy companies (Moore and Wuestenhagen 2004).

New markets have been created addressing particular SI-related issues, notably carbon trading which is worth more than £12bn in Europe, and in which blue chip investment houses such as Goldman Sachs and Morgan Stanley have become major investors. But alternative sources of capital have also enabled SI, as with the fairtrade movement's success in raising capital from faith-based organisations and development/relief charities (Nicholls and Opal 2005). In addition, public funding should not be ignored as a source of capital, especially in relation to some of the basic research SI requires (Holliday, Schmidheiny et al. 2002). Philanthropy is also playing a part in the resourcing of SI: while foundations such as Ashoka, Skoll and Schwab have launched initiatives to support build the profile of social entrepreneurship, new models of philanthropy such as that pioneered by Google could be used to fund innovation directly.

Overall, however, the investment community is ill-equipped to judge the significance of SI. In part, this is because of its focus on assessing financial data and management quality, and the money saved through, for instance, eco-efficiency, though large, may not be enough to attract analysts' attention. It is also because the value capital markets place on short-term returns acts as a disincentive to consider the kind of long-term value associated with SI (Blowfield and Murray 2008 forthcoming).

Technology

Finally, we should not forget technology itself as an enabler. Any type of commercial innovation consists of both the end product and the institutional processes that go toward that product. In some cases, the end product may be a new technology such as One Laptop Per Child's \$200 computer, but in others technology may be part of the enabling environment. For example, Vodafone has made existing telephone technology available to poor communities in Africa, and Citibank is making its ATMs available in Indian slums. In the case of eco-efficiency, although there have been technological innovations, much of the success is attributed to rethinking how current technologies can be used more efficiently. Indeed, in some industries such as chemicals there are examples of 'small step' efficiencies leading to companies building the confidence to invest in new technologies such as water-based solvents ((Holliday, Schmidheiny et al. 2002).

In most of the literature, whether technology is an outcome or part of the SI process is not considered pertinent, even though conventional innovation literature highlights the hazards of misunderstanding the nature of the innovation process (Kanter 2006). Yet this distinction would seem especially important given what we said earlier that SI was part of



a wave of innovation concentrated on new features and functionality rather than new technologies (cf. the wave of digital innovation).

Culture

Culture deserves to be flagged as an influence on SI in two ways. First, as mentioned earlier, innovation exhibits different characteristics depending on the size of the firm, and although entrepreneurship is often considered synonymous with start-ups and SMEs, we should not ignore innovation from large firms, or fail to understand the conditions under which different sizes and cultures of companies become advantageous (Ahmed and McQuaid 2005). For instance, it may be part of the culture of large public firms to be unsympathetic to innovation where the rewards may not be immediately apparent, and they either have to adjust their culture to accommodate entrepreneurial activity (Kanter 2006), or they may do better to position themselves as investors in innovation by others (Seelos and Mair 2005). Equally, as empirical and theoretical studies of NGOs of the kind now associated with social enterprise have shown, the change of culture exhibited when they transform and grow (e.g. from being the vessel of a single person's vision to becoming large, complex organisations in their own right) is a critical management challenge that determines the organisation's ultimate success (Korten 1990; Edwards and Hulme 1995).

The second meaning of culture relevant to SI is the prevailing socio-cultural environment within which the enterprise operates. Innovation in general is most widely studied in a Western cultural context, which tends to overlook its immense significance in other cultures where, for example, it may be driven more by necessity than the desire to innovate for its own sake (Ahmed and McQuaid 2005). However, despite the importance being attached to SI in and for the benefit of developing economies, culture as an influence on SI is hardly discussed.

Even the fairtrade movement, which to a significant extent depends on its success in fostering innovation and entrepreneurship in poor communities, has not generated any significant enquiry into the cultural dimensions of entrepreneurship, and for the most part takes for granted the universal applicability of Western organisational models such as cooperatives: this despite the mixed record of such organisations in developing countries in the post-colonial era (NRET 1999). Moreover, a criticism that has started to be levelled at the Bottom of the Pyramid (BOP) model (Prahalad 2004) is that it views the poor as an untapped consumer market, and ignores the consequences of external investment (e.g. by Western foundations and multinational companies) on indigenous entrepreneurs (Blowfield and Frynas 2005).

