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### Advancing Sustainability Through Change and Innovation: A Co-evolutionary Perspective

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# Advancing Sustainability Through Change and Innovation: A Co-evolutionary Perspective

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**ABSTRACT** *This article addresses the problem of how change and innovation can create a fuller voice for ecological interests in organizations and public policy, raising issues about change mechanisms at the institutional versus organizational level. First, it suggests that the newer, systems-based and inclusive approaches to organizational development practice and theory may overcome shortcomings of earlier approaches to planned change. Second, it argues that co-evolutionary approaches that use complex adaptive systems thinking will more effectively structure such third-generation interventions by focusing on issues at the institutional level. Third, the article examines a dialectical model of institutional change which incorporates activist input and channels conflict into innovative outcomes. Finally, it presents a case example of how a dialectical model combined with a co-evolutionary perspective could foster the institutional change required to facilitate the integration of ecological priorities into the human systems of organizations.*

**KEY WORDS:** Sustainability, innovation, organizational development, co-evolution, institutional level change

## Introduction

### *Ecological Sustainability and Innovation*

This article addresses the problem of how change and innovation can create a fuller voice for ecological interests in organizations and public policy through a critical evaluation of current approaches to organizational development and change.

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The first section of the article points out shortcomings of earlier approaches to planned organizational development and change in relation to achieving ecological sustainability requirements. It is then suggested that the newer, systems-wide and inclusive approaches to organizational development practice and theory may overcome these limitations. As an example, the article explores co-evolutionary approaches that use complex adaptive systems thinking, arguing that such interventions will enable a focus on issues at the institutional level. A dialectical model of institutional change, which incorporates activist input and channels conflict into innovative outcomes, is then examined. The article then presents a case example of how a dialectical model combined with a co-evolutionary perspective, could foster the institutional change required to facilitate the integration of ecological priorities into organizational and public policy and decision-making.

A major challenge for organizations is how to balance and incorporate competing interests, values and constituencies (Quinn and Rohrbaugh, 1983; Buenger *et al.*, 1996). However, the now pressing debate on how to balance human requirements and economic priorities with ecological sustainability confronts managers with new and more difficult challenges. Non-human stakeholders are now to be considered as relevant stakeholders with whom it is important to build enduring and mutually beneficial relationships (Maak, 2007), with authoritative sources claiming impending conditions of crisis unless ecological issues are given more equal countenance in decision-making (Mooney *et al.*, 2005; Stern, 2006; Intergovernmental Panel on Climate Change, 2007). The urgency of the response lies in the need to address a major systems failure entailing a reassessment of the relationship between human and ecological systems (Coupland, 2005; Ehrenfeld, 2005).

At the level of the organization, the multiple strategies, modes of assessment and required standards of ecological sustainability, such as industrial ecology, eco-efficiency and strategic proactivity, point to a highly complex task if such innovations are to be implemented (McDonough and Braungart, 2002; Winn and Zietsma, 2004; Jamali, 2006; Kallio and Nordberg, 2006; Tregigda and Milne, 2006; Dunphy *et al.*, 2007; Waage, 2007). It is important to note that innovation within the context of sustainability may not be the same as innovation in other contexts. Hall and Vredenburg (2003), for example, report that managers have had great difficulty when trying to innovate under pressures from sustainable development. Managers find their innovation strategies are inadequate to accommodate the highly complex and uncertain nature of these new demands. Their previous strategies do not incorporate the constraints of the social and environmental pressures, which involve a wider range of stakeholders as well as more ambiguous and contradictory demands. Stakeholders may include environmental activists, safety advocates and local interests, with different priorities, often less focussed on technical aspects of innovation, as well as the more usual stakeholders such as customers, suppliers or investors (Hall and Martin, 2005).

This article assumes that organizations will need to make fundamental changes in the way they conduct business and work within the tenets of 'stronger' versions of sustainability, to ensure human needs do not diminish the supply of natural capital available for future generations (Turner, 1992; Daly, 1996). An accepted body of thought within the corporate sustainability literature is that such an

outcome can only be achieved through high levels of innovation within the organization, leading to product, process or service redesign (Rodriguez *et al.*, 2002; Snyder and Duarte, 2003; Hart, 2005; Laszlo, 2008). However, this literature leaves unanswered the question of how to go beyond technical innovation to engender the paradigmatic change that incorporating ecological values entails.

