Leadership for Sustainability in the Business and Biodiversity Sector: Understanding the Science-Policy-Stakeholder Interface

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Paper Prepared for Presentation at the Second International Conference on Responsible Leadership, Spier Wine Estate, Stellenbosch, South Africa, 19 - 20 November 2012

Abstract

Challenges and opportunities evident in the landscape in which biodiversity conservation and corporate sustainability interface have gained topical currency in recent years. Greater pressure on biodiversity and the risk this poses to business and society at large present a new set of leadership challenges for both private and public institutions. The complexity of challenges faced in this landscape makes mainstream business solutions to biodiversity conservation no longer adequate. Corporations and other users are not only dependent on biodiversity and the goods and services deriving therefrom, but they also often have serious impact on them. It is hard to think of any major economic activity that does not benefit from biodiversity-related ecosystem goods and services or, in some way, alter the ecosystems around it. This paper explores the business and biodiversity leadership landscape with a view to critically assessing some of the challenges and opportunities that it presents for sustainable futures. Expectations of intensified interactions among actors in the business and biodiversity conservation landscape are analysed through a lens that positions biodiversity conservation as an organized social ecology project. Within this view, the social dynamics of conservation emerge as coordinated visioning, agreement and action among a variety of actors that take shape within a relatively uncertain environment. Against the backdrop of contemporary 'irresponsible' human behaviour which is dominated by business-as-usual market paradigmatic forces, more responsible leadership is required to bring about the change that we seek. Efforts by various actors to address challenges in this landscape have often proceeded largely independent of one another and yet there is a lot of benefits to be gained from collective energies and shared knowledge. Thus, the paper argues that leadership for business and biodiversity sustainability requires a change in the mindset of the private sector and other key players. It requires collective and self-responsibility, innovation, and a willingness to do 'business-unusual'. Building commitment to self-regulation, biodiversity stewardship and investments in 'clean' technologies, fostering on-going multi-stakeholder engagement and partnerships to develop optimum solutions that directly address the interface, and enhancing collective responsibility for change, are some of the cornerstones of the new approach.

Key words: *biodiversity; corporate sustainability; stewardship; collective leadership; partnerships*

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1. Introduction

Most of the prevailing projections of the earth's *biodiversity* profile and natural resource-use patterns in the coming decades paint a disturbing picture of increasing ecosystem degradation and significantly reduced biodiversity.[1] This degradation is faster and escalating in Africa as various countries and companies expand and intensify their economic production activities. Therefore, degradation of biodiversity and the broader basket of the earth's natural resources is going to remain a serious challenge in development policy and practice for several decades. At the heart of this challenge, is the realization that to be sustainable, businesses rely on well-functioning ecosystems and biodiversity but in the process of conducting their activities and operations, they invariably degrade ecosystems and biodiversity. In essence, economic growth and limitations in integrating environmental concerns into development planning have put increasing pressure on biodiversity across Africa and other parts of the world. Among others, resource degradation mainly occurs in the form of deforestation, desertification, habitat loss, coral reef degradation, declining fish stocks, spread of invasive species and loss of pollinators. Therefore, threats to biodiversity are often posed not by a completely new, poorly understood technology or process, but by the expansion or intensification of well-understood activities such as harvesting of wild species, clearing forests, mining, or over-exploitation of fish stocks. To this end, threats often derive from multiple rather than singular sources, with different courses of action raising potential risks and alternatives.

Emerging paradigms and analytical frameworks in this complex landscape increasingly point towards responsible leadership in the corporate sector and collective action at local and national levels as critical ingredients for addressing the challenges evident in the interface between business and biodiversity sustainability. But a dimension that is not sufficiently emphasized in most of the discourses is the importance of enabling better interface between science, policy, and key stakeholders to enhance environmental responsibility and collective leadership. Indeed, understanding regarding collective leadership imperatives that help in enhancing sustainability in the business and biodiversity landscape is still in its infancy and the quest for new knowledge in this domain remains paramount. Among the multiple causes of this situation is the limited collective learning that

[1] *Most definitions of biodiversity usually relate it to the complex array of living organisms that one finds on land and aquatic ecosystems, together with the processes that sustain them (see Convention on Biological Diversity, 1993; Millennium Ecosystems Assessment, 2005).*

occurs between researchers, development practitioners, policy-makers and the private sector.

In trying to address these shortcomings, one begins to engage with three analytical constructs that are very important for understanding leadership in the context of business and biodiversity sustainability. First is the recognition that biodiversity conservation and sustainability can no-longer be easily attained in a context where responsible leadership is conceptualized as the result of individualized intentions and actions. It is increasingly conceptualized as coordinated visioning and action among different players that take shape within the confines of specifically defined objectives and roles for each actor (stakeholders). Second, the practical expression of that coordination exists as organized social groups and networks of key actors in the conservation landscape that emerge out of specific historical contexts. Key aspects of 'organization' in this context imply the promotion of certain ideological perspectives and potential lines of action that are worked out through processes of negotiation and agreement, and ultimately implemented through public policy and specific practices in the business sector. These are by no means exclusive processes limited to governmental private sector players. Other actors from the science sector, civil society and the public are part of the process of identifying, negotiating and implementing relevant solutions.