Agents of sustainability innovation

Companies and individuals

Research on innovation typically treats entrepreneurship as a phenomenon where individual initiative influences system-wide activity and outcomes (Kilby 1971; Stevenson and Jarillo 1990). However, the literature is largely divided between that



which focuses on a system-level approach concerned with the functioning of the economic system, and that devoted to the individual and why some are more likely than others to pursue entrepreneurial opportunities (McMullen and Shepherd 2006). Thus, the system-level approach regards the specific entrepreneur as inconsequential, while the individual approach puts the character of the entrepreneur at centre stage, reflecting a wider school of thought in management theory that company behaviour should be traced back to the preferences, power and strategies of individual managers (Prakash 2001). Furthermore, although the conceptual overlap between the two approaches implies they are complementary, attempts to blend them have tended to produce inconclusive or misleading findings (*ibid.*).

The same distinction between system and individual is evident in SI literature, although there is a marked preference for focusing on the person rather than the organisation, particularly in the area of social entrepreneurship. Research is divided between that focused on the role of the individual, often referred to as a social or environmental champion (Walley and Stubbs 1999; Andersson and Bateman 2000), and the organisational mechanisms and culture (Gladwin, Kennelly et al. 1995; Werther and Chandler 2006). There is some overlap between systems and individual orientations, but only a limited examination of their interrelationship (Post and Altman 1994; Hockerts 2003; Hemingway and Maclagan 2004).

Social entrepreneurs exhibit many of the characteristics of other entrepreneurs (Anderson and Dees 2002), but in addition to risk-tolerance, innovativeness, proactiveness and refusal to accept resource constraints (Low 2001), social entrepreneurs recognise opportunities for delivering superior value (Mort, Weerawardena et al. 2003), and have a coherent unity of purpose and action in the face of complexity (Waddock and Post 1991), reflected in a sense of accountability for outcomes to the multiple constituencies served by the enterprise. Indeed, borrowing heavily from stakeholder theory, social entrepreneurship (and by extension SI) theory treats these constituencies as the equivalent of market discipline for social entrepreneurs (Dees 1998).

Following the above reasoning, some argue that SI is an effect of special personal traits reflecting a determination to achieve social change (Drayton 2002), in contrast with the strand of mainstream innovation theory that argues entrepreneurship can be taught (cf. Drucker). There have been various attempts to understand the qualities of the SI entrepreneur (Schaper and Schaper 2005), but there is a lack of empirical data to say whether a shortage of these traits stands in the way of achieving scale (Seelos and Mair 2005). Furthermore, although mission-related impact can be a more important driver than wealth creation (Dees 1998), and some theorists reject profit-motivation as genuine social entrepreneurship (Leadbeater 1997), there is evidence that this attitude changes as markets/industries mature and attract entrepreneurs who see SI primarily as a business opportunity.

It may also be misleading to give primacy to the role of the individual: SI may be better understood as the result of teamwork (Nicholls and Opal 2005; Peredo and McLean undated). Equally, entrepreneurial success often depends on external dynamic factors such as availability of venture capital, accessibility to customers and proximity of



universities (Bruno & Tybee 1982 in Ahmed and McQuaid 2005). Indeed, there is a marked difference between the literature on social entrepreneurship generally, which emphasises the role of the individual, and that on the specific area known as fairtrade, which emphasises the socio-political context and the functioning of not just the organisation but the overall trading system.

Non-business agents

Innovation theory recognises that innovation is significantly affected by agents external to the business, as we have already discussed to some extent in the earlier section on SI enabling environments. Financiers and government act, for example, act as agents of SI in different ways, providing access to capital, tax incentives and other forms of subsidy, and otherwise making SI a viable business proposition. There are several notable examples of such agents, separately or in partnership with companies, acting to encourage SI. For instance, the Forest Stewardship Council and the Marine Stewardship Council form the backbone of what in effect are shadow markets that apply pressure along the supply chain to only buy responsibly managed natural resources; hence, these have spurred innovative new systems related to sustainability where no previous mechanisms of product traceability existed (Thorner 1999; Cummins 2004). The EU's support of carbon trading has similarly encouraged SI, and the role US states are playing in combating climate change is part of a tradition of local government helping to encourage SI ahead of national or regional government.