The following section of the article critically evaluates the organizational development approach of planned change in light of this requirement. Some critical limitations of the earlier organizational development approaches are identified, particularly in relation to organizational complexity and the relationship between human and ecological systems. Some of the advances of more recent interpretations are noted in this regard.

## **Innovation, Sustainability and Organizational Development**

### *Earlier Approaches to Organizational Development*

Organization development is traditionally described as the process by which an organization can achieve its mission and build long-term success. It is defined here as a highly planned program of change and development using behavioral science knowledge, geared towards a particular organizational outcome (Beckhard, 1969; Cummins and Worley, 2004; Seo *et al.*, 2004). The claimed systemic impacts of earlier approaches to planned change such as action research and team building are undermined by their individual or group level focus (Seo *et al.*, 2004). For the purpose of addressing change that might give a fuller voice to ecological interests, such an approach is particularly inappropriate given the holistic, systems-wide intervention required to establish a more dynamic relationship between the ecological and human systems of the organization (Milne *et al.*, 2006). It does not have the capacity to drive the fundamental innovations and radical change required to implement ecological values such as intergenerational equity and interconnectedness (Driscoll and Starik, 2004) and address the now pressing environmental concerns such as climate change associated with business activity (Bartunek *et al.*, 2006; Maguire and Hardy, 2009).

The earlier versions of the planned approach to change are constrained in their capacity to deal with the complexity of interrelationships between the natural environment, organizations and their employees (Dobers and Wolf, 1999; Law, 2004; Sandstrom, 2007). Both the first generation (action research, sensitivity training) and second generation (transformational change, future search) iterations (Seo *et al.*, 2004) of planned change tend to interpret nature/employee, employee/organization, and organization/nature as dualistic entities. Implementing change according to a pre-determined goal and through the lens of such polarities has problems, given the 'complex reality' of assessing ecological performance (Kolk and Mauser, 2002, p. 25) and the many contingency factors that need to be considered in its specification (Jermier *et al.*, 2006). At a practical level, these include the type of program (pollution prevention, waste management, and sustainable management systems), as well as sectoral characteristics (Orsato, 2004; Ramus and Montiel, 2005) and the increasing differences in ecological performance between organizations (York, 2004).

*Contemporary Organizational Development Approaches*

Recent work in what Seo *et al.* (2004) term third-generation organizational development has the capacity to address these limitations. Third-generation organizational development approaches, such as learning organization and appreciative inquiry, and including process interventions such as open-space technology aim at transformational change. Yet in contrast to second-generation organizational development, they work on the premise that the past does not have to be totally rejected for radical change to occur. These approaches are not static and they allow for systems-wide interventions, the incorporation of visioning or futuring and representation of a wide range of stakeholder viewpoints (Waddell *et al.*, 2007). In line with these approaches, some action research has also shifted to a whole systems approach to incorporate a wider range of stakeholders. So, for example, leading action research specialists now focus on inquiry that contributes to the wellbeing of human communities and the ecosystems within which they co-exist (Reason, 2006). A recent definition of action research defines its wide purpose as:

to contribute to the increased well-being – economic, political, psychological, spiritual – of humanity, and to a more equitable and sustainable relationship with the wider ecology of the planet of which we are an intrinsic part (Reason and Bradbury, 2001, p. 2).

Other contemporary exponents of organizational development working within this third-generation approach contend that there is a need to move from what Anderson and Anderson (2001) have termed the Industrial Mindset, reflecting the dynamics of closed systems, to the Emerging Mindset where reality is portrayed as a living system, all components are perceived as interconnected and interdependent, and life is seen as continuous, rather than composed of discrete elements. It is argued that systems-wide process interventions can bring about a shift from the Industrial Mindset and transform leader and employee behavior within the organization. However, the question raised in this article is how to bring about change from the Industrial Mindset at an institutional level. How can third-generation organizational development approaches be focussed at the level of institutional change? What are the processes, for instance, that allow for deinstitutionalisation (Dacin *et al.*, 2002) and the disappearance of the beliefs, ideas and practices associated with the Industrial Mindset?

**Towards Institutional-level Change and Innovation***The Organization as Complex Adaptive System*

In the following sections of this article, it is argued that co-evolutionary approaches that use complex adaptive systems (CAS) thinking and incorporate dialectical collective action processes can be useful to structure interventions so that they focus change at the institutional level. Using a case example of a long-running environmental dispute, the article then discusses how such an approach can be enabled and embedded.