The third critical dimension of leadership conceptualizations in this landscape relates to the realization that in the world of biodiversity policy and practice – where policy-making and influencing has historically been viewed as a simple linear progression from technical evidence, to policy design, to accurate implementation – the failure of public policy to stop the rapid decline of biodiversity and ecosystems may be interpreted as a problem of limited/ non-existent stakeholder engagement processes as well as limited application of evidence-based policy-making. Thus emerging perspectives on business and biodiversity leadership have to begin to take into account the non-systematic outcomes realized through previous conservation regimes. In the process, weaknesses evident in past and current research and policy efforts become apparent. In this complex landscape, the impacts of research and policy do not occur at the envisaged time nor in ways that are predictable. Additionally, the influence of research and the impact of public policy are not necessarily always in the direction in which they are originally intended.

We can anticipate that millions of dollars will continue to be spent each year on initiatives designed to improve the performance of businesses and other sectors in biodiversity conservation. We can also anticipate that despite this expenditure, the

degradation of ecosystems and biodiversity will remain an intractable problem if appropriate policy and institutional processes are not re-designed to enhance collective leadership and bring together scientists, policy-makers, and end-users of research and innovations. It is critical that useful research and innovations generated in various sectors are disseminated broadly to benefit the private sector. Lessons learnt should influence further research, public policy agendas and business strategic planning. In this paper, we suggest that adoption of such a perspective provides the groundwork for ongoing debate, theorising, and paradigmatic shifts that can help us re-conceptualize research-policy-stakeholder interactions in fresh and practical ways that resonate with emerging realities in the business and biodiversity leadership landscape.

2. Analytical framework

This paper is the result of a qualitative study focusing on the interface of business, biodiversity, science and policy. Through detailed review of the published literature, the paper explores major discourses and perspectives prevailing in the emerging field of business and biodiversity leadership, the role of science and stakeholder engagement in this complex landscape. In so doing, key areas of focus for corporate environmental responsibility, collective leadership and biodiversity stewardship are revealed. Emphasis is placed on the need to generate more knowledge on how to strengthen the science, policy, and end-user interface. A critical assessment of potential pathways into the future enables the generation of alternative policy options, strategies and institutional steps.

The paper adopts an analytical approach informed by an action-oriented framework that fosters socio–ecological sustainability in a rapidly changing planet through greater biodiversity stewardship and collective responsibility. This analytical framework applies a dynamic and actor-centric conceptualization of institutions which emphasises change and collective action rather than the rigidity and independence of social structures. Application of this framework enables us to seek answers about how best to bridge the gap between policy-makers, scientists and the business community. ‘Bridging this gap’ is not a technical issue. It is a political, economic, social and cultural issue that moves us further along the continuum from individualized actions to collective leadership and responsibility.

Closer examination of this analytical framework also reveals the complexity of the subject matter and in the process, raises a wide range of pertinent questions. For example, how would a biodiversity and ecosystem services-informed approach

differ from the business-as-usual and current corporate environmental management processes? What is the added-value of a biodiversity perspective based on collective responsibility relative to existing corporate environmental management practices? What is the role of science in this landscape and how best do we ensure that scientific innovations actually reach the intended end-users and policy-makers? The seminal work by Garforth & Usher (1996) which explores the barriers that have historically limited the impact of science on policy and practice is quite informative in this regard. It helps to shed light on how one can address these barriers and contribute to the broader goal of biodiversity conservation and responsible leadership.[2] The paper reviews the extant literature, contextualizes the relevant issues, and highlights articulated challenges and opportunities in the business and biodiversity conservation leadership landscape. The paper adds to the growing body of knowledge in the business and biodiversity leadership landscape in South Africa and beyond. It is targeted at decision-makers and key players in the business and biodiversity leadership sector who grapple continuously with the challenges evident in this landscape.

In this paper, we examine and profile the changing landscape of business and biodiversity sustainability and the broad implications for leadership paradigms. We further interrogate discourses on the science-policy-stakeholder interface and argue that paying more attention to this interface in theory and practice suggests the possibility of strengthening responsible leadership in the business and biodiversity conservation landscape. From the analysis, stakeholder participation and strategic engagement in research and policy decision-making processes emerge as key ingredients for collective action and positive change in biodiversity use and conservation practices.