However, a proper understanding of the role played by external agents requires a more precise interpretation of what we mean by the SI enterprise, as different agents have helped foster different types of SI. For example, as noted earlier, faith-based organisations played an important role in building up the fairtrade movement, while organic agriculture (which has become a large sector in its own right) has its origins in the soil conservation movement.

The term social enterprise is now being used to refer to several quite different models of entrepreneurship, including: a) the application of sound business practice to NGO management (Dees, Emerson et al. 2002; Pomerantz 2003); b) an entrepreneurial approach to delivering societal benefits without necessarily any commercial/business-like exchange (Anderson and Dees 2002); c) the use of earned income strategies for achieving societal benefits (the double bottom line); d) complementary entrepreneurship where enterprise uses income from commercial activities to invest in social or environmental projects (Fowler 2000); e) partnership between NGOs and for-profits (Pomerantz 2003); and f) cause-branding linking commercial activities to societal issues (e.g. Avon and breast cancer).

There is, therefore, a continuum of definitions of social (and environmental) enterprise, from the requirement that social and environmental benefits be the only goal, to a stipulation that such benefits be amongst the goals (Peredo and McLean undated). Indeed, social/environmental entrepreneurship may be becoming too broad to be meaningful, and, for instance, might be simplified to new models of innovation that serve explicit sustainable development goals (Seelos and Mair 2005). But whatever definition



is used, this will have consequences for what we mean by a relevant external agent: yet this interrelationship has not been studied in the SI context.

Processes of sustainability innovation

Individual actions

What happens within a company that assists or hinders innovation as a whole has been well studied, and there is a general sense (more *a priori* than empirical) that SI champions within a company share common characteristics with other types of champion/'intrapreneur'. Environmental champions, for instance, convince and enable their company's members to turn issues into successful corporate programmes and innovations (Fineman and Clarke 1996; Andersson and Bateman 2000). As well as personal commitment to change, they are affected by factors such as ability, extrinsic motivation (e.g. pay, promotion), intrinsic motivation (e.g. pride, accomplishment), efficacy and desirability (Hostager, Neil et al. 1998).

SI 'initiators' can come from almost any part of a company, but key ingredients are moral imagination (Arnold and Hartman 2003) and sincerity (Fineman and Clarke 1996). There are examples of middle management (Drumwright 1994) as well as CEOs and Boards (George 2003; Catell, Moore et al. 2004) acting as the initiators, and although middle managers are sometimes portrayed as being obstacles to innovation (Olsen 2004), there are also examples of them having the passion to spark new initiatives (Sutcliffe 2005). In general, however, there has been little research done on the process of championing, i.e. how the individual acts as catalyst (Andersson and Bateman 2000), although work to date suggests that individual actions and concerns are only one contextual condition for change along with, for instance, issue salience and field cohesion (Bansal and Roth 2000).

Regardless of how the SI process is initiated, there is a critical role for senior management to give it legitimacy so that it gets valued across the company. This includes the creation of relevant systems to develop policies, processes, indicators and targets (BSR 2002), although it is worth noting that there tends to be more information on the purpose of such systems than on what they look like and how they have evolved in practice. What empirical information exists (primarily from the world of corporate responsibility) suggests that senior management buy-in should not be won at the expense of engaging others in the company and winning their commitment (CCC 2005).

However, as with other types of innovation, over-emphasis on leadership and structure can lead companies to ignore that SI is not something best induced through 'command and control', and that sustainability in particular may be better seen as part of a web of dynamic relations (Olsen 2004; CCC 2005). At the same time, the champion cannot remain a lone fighter for long, and the involvement of others in the company is essential to sustained change (Fineman and Clarke 1996). Indeed, a feature of SI may be the tension that arises as the impassioned champion (often acting from a personal belief) over time (and as a mark of his/her success) comes into conflict with formal environmental or



other SI-related management roles and the need for and value of informal champions diminishes (Walley and Stubbs 1999).