The article begins with a discussion of why viewing an organization as a CAS is useful concerning its aim to explore how to give fuller voice to ecological values. Overall, the complexity of today's organizations increases the need to conceptualize the relationship between human and ecological systems within a more dynamic framework. In an article on 'post- bureaucracy', Clegg (forthcoming) argues that bureaucracy, far from being superseded, is becoming embroiled in complex processes of hybridization and that bureaucracies are simultaneously decomposing and recomposing. In the latter, the bureaucrat is being replaced by the project leader. Such depictions of organizational life fit well with viewing the organization as a CAS and suggest reconceptualizing the relationship between the human and ecological systems of the organization within that context.

CAS are neural-like networks of interacting, interdependent agents who are bonded by common goals, outlooks and needs. They are changeable structures with multiple overlapping hierarchies, and like the individuals that comprise them, CAS are linked to one another in an interactive network (Uhl-Bien *et al.*, 2007, p. 299). The metaphor of CAS has been widely put to use in the organizational studies and management literatures to highlight organizational and inter-organizational properties such as the dynamic interaction between organizations and associated systemic evolution through recombination (Cornelissen and Kafouros, 2008).

#### *Co-evolutionary Approaches to Innovation and change*

Within the CAS context, organizational adaptations co-evolve with changes in the external environment. The metaphor of organizational co-evolution is drawn from the biological concept of co-evolution – that two species or populations may evolve, each adapting to the other. The next section explores the applicability of co-evolution in CAS in the context of sustainability.

Viewing organizational sustainability through the lens of the CAS metaphor has been supported by an ever-increasing number of authors (for examples, Berkes *et al.*, 2003; Pahl-Wostl, 2007; Rammel *et al.*, 2007), concomitant with the identified need to apply frameworks, approaches and philosophies that take a holistic approach (Ramos-Martin, 2003). Similarly, a CAS perspective is seen across organizational and environmental literature (Kallio and Nordberg, 2006), with a common entreaty to move beyond fragmented, mechanistic views of ecological problems and solutions (Clark, 1994; Hoffman, 2006). A linear view on change is recognized in this literature as unsuitable and inadequate for modelling systems with interconnections and feedback loops (Anderson, 1999; Glor, 2007).

Rather than a linear relationship between the planned development of the human systems of the organization and ecological sustainability, a more dynamic understanding would thus predict that 'change may occur rapidly or slowly; it may accumulate linearly or nonlinearly, it may be constant or have bursts of punctuated equilibrium' (Dooley, 1997, p. 89). Even the assumption that the individual elements of the human and ecological systems can be identified in order to establish a causal relationship needs to be rethought when viewed through the CAS lens. Complex systems cannot be reduced to basic elements and so cannot be



recombined in lawful ways to explain characteristics; thus such systems need to be studied as whole entities/systems or patterns of behavior (Glor, 2007)

A further consideration that can be drawn from the CAS metaphor is the inherent interconnection between organizations and the larger systems within which they are located. As discussed above, this has implications for the way it is conceptualized that innovations develop in organizations, but it also can inform about how organizations must change to adapt to their wider environment – in the terms used in this article, the ecosystem.

Sustainability draws on the interrelatedness of technological, social, political, and ecological systems and sub-systems. The following section argues that the relationship between human and ecological systems should be reconceptualized in terms of a dynamic co-evolution towards sustainability. Such an approach, based in conditions of mutual influence, it is argued, could result in the transformational changes at the institutional level that are required if organizations and public policy formation are to reframe around incorporating ecological concerns. As Maguire and Hardy (2009) argue, institutional change and particularly, deinstitutionalisation, is highly relevant in a world where long-accepted business practices may have negative effects on society and on the natural environment.

This problem is broadly addressed in the natural resource management (NRM) literature, where leading scholars argue that the complexity of ecosystem needs means a 'need for smaller-scale, more environmentally sound and more democratic and nested natural resource management systems that are self-organizing, adaptive and resilient' (Berkes *et al.*, 2003, p. 21). Such an approach recognizes that humans are part of the system and, therefore, part of the problem and that mutual adaptation may be the answer.