3. The changing landscape of business and biodiversity sustainability

Broadly speaking, two threads of literature have contributed to sustainability concepts relevant to the business and biodiversity leadership landscape. One comes from ecology and addresses ecological sustainability as a basis for biodiversity conservation. The other comes from geography and United Nations development efforts and addresses the socio-economic sustainability of human well-being (Turner, 2003; World Commission on Environment and Development, 1987). Following the lead of the Millennium Ecosystem Assessment, some scholars have

[2] Emphasizes results-based management and is concerned with getting value-for-money from research spending or with 'more bang for the buck'. It is also concerned with whether research is actually 'making a difference'.

begun to integrate these approaches to address socio–ecological sustainability, recognizing that people are integral components of socio–ecological systems and that people both affect and respond to ecosystem processes (MA, 2005; Berkes et al., 2002). Efforts that fail to address the synergies and trade-offs between ecological and societal well-being are unlikely to be successful. Local inhabitants, for example, are unlikely to respect rules that establish parks for species conservation (so-called 'fortress conservation' approaches) but that exclude local people and reduce their livelihood opportunities (Liu, et al., 2007). Conversely, development projects that stimulate unintended ecosystem degradation (e.g. illegal logging owing to improved access) are unlikely to produce a sustainable trajectory of human well-being (Folke et al. 2004; MA, 2005).

It is now almost common knowledge that many economic production activities negatively impact while also depending on well-functioning ecosystems and biodiversity. Therefore, the constant decline we currently witness in the world's ecosystems and biodiversity pose significant challenges to the business sector, public policy and society at large. The big challenge is to determine how best to create enduring socio-economic opportunities for a growing population while ensuring societal environmental responsibility and biodiversity sustainability. There is evidence from various parts of the world indicating that all players who degrade biodiversity can reposition themselves to become a very positive force in addressing the challenge through pursuit of new and "smarter" policies, reduction of their environmental footprint, development and deployment of new eco-efficient technologies, and establishment of effective partnerships.

The Millennium Ecosystems Assessment carried out between 2001-2005 established that over the past 50 years, virtually all ecosystems have been rapidly transformed by human actions (and this is worse in developing countries). For example, 25% of mammal species are now threatened by extinction. The assessment also concluded that human activity has caused between 50 and 1000 times more extinctions in the last 100 years than would have happened due to natural processes (MA, 2005). Since 1900, the world has lost about 50% of its wetlands and there is still increasing pressure for the conversion of tropical and sub-tropical wetlands to alternative land-uses (Moser et al., 1996; Wilkinson, 2004). Damage to biodiversity has been estimated to cost the global economy more than US$500 billion per year (UNEP, 2010). It is now generally agreed that a large percentage of ecosystem degradation and biodiversity loss is attributable to anthropogenic factors. The intensive use of ecosystems and biodiversity often produces the greatest short-term advantage, but

excessive and unsustainable use leads to losses in the long-term. In addition, loss of biodiversity makes it more difficult for ecosystems to recover from damage, recovery being slow, costly, and sometimes even impossible (TEEB, 2008).

4. Knowledge regimes and awareness

Human knowledge of the biophysical and socio-economic dimensions of the business and biodiversity nexus is also improving fast. Most of the dominant scholarship in the field fully acknowledges that biodiversity is threatened by human development processes that exploit or simply disturb the natural environment and its resources (see Barna, 2008; WRI, 2008; TEEB, 2009; Rands et al. 2010; WBCSD, 2011). It is also well known that global biodiversity is changing at an unprecedented rate, with the most important drivers of this change being land conversion, climate change, pollution, unsustainable harvesting of natural resources and the introduction of exotic species (Pimm et al., 1995; Sala et al., 2000). The published literature indicates that as biodiversity and ecosystem goods and services decline, business value is destroyed and in the process, worsen the limits to future growth opportunities (see Sala et al., 2000; UNEP, 2010; WBCSD, 2011). Therefore, in both theory and practice, there is growing awareness of the impact and dependency that business operations have on biodiversity and ecosystem services and the business risks that poor management of them can present (TEEB, 2008; Schaltegger & Beständig, 2012).

Environmentalists increasingly frame their analysis of biodiversity loss in terms of the benefits or ecosystem goods and services provided to people and the public policy and practice challenges the loss poses. The McKinsey Global Institute (2011) states that greater pressure on resource systems together with environmental risks present a new set of leadership challenges for both private and public institutions. Loss of biodiversity and ecosystem services will affect the framework conditions within which businesses operate, influencing customer preferences, stockholder expectations, regulatory regimes, governmental policies, employee well-being, and the availability of finance and insurance. Higher operating costs or reduced operating flexibility should be expected due to diminished or degraded resources (such as fresh water) or increased regulation.

4.1 Business and biodiversity leadership

Approaches dominant in the responsible leadership field, particularly corporate social responsibility, seem to have been extrapolated to the business and biodiversity landscape. Now experts usually discuss corporate social responsibility

together with corporate environmental responsibility. Thus the quest for responsible leadership is no longer limited to scandals and subsequent calls for responsible and ethical conduct in the public domain (Brown & Trevino, 2006). It also stems from the changes in and new demands of business contexts (see Maak & Pless, 2006). One such expectation is that businesses and their leaders take active roles in fostering responsible behaviour, within and outside the organization, such as by creating responsible organizational cultures imbedded in the 'triple bottom-line' that takes into account the social, environmental, and economic value dimensions of the business and its resources (Maak, 2007; Waldman & Galvin, 2008).