Management systems

Structures for managing SI vary significantly from company to company. Much of the research that has been done in this area has been done in the context of corporate responsibility where there is a fair degree of experimentation but no real consensus on best practice (Melcrum 2005). The 'right' structure depends on the company, its industry and its internal culture (Sutcliffe 2005). Equally, the right size in terms of human and financial resources varies from company to company, often irrespective of industry (Olsen 2004).

It is widely held that sustainability should be part of an integrated strategy that makes it part of the 'corporate DNA' (PwC 2006), but achieving this has long been acknowledged as a problem (Andrews 1973). Although according to some surveys 95% of companies think sustainability-related innovation (defined as the creation of new market space, products/services, and processes driven by sustainability issues) promises new business value, there is often a disjunct between process design innovation and integrating sustainability into strategy. In contrast with other dimensions of the business that are aligned and integrated (e.g. R&D, quality management), sustainability is often tackled through specific, isolated programmes (Olsen 2004; Werther and Chandler 2006). There is a body of received wisdom about what companies should do to integrate SI issues (e.g. make the business case, get senior-level buy-in, work with stakeholders) (BSR 2002), but closer examination of individual companies' experiences suggests these should be treated as 'half-truths' (CCC 2005). Mirroring lessons from innovation more widely, success is more commonly achieved by identifying and executing one or two opportunities rather than by pushing too hard, too soon (ADL and WBCSD 2005).

Likewise, it needs to be acknowledged that at present corporate cultures, while successful in generating debate around certain aspects of SI such as eco-efficiency, for the most part engage only superficially with sustainable development. There is ample evidence of this (Hammond, Kramer et al. 2007; SustainAbility 2007), and the solution is typically described in terms of technical instrumental shifts such as embedding sustainability into corporate strategies. Yet there is little empirical evidence that this is happening in large companies with a commitment to social and environmental responsibility (Blowfield and Murray 2008 forthcoming), or in organisations built around notions of SI where key issues such as how a SME conforms to contemporary norms of business efficiency while remaining true to its SI vision are not well documented. Indeed, it may be that the tension between this vision and aspects of conventional management practice cannot be resolved with reference to technical instrumental solutions (Collinson and Leon 2000; Nelson and Galvez 2000), and that what is required is an alternative discourse of business and SI framed in critical theory (Springett 2003).

Tailored approaches



Specific approaches to SI have been demonstrated to require particular processes. For instance, a focus on underserved markets requires a company to have multi-faceted relationships with those markets, seeing them as consumer, supplier, neighbour and human resource. This relationship, therefore, has implications for all levels and disciplines of the business (e.g. sales & marketing, HR, purchasing, product & process innovation) (Weiser, Kahane et al. 2006). Moreover, because SI can be accompanied by ethical, environmental and social controversy, it tends to engender debate, and thus needs to be carried out with as much transparency as possible, both within and between firms (Holliday, Schmidheiny et al. 2002).

However, any similarities in this regard should not cause us to overlook lessons about the way SI requires a different approach to doing business, and therefore a change from established corporate cultures (e.g. the use of non-traditional sources of market information, the business model, incentives, partnerships/alliances, willingness to improve the enabling environment) (Weiser, Kahane et al. 2006). To realise this, companies need to overcome internal and external prejudices and suppositions, especially ones about social enterprise markets (e.g. that poor communities are underserved due to high crime, high rents/insurance, access/transportation) (BSR 2002; ICSC and BSR 2002; Weiser, Kahane et al. 2006).

Although any lessons at this stage need to be treated as tentative – not least because they have largely been drawn from case studies from particular areas of SI, notably environmental entrepreneurship – it seems that successful SI combines established business change management with unique process steps such as sustainability intention, envisioning, implementation, and investment realisation (Langeland 2005; Townsend 2006). Competitive SI strategies appear to follow the rules of Porter's competitive advantage, concentrating on cost leadership or market differentiation, but rarely succeeding if they attempt to tackle both. The basic requirements for SI success are financial performance competitiveness, technological competitiveness, investor commitment, and a credible business image in sustainability terms (Schaltegger, Burritt et al. 2003).