This context of a co-evolutionary perspective on organizations can also learn from evolutionary and ecological economists. Arguably, Norgaard's (1994) theory on co-evolution is a highly relevant approach that could be taken up as a framework for progressing sustainability at an organizational level. On this view:

Development is a process of co-evolution between knowledge, values, organization, technology and the environment. Each of these sub-systems is related to each of the others, yet each is also changing and effecting change in the others. . . . and with each sub-system putting selective pressure on each of the others they co-evolve in a manner where each reflects the other. (Norgaard, 1994, p. 216)

So, for example, social norms, practices and attitudes need to evolve so that they incorporate ecological concerns, as well as the reverse. In an approach drawing on ecological economics, Rammel *et al.*'s (2007) analysis of CAS leads to their recommendation that institutions (and organizations) need to take a co-evolutionary perspective to progress sustainability. On this argument, organizational learning systems need to be developed to obtain higher levels of recognition of the socio-economic adaptations that emerge within institutions, their impact on the natural environment, and vice versa. An example of this co-evolutionary approach is the way that norms and practices of community-based management systems have co-evolved with their resource base. As Dove (1993) points out in his study of forestry use in Pakistan, the efficacy of applying this approach is dependent upon

feedback from the ecosystem to the sociosystem, in turn dependent upon the accurate perceptions of the process by the participating population.

To explicitly take this view of human-ecological sustainability as co-evolutionary, it is necessary to understand that beyond the intertwined nature of human and ecological systems is the fact that human systems, as opposed to ecological systems, are self-reflexive and self-aware (Kay and Regier, 2000), lending strength to the notion that innovations, if enabled within a co-evolutionary framework, could develop more in line with ecological sustainability – given that humans are by their very nature a part of the ecology. However, as Porter (2006) points out, careful consideration needs to be given to the co-relationship between human and ecological systems, since one entity is meaning making, involving the conscious and therefore rapid sharing of knowledge, while the other is not.

These considerations of the organization within a co-evolutionary perspective support the claim made in this article for innovation and change at the institutional level – reaching beyond the boundaries of the individual organization to deliver an established, radically changed pattern of norms and practices that recognize the interconnection between the elements of sustainability in the context of business and public policy formation. Yet it raises the key question – how to prompt the functional interdependence of social and ecological systems so that they ‘change together via constant change in both systems’ (Arrow *et al.*, 2000, p. 207).

## Generating Institutional Innovation

### *Dialectical Processes and Mutual Influence*

Hargrave and Van de Ven (2006) offer an important view on innovation at the institutional level that is highly relevant to the challenge of implementing a radical and paradigmatic shift through co-evolutionary approaches to sustainability. Drawing from social movement and innovation management literature, these authors see institutional change as a dialectical process where the ongoing contestation between competing actors results in the synthesis of new institutions.

In their model of collective change, networks of activists representing partisan viewpoints engage in a collective process that can create or revise institutions. Clearly, the dialectical process involves issues of power, as well as conflict. The suggestion is that this collective action model of innovation is most appropriate at the ‘*developmental phase* of institutional change, when networks of actors emerge to introduce competing alternative approaches or designs that entail different proposals for institutional change’ (Hargrave and Van de Ven, 2006, p. 883). Actors contribute to the creative process when they have sufficient resources to do so. This model offers suggestions on how the co-evolutionary relationship based on patterns of mutual influence between the social and ecological sustainability elements could be established.

Such a perspective on innovation has particularly radical implications for the influence that could be exerted from the ecological system. The time is ripe for these ‘partisan actors’ to include environmental activists. Now resources are



available to be harnessed in this collective process in order to represent the ecological system as a stakeholder (Starik, 1995). Such available resources include concerned employees at various levels, environmental NGOs and activists, as well as international organizations such as the Inter-Governmental Panel on Climate Change.

It should be noted that it is the dialectical interaction between the actors that generates innovation and change. The following case provides an example of a societal dilemma where such interactions between multiple actors have prompted innovations that reflect some progress towards the introduction of ecological values and norms into organizational thinking and public policy making.

### *The Case of Decision-making on HCB*

The case of decision-making concerning the largest store in the world of the so-called intractable waste, hexachlorobenzene (HCB), stockpiled in the grounds of the Orica chemicals company on the shores of Botany Bay, Sydney, is well described elsewhere (Benn and Jones, 2009; Brown, 2009). For the purposes of the argument presented in this article, however, the case highlights how Hargrave and Van de Ven's (2006) model may play out with resulting shifts in accepted ideas, norms and practices in decision-making concerning toxic waste and how dialectical processes can generate a co-evolutionary model of change.

The story of this HCB waste begins during World War II, when it was produced as a by-product of the industrial processes conducted by ICI Australia, on the site that is now Orica, at Botany Bay. Although these processes were halted in the 1970s, 10,000 tonnes of this carcinogenic compound, now classified under the Stockholm Convention as a persistent organic pollutant, remain stored in specially prepared drums on the site, awaiting a decision as to their disposal.