In these discourses, most of the scholarship underlines the vital contribution of the environmental pillar to a company's bottom-line (profits) and use the environment and biodiversity as entry-points when addressing broader sustainability issues. Indeed, a fundamental paradigmatic shift is now recognizable globally regarding the way biodiversity should be managed by government, communities and the private sector. Being an environmental leader can put you ahead of the game and help differentiate your brand and attract new business. It seems that investors reward those companies with long-term visions rather than short-term gains, and robust environmental risk management practices (Chhabara, 2009). There is growing recognition that all actors and users have a pivotal role to play in the sustainable use and protection of natural resources and biodiversity (Schaltegger & Beständig, 2012).

UNEP (2010) posits that perhaps the most dramatic evolution in business over the past decade is the dawn of the new economy and perspectives informed by the corporate environmental responsibility bandwagon. The way companies conduct their business is now expected to reflect the broad goals and values that underpin the key concepts and practices of corporate environmental responsibility and advance the objectives of sustainable development. This perspective acknowledges the close interrelations between and among business operations, society and the environment, and seeks positive mutual impact. Key actors are now expected to mainstream biodiversity in development planning, public policy, corporate strategy and community-based resource management initiatives (see TEEB, 2010; Schaltegger & Beständig, 2012).

In response to the impending crisis, some businesses are increasingly becoming positive agents of change and the source of innovation, helping to create new

ecosystem-friendly markets and developing more sustainable technologies and business practices (WBCSD, 2010). Bellini (2003) argues that businesses have progressively taken environmental issues into account under the impulsion of three types of arbitrage: legislative or normative, economic and technical. Jamison et al. (2005) states that corporations are beginning to respond to expectations of corporate responsibility by asking what is good for the environment, society and business, as well as how performance can be measured and evaluated. For some companies improving corporate environmental performance is simply "the right thing to do," while for others it is viewed as a strategic business advantage to increase competitiveness. These companies want to know what is expected of them so they can incorporate corporate environmental responsibility into their business strategies and become more competitive.

More corporations are recognizing that there is value and opportunity in a broader sense of responsibility beyond the next quarter's results and that what is good for people and the planet can also be good for the long-term bottom-line and shareholder value (see KPMG, 2012). The statement by the UN Under-Secretary General and UNEP Executive Director, Achim Steiner, resonates very well with developments in the sector:

> " The landscape may appear bleak, but a rising number of companies are making the link between natural assets, their bottom line, business sustainability and the urgent need for a low-carbon, resource-efficient 21st century green economy" (see UNEP, 2010).

Business leaders, as well as the general public, now realize that biodiversity conservation does not necessarily mean excluding large tracts of land from development, or excluding biological resources from wise and sustainable use. Although protected areas are important, by themselves, they are not sufficient to fully conserve biodiversity, nor do they normally provide for sustainable resource use. Equally important are efforts to sustain the working landscapes and waters between the protected areas in order to sustain human well-being and business activity in the long-term (Canadian Business and Biodiversity Council, 2010). A win-win approach has attempted to demonstrate the advantages of environmental actions undertaken by firms, invalidating the orthodoxy of negative causality between competitiveness and the internalization of environmental concerns (Porter & Van der Linde, 1995; Houdet et al., 2009). An exclusive focus on reducing the impacts of business on biodiversity should be discarded in favour of an innovative

approach in which biodiversity becomes an integral part of business strategy (Houdet, 2008).

While some companies have already made significant steps to adopt and implement these approaches within the context of aspirations for a more sustainable economy, the big challenge remains the transformation of mainstream businesses to practically apply these approaches in a local and sector-specific context (Schaltegger & Beständig, 2012). It is encouraging to note that many companies are taking steps to identify and minimise their impacts on biodiversity and ecosystems and reaching out to civil society to create innovative solutions that enable the present-day needs of society and economies to be balanced with the overarching need to ensure we continue to live in a healthy and productive environment (ibid). Indeed, business-case thinking on environmental issues has shifted from basic compliance and day-to-day cost-saving to a focus on reputation for social responsibility and long-term supply of resources and ecological services (Canadian Business and Biodiversity Council, 2010; UNEP, 2010).

5. The science, policy, end-user interface

The imperative for the business sector to address the environmental pillar invariably generates new scholarship and debate focusing on analytical frameworks and governance arrangements for better conservation of biodiversity. Scholars and practitioners alike are agreed that scientific evidence and innovations backed by robust public policy will enhance biodiversity conservation initiatives (see Robertson & Hull, 2003; Gatzweiler, 2006; Hage et al., 2010). What seems to be less-understood is the process and means of ensuring that both science and policy actually have the desired impact on biodiversity conservation practices of business and society, both immediately and in the long-run. As Reed (2008) explains, biodiversity conservation problems are typically complex, uncertain, multi-scale and affect multiple actors and agencies. The challenge becomes even more complex when assessed from a business sustainability perspective. Stave (2002) points out that pressure to improve public involvement in decisions about biodiversity resources management is especially high. Because such decisions generally involve complex scientific and technical issues and a wide array of stakeholders, scientific uncertainty, value conflicts, ecosystem dynamics, and social dynamics make environmental decisions especially prone to challenge.