While there is understandable excitement about new, attention-grabbing ideas, the reality is that SI can be either transformative or incremental. Alongside dedicated SI organisations such as One World Health and EcoCities, there are companies where incremental changes in work practices (e.g. teamwork, continual learning) have led to ecological SI (Starik, Sharma et al. 2005), and some describe SI as part of an evolutionary path that organisations undergo (Zadek 2004).

Conclusion

Several conclusions can be drawn from this mapping of the territory on SI. First, there is surprisingly little evidence to suggest that well established theories of innovation have been applied to any great extent within the literature on SI. Second, most SI seems to be innovation processes specifically targeting sustainability issues, rather than embedding sustainability principles in core innovation processes (with reference to Figure 1). Third, key enablers of SI are government, finance, technology and culture, although the extent



to which these are being successfully and deliberately applied varies greatly. Fourth, most discussion of SI agency focuses on individuals – social and environmental champions or entrepreneurs – with far less attention paid to the equally important roles of companies and non-business agents. Finally, recommended SI processes tend to be a mixture of individual action, management systems and tailored approaches, although much of the received wisdom about these remains anecdotal and unsubstantiated.



Tables and Figures

Table 1 – Rothwell’s five generations of innovation models

Generation	Key features
First/second	Simple linear models – need pull, technology push
Third	Coupling model, recognising interaction between different elements and feedback loops between them
Fourth	Parallel model, integration within the firm, upstream with key suppliers and downstream with demanding and active customers, emphasis on linkages and alliances
Fifth	Systems integration and extensive networking, flexible and customised response, continuous innovation

(from Tidd, Bessant et al. 2001).

Figure 1 – Exploring the usage of the term sustainable innovation


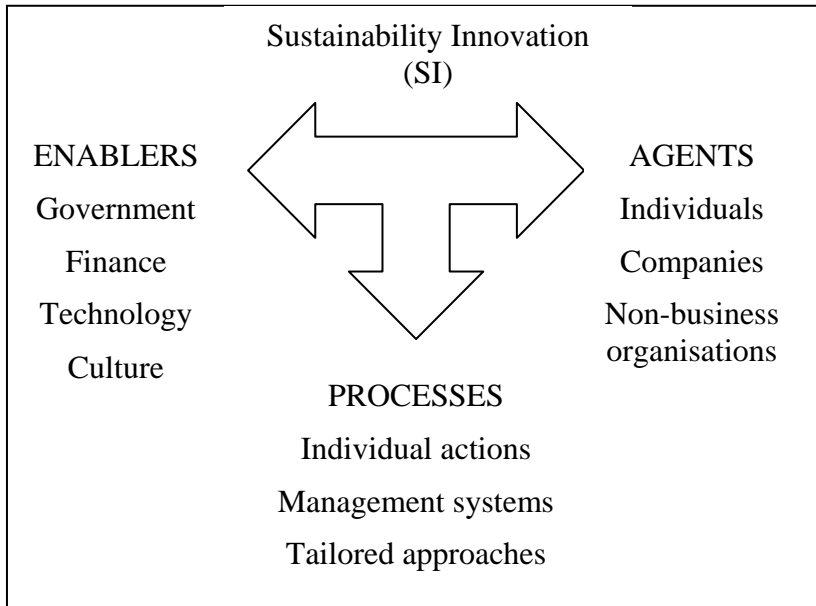
Innovation process with explicit target of sustainability issue? 	Innovation process adheres to sustainability principles?	
	NO	YES
NO	<i>Area of least interest I.e. want to avoid companies from here</i>	<i>Area of most interest I.e. making standard innovation sustainable</i>
YES	<i>Useful companies would exist here?</i>	<i>Of interest to see if the innovation models here are different to standard models</i>



Figure 2 - Sustainability Innovation Territory Map





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