A 1992 decision by the Australian Government, rejecting the construction of a High Temperature Incinerator (HTI) at various rural sites in Australia due to community opposition, prompted a study of other available technologies and sowed the seeds for possible decision-making allowing disposal of the waste on site in the once industrial but now increasingly suburban area of Botany. However, also prompted by increased community recognition of the risks associated with toxic chemicals, in 1992 the Government established a Community Participation and Review Committee (CPRC) constituting Orica, other local business and industry interests, local community representatives, local and national environmental organizations, state and national government representatives and local government (Rae and Brown, 2009). The CPRC was charged with the responsibility of reviewing information concerning the disposal of the waste and of advising the government and Orica in this regard.

The diverse composition of the CPRC and the active facilitation at its regular meetings by a skilled and independent Chair has ensured robust debate, openly conducted within this forum. All interests represented on the CPRC have shown remarkable tenacity in pursuing its mission, ongoing now for 17 years. Local environmental activists within the CPRC have been strongly supported by the wider environmental organizations and environmental justice networks in Australia, with the focus being on the building capacity of the local community

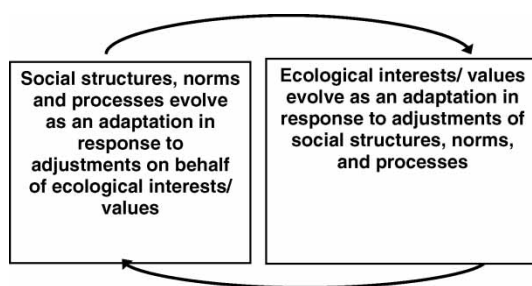
so that they could engage more effectively with the highly scientific issues underpinning the decision-making concerning disposal of the waste (Lloyd-Smith, 2009). Local government, too, has given support to the ongoing functioning of the CPRC as a forum for interaction between the stakeholders (Hillier *et al.*, 2009).

While, as yet no decision has been made on how to destroy the waste,<sup>1</sup> the CPRC has been a vehicle for institutional change engendered by the dialectical interchange between these various actors. The interchange, often but not always, involving major disputations (Brown, 2009; Jensen-Lee, 2009) has pushed new understandings of the need for community consultation at Orica, with radically different corporate protocols now in place to convey and receive information concerning its environmental impacts on the local community (Brown, 2009). The rejection by an Independent Panel of Orica's claims to the right to destroy the waste on site reflects changes to the previously accepted practice in Australia that companies can generate toxic waste through often polluting industrial processes and then externalize their social and environmental costs – expecting the local human and ecological communities to 'carry the burden of their remediation' (Grace, 2009). Such practices had been institutionalized through the supervisory activities of governments long accustomed to co-locate polluting industry and working-class populations in areas such as Botany (James, 2009). The fact that there has been no decision made as yet on how to destroy the waste does not, therefore, diminish our point that the CPRC forum, by enabling the interaction and debate between the multiple actors engaged with this dilemma, has prompted innovations concerning the implementation of ecological values into corporate and government decision-making.

Crucially, it has altered a view of what constitutes legitimate knowledge concerning environmental risk associated with toxic chemicals. As citizens' concerns regarding the quality and long-term impacts of waste disposal techniques gained legitimacy (partly through their determination to develop their own knowledge around complex issues of toxic risk), their understanding of normative practice has become incorporated into the various Commissions of Inquiry and other institutional effects associated with toxic waste in Australia (Healy, 2009). Key to this transfer in legitimacy has been an identity shift for Orica. The dispute concerning disposal has seen the influence of a high-profile science and technology-based organization about how the waste should be destroyed now challenged by the growing symbolic capital of the CPRC as an entity, a factor strongly linked to the preparedness of the members to engage in informed and ongoing dialogue within its forum (Benn and Jones, 2009; Hillier *et al.*, 2009). In particular, legitimacy is increasingly accorded to the voices of local environmental activists – with their leader, now aged over 80 years, recently accorded Australia's major public honour, the Order of Australia.

From the argument presented in this article, this case example demonstrates the widening and diverse constellation of stakeholders prepared to represent the ecological system, now energised and committed to such an extent that it can engage in collaborative networking with actors representing other ecological elements. These interactions, along with the often confrontational debates engaged in over the years through the CPRC forum, have pushed government and corporate

policymaking in Australia to address the right for ecological and community interests to be recognized in decisions such as the disposal of toxic waste. The effect has been to establish a pattern of co-evolution between the social and ecological systems implicated in this issue. The case provides an example of how the mutual adaptation between social and ecological systems can be enabled, as new social norms, decision-making structures and processes of community engagement evolve in dynamic interaction with emergent ecological values (see Figure 1).