5.1 Collaborative partnerships

In the literature, cross-sectoral partnerships repeatedly appear as key to finding the solutions to many of the challenges evident in the business and biodiversity leadership nexus. Some of the articulated advantages of partnerships include helping businesses manage their impacts on biodiversity and capitalize on opportunities, as most initiatives are undertaken in collaboration with conservation groups, government groups, and academic institutions. By working in partnership with other sectors, businesses have access to resources, including expertise and networks, which can help address biodiversity issues. Therefore, to enhance the sustainability of businesses and biodiversity, many options will be needed that make use of collaboration and partnerships across levels. In this regard, it is very important to acknowledge that ultimately, halting biodiversity loss, reducing ecosystem degradation and enabling continuity in economic production is going to be a shared responsibility and all stakeholders (including the private sector) must be committed to generating workable solutions. Collective responsibility, leadership and action will be required to address the complex challenges that businesses face as they interact with or make use of biodiversity. Expert groups in the biodiversity sector, government departments, the private sector, civil society, research and academic think-tanks, and other interested stakeholders will need to work together to catalyse collective effort and environmentally responsible leadership.

In the accentuated debate and analysis of new challenges and opportunities evident in the business and biodiversity conservation landscape, collaborative networks and dialogue platforms emerge as important mechanisms that facilitate more responsible leadership and biodiversity stewardship. In this paper, we adopt the position that the challenge isn't so much with managing biodiversity as it is with managing stakeholders who have different needs, priorities, institutions, and access to the biodiversity resources upon which they depend (Stave, 2002). We further argue that solutions will require broader public and private sector awareness, involvement and participation in decision-making processes. Such participation is better understood within the context of the science-policy-stakeholder interface. And scholarship from social ecology provides useful illumination in this regard as it exists at the interface of science and policy. It is an approach to environmental inquiry and decision-making that does not emphasize the perfection of scientific knowledge. Rather, it requires that science and policy be produced in collaboration with a wide variety of stakeholders or, at the least, be significantly informed by results of strategic engagement with key stakeholders in order to construct a body of knowledge that will reflect the pluralist and pragmatic context of its application (ibid).

This suggests that the focus of initiatives that address challenges evident in the business and biodiversity conservation leadership landscape should be on *process, content* and *outcomes*. *Process* values the participation of expert communities, civil society, scientists, policy-makers, corporate sector representatives, concerned citizens, and other stakeholders. *Content* encompasses biophysical and social knowledge of dynamic ecosystems and biodiversity that directly relates to and results from the participatory processes that are designed to build common ground among competing beliefs and stakes related to biodiversity (Fischer, 2000; Irwin, 2001). The development of techniques that recognise local knowledge such as farming systems research and participatory rural appraisal in the 1980s has informed significantly the current theoretical underpinnings of stakeholder engagement and participatory approaches (see Chambers, 1983). An *outcomes* focus would be about getting positive results, but with the end being justified by the means.

From the foregoing, it is increasingly clear that science alone cannot provide a complete assistance package that fully informs biodiversity stewardship and decision-making in the public and business spheres. Ultimately, public policy and business practice must be made according to a set of beliefs, values, interests, institutions, and assumptions that extend beyond the boundaries of what is traditionally considered to be "good" science (Robertson & Hull, 2003). The novelty of social ecology is that it emerges at the confluence of three major currents shaping the contemporary biodiversity conservation arena. First, the need for local actors and key stakeholders to coalesce and use local knowledge and local action to address local concerns; second, the need for dialogue and collaboration across the many disciplinary and cultural boundaries that divide scientists, policy-makers, and citizens; and third, the need for a vision of nature and human society that encourages people to create healthy ecosystems and sustainable resource use at local, regional, and global scales (see Berkes & Folke, 1998; Berkes et al., 2002; Stave, 2002).

The global development community is beginning to recognize the requirements for greater stakeholder engagement in order to come up with relevant solutions. Speaking at a meeting of the Clinton Global Initiative held in October 2012, U.S. Secretary of State Hillary Clinton made the bold statement: "You cannot have development in today's world without partnering with the private sector." A few years ago, this is the kind of proclamation that might have raised eyebrows but now was just met with widespread agreement in the development community, and the shift reflects how deeply attitudes toward engaging the private sector have changed in the past decade (see Troilo, 2012). The World Business Council for Sustainable

Development has been advocating and leading efforts to facilitate such engagement. They strengthen the case for greater stakeholder engagement by pointing out that businesses are keen to work more closely with policy makers and researchers on the design and implementation of biodiversity and ecosystem-related policy and innovations. They argue that much biodiversity and ecosystem policy and regulation relies on the private sector in its implementation, and in any event, it is often the private sector which has the resources and flexibility to develop and implement solutions at scale. For these reasons, as part of increased involvement from business, it is essential that overarching objectives and targets are designed to be relevant for business (see WBCSD, 2010).

In recognition of the complex and uncertain aspects of biodiversity conservation, it is clear that a more practical approach requires that scientists and policy-makers share with a larger community of stakeholders the responsibility and the privilege of defining the problems, the research needs, the policy decision-making processes, and the content of the deliberation surrounding biodiversity conservation issues. In this science-policy-end-user interface, uncertainty is not necessarily banished but is managed through interactive dialogue, and values are not presupposed but are made more explicit (Funtowicz and Ravetz, 1995; Robertson & Hull, 2003). The key to 'good science' and policy leading to desirable action on the ground is a participatory process with open dialogue and paradigmatic debate (Song and M'Gonigle, 2001). While dialogue among diverse stakeholders is not necessarily the 'silver-bullet' to conservation and sustainability challenges, empirical evidence suggests that collaborative learning processes can be enhanced by involving a greater range and diversity of people in science and policy-making processes (Petts, 1997; Maarleveld and Dangbègnon, 1999; Finger and Verlaan, 1995). This includes actors in the civil society and private sector spheres who are traditionally marginalized within or located outside the institutional boundaries of professional and disciplinary practice.

There are other scholars who adopt a constructivist position that views the science-policy-end-user interface as a 'network' consisting of mechanisms and patterns of connections between actors. These connections are typically characterized by the formation of working groups, projects or partnerships that enable better communication and exchange of knowledge. Kelsey (2003) argues that biodiversity initiatives have traditionally operated within a 'science-first' model of decision-making in which the public is expected to respond to environmental problems, initially and accurately described by scientists. Solutions, according to this rationalist model, are informed by science, negotiated and adopted by politicians and enacted

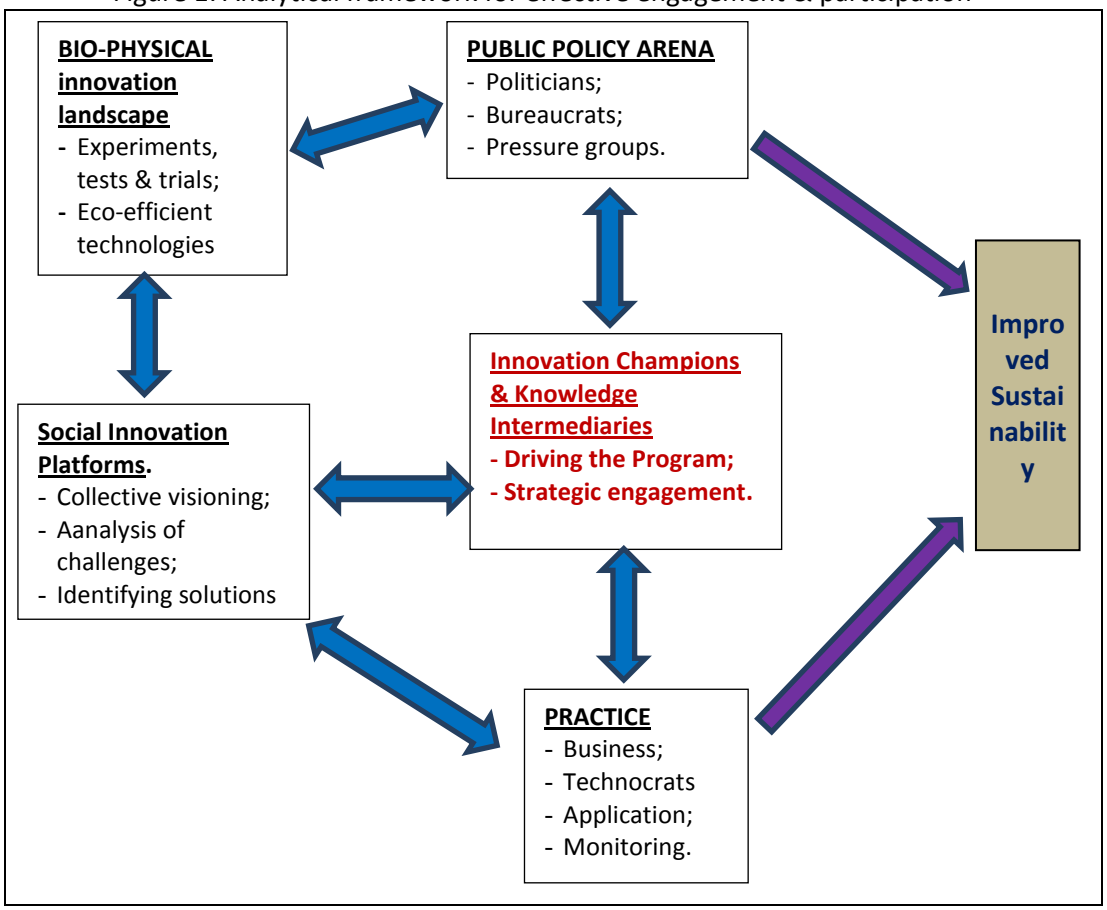
by the public through various means of persuasion and regulation (Grove-White, 1993; Macnaghten and Urry, 1998). The collaborative perspectives that now inform business and biodiversity leadership and sustainability discourses discard the 'science-first' model in favour of a collective leadership model whose application provides the opportunity for all key players to define challenges, digest emerging issues, learn from one another, identify potential solutions and mobilize around specific programs of action (see Powell, 1990; Burt, 2000; Primmer, 2011).