**Figure 1.** Co-evolution of social and ecological interests.

As empowered local activists have adapted by developing high levels of scientific knowledge around issues of toxic risk, enabling them to engage in an ongoing argumentation concerning the environmental risks associated with disposal of the waste on site, they have forced adaptation in the social system, reflected in new norms and practices concerning community consultation around environmental impacts of industrial processes. The case also supports Glynn and Abzug's (2002) findings concerning the relationship between identity shifts and the legitimacy accorded to actors, processes or structures that underpin such changes at the institutional level. The struggle has been about legitimacy, in this case of scientific versus lay knowledge.

In summary, the HCB case highlights a number of key points in the argument concerning the conditions underpinning institutional change on behalf of ecological values. Firstly, it shows how a systems-based approach, incorporating capacity building to enable effective dialectical interaction between all concerned stakeholders, can enable institutional change. This approach can be supported through what we have termed (following Seo *et al.*, 2004) third-generation organizational development. In that sense, the human systems can be developed so that they can co-evolve with the ecological systems.

Relating this case to Hargrave and Van de Ven's thesis about institutional-level change (2006), it is suggested that groups of 'ecological' activists will emerge who are distanced enough from current institutionalised perspectives on the way business should be conducted, that they will engage in dialectic interaction out of which paradigmatic change can occur. It is further suggested that the importance of appropriately facilitated system-wide fora as sites for such interaction and in the context of which actors representing ecological interests can be supported so that they have equal voice with other interests.

An alternative approach to explaining institutional-level change is to view it as the harnessing of collective action to displace entrenched interests (Rao, 2009). Rao employs the concepts of ‘market rebels’ (activists that defy authority and convention), ‘hot causes’ (constructions that arouse intense emotions) and ‘cool mobilization’ (unconventional techniques that engage audiences in collective action). He also emphasises the importance of thinking like an activist, forging a collective identity and mobilizing support when trying to initiate social innovation. Rao’s approach, although coming from a social-movement literature base, has much in common with the thesis of this article. Rao presents case studies from many different contexts to support his argument and these case studies provide practical guidance which is complementary to this article and could be integrated with our work in its future development. For example, in extending this article from its present emphasis on theory into relevant practice, one could integrate the use of third generation OD interventions with Rao’s advice to activists (based on use of ‘hot causes’ and ‘cool mobilization’) to help organizational employees to start thinking more like insurgents. This integration would assist in overcoming a current limitation in this article, the large gap between the theoretical approach it takes and the knowledge that will be required to put it into practice.

## **Conclusion**

The process of co-evolution, or the process of alignment between different entities in CAS, involves unplanned innovations, emergent and operating at the edge of chaos. Crucial to ensuring the counterforce required on behalf of ecological systems, so they can participate in the dialectical struggle discussed above, is the creation and facilitation of appropriate fora (Carson, 2009). It is here that the more recent advances in organizational development that involve dialectical representation from all stakeholders are relevant in generating interaction at an institutional level.

This article concludes with the point that utilizing third-generation organizational development approaches in the context of the organization as CAS can, facilitates the co-evolution that may enable ecological interests to be institutionalized while deinstitutionalizing those business and industrial practices antagonistic to such values. It is also suggested that the co-evolutionary decision-making systems and fora that are developed around ecological issues may generate useful systems, ideas, models and networks that could then serve to help both business and government — corporate and public policy-makers — generate change and innovation about issues that arise in organizational core functions that are outside the direct concerns of environmental sustainability.

## **Note**

1. Most recent attempts at a conclusion to the long-running dispute involve negotiations with Denmark in order to export the waste to be destroyed by HTI in that country. This follows a 2007 decision by the Australian Government to export it to Germany for HTI destruction and the subsequent ruling by German jurisdictions that the HCB import would be illegal (Brown, 2009)

## References

- Anderson, D. and Anderson, L. (2001) *Beyond Change Management* (San Francisco: Jossey-Bass Pfeiffer).
- Anderson, P. (1999) Complexity theory and organisation science, *Organisation Science*, 10, pp. 216–232.
- Arrow, H., McGrath, J. and Berdahl, J. (2000) *Small Groups as Complex Systems*, 2nd edn (Thousand Oaks: Sage Publications).
- Bartunek, J., Rynes, S. and Ireland, D. (2006) What makes management research interesting and why does it matter? *Academy of Management Journal*, 49, pp. 9–15.
- Beckhard, R. (1969) *Organisation Development: Strategies and Models* (Reading, MA: Addison-Wesley).
- Benn, S. and Jones, R. (2009) Forming corporate identity: symbolic capital, industry perspectives and community participation, in: P. Brown and S. Benn (eds) *Journal of Environmental Management*, 90(4), pp. 1593–1604.
- Berkes, F., Colding, J. and Folke, C. (2003) Introduction, in: F. Berkes, J. Colding and C. Folke (eds) *Navigating Social-ecological Systems: Building Resilience for Complexity and Change*, pp. 1–30 (Cambridge: Cambridge University Press).
- Brown, P. (2009) Toxic waste in our midst: the case of hexachlorobenzene, in: P. Brown and S. Benn (eds) *Journal of Environmental Management*, 90(4), pp. 1559–1567.
- Buenger, V., Draft, R.L., Conlon, E.J. and Austin, J. (1996) Competing values in organisations: contextual influences and structural consequences, *Organisational Science*, 7(5), pp. 557–576.
- Carson, L. (2009) Deliberative public participation and hexachlorobenzene stockpiles, in: P. Brown and S. Benn (eds), *Journal of Environmental Management*, 90(4), pp. 1636–1643.
- Clark, M.E. (1994) Integrating human needs into our vision of sustainability, *Futures*, 26(2), pp. 180–184.
- Clegg, S.R. (forthcoming) Under reconstruction: modern bureaucracies, in: M. Harris, H. Höpfl and S.R. Clegg (eds) *Managing Modernity* (London: Routledge).
- Cornelissen, J. and Kafouros, M. (2008) The emergent organisation: primary and complex metaphors in theorizing about organisations, *Organisation Studies*, 29, pp. 957–978.
- Coupland, C. (2005) Corporate social responsibility as argument on the web, *Journal of Business Ethics*, 62, pp. 355–366.
- Cummins, T. and Worley, C. (2004) *Organisation Development and Change*, 8th edn (Cincinnati, OH: South-Western Publishing).
- Dacin, M., Goodstein, J. and Scott, W. (2002) Institutional theory and institutional change: introduction to the special issue forum, *Academy of Management Journal*, 45, pp. 45–57.
- Daly, H. (1996) *Beyond Growth: The Economics of Sustainable Development* (Boston, MA: Beacon Press).
- Dobers, P. and Wolff, R. (1999) Eco-efficiency and dematerialisation: scenarios for new industrial logics in recycling industries, automobile and household appliances, *Business Strategy and the Environment*, 8, pp. 31–45.
- Dooley, K.J. (1997) A complex adaptive systems model of organization change, *Nonlinear Dynamics, Psychology, and Life Sciences*, 1, pp. 69–97.
- Dove, M. (1993) The co-evolution of population and environment: the ecology and ideology of feedback relations in Pakistan, *Population and Environment*, 15, pp. 89–111.
- Driscoll, C. and Starik, M. (2004) The primordial stakeholder: advancing the conceptual consideration of stakeholder status for the natural environment, *Journal of Business Ethics*, 49, pp. 55–73.
- Dunphy, D., Griffiths, A. and Benn, S. (2007) *Organisational Change for Corporate Sustainability* (London and New York: Routledge).
- Ehrenfeld, J. (2005) The roots of sustainability, *MIT Sloan Management Review*, 46, pp. 23–27.
- Glor, E.D. (2007) Assessing organisational capacity to adapt, *Emergence: Complexity and Organisation*, 9, pp. 33–46.
- Glynn, M. and Abzug, R. (2002) Institutionalising identity: symbolic isomorphism and organizational names, *Academy of Management Journal*, 45(1), pp. 267–280.
- Grace, D. (2009) Errant corporations, diffuse responsibilities, and the environment: ethical issues in the Orica case study, in: P. Brown and S. Benn (eds) *Journal of Environmental Management*, 90(4), pp. 1622–1627.
- Hall, J. and Martin, M. (2005) Disruptive technologies, stakeholders and the innovation value-added chain: a framework for evaluating radical technology development, *R&D Management*, 35(3), pp. 273–284.
- Hall, J. and Vredenburg, H. (2003) The challenges of innovating for sustainable development, *MIT Sloan Management Review*, 45(1), pp. 61–68.
- Hargrave, T. and Van de Ven, A. (2006) A collective action model of institutional innovation, *Academy of Management Review*, 31(4), pp. 864–888.