One major weakness of the 'one size fits all' science-first model is that it assumes a hierarchical relationship in which scientific knowledge is elevated above other knowledge systems and the views of other players in the system are ignored. Application of such a model in the business and biodiversity conservation landscape, would imply that the views of the business sector and the general public do not count in decision-making. Scientific knowledge is regarded as unproblematic, and science communication is considered to be a unidirectional flow of information from scientists to the receivers (Palmer & Schibeci, 2012). It is a model whose structural weaknesses have been identified and critiqued for many decades already. Reed (2008) argues that natural resource management and biodiversity conservation have long been recognized to have implications for a broad group of stakeholders and hence to require collaboration and knowledge-sharing. Young (2008) argues that although most policy processes conceptually involve a sequence of stages from agenda-setting through decision-making to implementation and evaluation, in reality policy and research utilization processes are very rarely linear and logical. Simply presenting research results to policymakers and practitioners and expecting them to put the evidence into practice is very unlikely to work.

Collaboratively designed policies and scientific options are more legitimate and easier to implement while solutions developed in top-down fashion often face resistance from those who must actively contribute to the implementation process (Primmer and Kyllönen, 2006; Schenk et al., 2007). Collaboration also enables improved reflection and adaptation to emerging ecological challenges as well as the building of trust and mobilization of resources (Conley and Moote, 2003; Schusler et al., 2003). This also requires effective integration of knowledge systems that inform different social groupings. As Kelsey (2003) points out, the core commitment of this constructivist position is that knowledge is not transmitted directly from one knower to another, but is actively built up by all stakeholders. Brechin et al. (2002) argues that since nature protection is, by definition, a social and political process, it stands to reason that our responses to the biodiversity crisis will have to focus on questions

of human organization. In the final analysis, we argue that by focusing on the human organizational processes associated with nature protection, the conservation community will necessarily have to reflect internally on the fundamental concepts, methods, and modes of organization that govern collective action. Figure 1 depicts the basic elements of this model.

Figure 1: Analytical framework for effective engagement & participation



The philosophical underpinning of this new mode of knowledge production for is characterised by multi- or even trans-disciplinarity, the latter referring to the involvement of non-scientific actors; generated in a context of application; produced on a diversity of sites, in horizontal, ephemeral or even virtual networks; in highly flexible and reflexive settings; and steered by novel forms of quality control (Hage et al., 2010). In this model, everyone is a teacher, learner and co-leader. Problems are commonly defined, community will and commitment is established, supportive institutional arrangements, policy processes and programs are crafted, and trust and partnerships between policy-makers, scientists and other stakeholders are enhanced. There is therefore, a direct appeal for systematic two-way dialogue between science, society and politics (Ehrlich & Pringle, 2008).

Fundamentally, both the ends and the means need to be negotiated and applied in context. In this paper we argue that combining different ways of knowing and learning, promoting two-way dialogue processes, and empowering stakeholders enables different social actors to work in concert, even in situations characterized by much uncertainty and limited information (see Hage et al., 2010). Indeed, public policy and research into sustainable development issues is not an end in itself. If public policy and knowledge created by researchers is shared and debated publicly in multi-stakeholder innovation platforms, it is more likely to be effective and will be adopted and applied by the practitioners (Bassler et al., 2008; Palmer & Schibeci, 2012). Lomas (1997) argues that researchers, policy makers and end-users would benefit a lot from a greater understanding of each other's worlds and avoid listening to the sound of one hand clapping if they understood and committed themselves to collective engagement. This perspective also suggests the possibility of creating shared visions around contentious issues related to conservation and business that have, in many instances, led to innovative solutions. New tools and approaches are designed and tested to bridge the knowledge and trust-gap between the policy-makers, conservation community and the business sector (IUCN, 2012).

Uptake of new policies and research is greatest if there has been a clear communications and influencing strategy from the start, and if the results are packaged in concepts familiar to the end-users (Court & Young, 2003). Such a perspective understands the biodiversity governance system as a ''collective'', a shared set of responsibilities of states, market actors and civil society actors. Improvements of the system depend on the functional interdependencies the actors are able to shape, the deliberate allocation of tasks and the strategic alliances they are able to forge (Visseren-Hamakers & Glasbergen, 2007). Research ceases to be something that researchers do and communicate with 'end-users. In the emerging business and biodiversity leadership landscape, there is a need (rarely articulated) to create spaces for joint knowledge-generation and exchange in an environment that is open and non-threatening to all key players. We believe that these perspectives have the potential to positively drive the agenda for collective leadership and biodiversity stewardship in the business and biodiversity sustainability landscape.

5.2 Implications for leadership and knowledge generation processes

The main message from this discussion is that early and ongoing involvement of relevant decision makers and potential end-users in the conceptualization and implementation of research stands a better chance of ensuring utilization of its

recommendations. Similarly, researchers with ongoing linkages to specific actors and decision-makers in the business and biodiversity sector will have greater influence than those without such links. As Lomas (1997) points out, apparently, familiarity breeds pertinence not contempt. The strengths of the links among researchers, policy-makers and other stakeholders depend, therefore, on all parties finding points of exchange at more than the "product" stages of each of their processes and, furthermore, on a redefinition of the research product as synthesis of a broad spectrum of knowledge rather than an individual study's findings (ibid). Therefore, more effort should be placed on establishing and maintaining ongoing links and more comprehensive two-way dialogue. It is also important for knowledge champions to understand the political factors which may enhance or impede uptake of knowledge products and develop appropriate strategies to address them. This will probably include investing heavily in communication and engagement activities as well as the research itself and build strong relationships with key stakeholders. In other words, engaging with policy requires more than just research skills. Researchers who want to be good policy and practice entrepreneurs will also need to synthesise simple, compelling stories from the results of the research, network effectively with all the other key stakeholders involved in the process, build programmes that can generate convincing evidence at the right time and know the key decision-makers and how to get to them. Working in multidisciplinary teams with others who have these skills is also a non-negotiable ingredient.

6. Conclusion

This paper has demonstrated that most business processes affect biodiversity and ecosystems while being dependent on well-functioning ecosystems to remain in business. For the past few decades, ecosystems and biodiversity have been altered faster and more extensively than ever before as the pace of industrialization increases. These alterations continue to escalate as the national and global population increases and new development priorities emerge. These alterations pose significant risks to businesses and biodiversity as well as opportunities for use of new eco-efficient technologies, goods, and services. While the corporate fraternity must accept that changes are required in the way that business is done, there is no way that it can meaningfully contribute to reversing the current loss of biodiversity and degradation of critical ecosystems unless it is given incentives to comply with the requirements for conservation and a voice in the process of discussing and creating local and international policy solutions.

The process of generating the right incentives and magnifying the voice of the corporate sector has to be facilitated in a constructive and non-confrontational manner. That is where ongoing engagement and dialogue platforms become very important. They enable better interface between research, policy, and practice as well as the formation of partnerships that can deliver more relevant policies and technical solutions. They can also be used to establish a level playing field; leverage market forces; set realistic targets; and create appropriate incentives for sustainable resource use. Our main message is that given the right conditions, businesses can function profitably and in harmony with biodiversity. Given the right conditions, Science can contribute significantly to the definition and enhancement of the right conditions. The model of collective leadership and biodiversity stewardship promoted in this paper suggests that research is but one voice in the knowledge economy relating to policy and practice. This is not to dismiss its importance and the strength of messages which can be generated from research, but to recognise the competitive advantages that may be realized from collective engagement, collaboration and action. This is a model that mobilizes local actors and groups develop shared interests and build the common understanding around mutual or overlapping agendas critical for effective and responsible leadership in a rapidly changing business and biodiversity sustainability landscape.

In this paper, we also recognize that getting innovations into policy and practice is the big challenge and the social engineering, linear, top-down approaches of the past have failed. New mind-sets are required that view the halting of ecosystem degradation as a shared leadership responsibility. New biodiversity conservation initiatives require key players and institutions that are willing to take risks and put aside their own familiar ways of working in favour of experimenting with new approaches that better meet the needs of their diverse partners and the biodiversity goals they seek to achieve, responding more effectively to the social dynamics and institutional rigidities that inevitably arise. We reiterate that ultimately, biodiversity stewardship is everyone's responsibility and no amount of science, no matter how interdisciplinary and applied, will, in and of itself, solve environmental problems. In addition, no amount of policy and regulation will, in and of itself, solve the business and biodiversity sustainability challenge. Problems have to be identified, de-composed and solved by multiple stakeholders. Some of the answers will be found at the interface of science, policy and end-user engagement. The goal of such an approach is to build increased political will and social capital for informed and responsible biodiversity decision-making in this landscape. By getting the fundamentals right, including thorough assessment of context, engaging

policymakers, getting rigorous evidence, working with partners, and facilitating two-way dialogue in innovation platforms, the business and biodiversity sustainability champions can overcome key obstacles in this landscape.

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