- Hart, S.L. (2005) Innovation, creative destruction and sustainability, *Research Technology Management*, 48, pp. 21–27.
- Healy, S. (2009) Towards an epistemology of public participation, in: P. Brown and S. Benn (eds) *Journal of Environmental Management*, 90(4), pp. 1644–1654.
- Hillier, N., Genissen, J., Pickering, B. and Solesnki, R. (2009) With an introduction by Paul Brown, Our battle with hexachlorbenzene: citizen perspectives on toxic waste in Botany, in: P. Brown and S. Benn (eds) *Journal of Environmental Management*, 90(4), pp. 1605–1612.
- Hoffman, A.J. (2006) Linking social systems analysis to the industrial ecology framework, *Organisation and Environment*, 19(4), pp. 439–457.
- Intergovernmental Panel on Climate Change (2007) *Intergovernmental Panel on Climate Change Fourth Assessment Report*, Available at <http://www.ipcc.ch/> (accessed 19 September 2009).
- Jamali, D. (2006) Insights into triple bottom line integration from a learning organisation perspective, *Business Process Management Journal*, 12, pp. 809–821.
- James, P. (2009) The supervision of environmental risk: the case of HCB waste or Botany/ Randwick? in: P. Brown and S. Benn (eds) *Journal of Environmental Management*, 90(4), pp. 1576–1582.
- Jensen-Lee, C. (2009) When unequals are treated equally: the 2002 commission of inquiry into Orica's Geomelt proposal, in: P. Brown and S. Benn (eds) *Journal of Environmental Management*, 90(4), pp. 1613–1621.
- Jermier, J., Forbes, L., Benn, S. and Orsato, R. (2006) The new corporate environmentalism and green politics, in: S. Clegg, C. Hardy, T. Lawrence and W. Nord (eds) *The Sage Handbook of Organisational Studies*, pp. 618–650 (London: Sage Publications).
- Kallio, T. and Nordberg, P. (2006) The evolution of organisations and natural environment discourse, *Organisation & Environment*, 19, pp. 439–457.
- Kay, J.J. and Regier, H. (2000) Uncertainty, complexity and ecological integrity: Insights from an ecosystem approach, in: P. Crabbe, A. Holland, L. Ryszkowski and L. Westra (eds) *Implementing Ecological Integrity: Restoring Regional and Global Environmental and Human Health*, NATO Science Series, Environmental Security, pp. 121–156 (Dordrecht: Kluwer).
- Kolk, A. and Mauser, A. (2002) The evolution of environmental management: from stage models to performance evaluation, *Business Strategy and the Environment*, 11, pp. 114–131.
- Laszlo, C. (2008) *Sustainable Value: How the World's Leading Companies are Doing Well by Doing Good* (Palo Alto, CA: Stanford University Press).
- Law, J. (2004) *After Method: Mess in Social Science Research* (London: Routledge).
- Lloyd-Smith, M. (2009) Information, power and environmental justice in Botany: the role of community information systems, in: P. Brown and S. Benn (eds) *Journal of Environmental Management*, 90(4), pp. 1628–1635.
- Maak, T. (2007) Responsible leadership, stakeholder engagement, and the emergence of social capital, *Journal of Business Ethics*, 74(4), pp. 329–344.
- Maguire, S. and Hardy, C. (2009) Discourse and deinstitutionalisation: the decline of DDT, *Academy of Management Journal*, 52(1), pp. 148–178.
- McDonough, W. and Braungart, M. (2002) Design for the triple top line: new tools for sustainable commerce, *Corporate Environmental Strategy*, 9, pp. 251–258.
- Milne, M., Kearins, K. and Walton, S. (2006) Business makes a 'journey' out of 'sustainability': creating adventures in Wonderland? *Organisation*, 13(6), pp. 801–839.
- Mooney, H., Cropper, A. and Reid, W. (2005) Confronting the human dilemma, *Nature*, 434, pp. 561–562.
- Norgaard, R. (1994) The co-evolution of economic and environmental systems and the emergence of unsustainability, in: R. England (ed) *Evolutionary Concepts in Contemporary Economics*, pp. 213–224 (Michigan: University of Michigan Press).
- Orsato, R.J. (2004) The ecological modernization of organizational fields, in: S. Sharma and M. Starik (eds) *New Perspectives in Research on Corporate Sustainability: Stakeholders, Environment and Society*, pp. 270–306 (London: Edward Elgar).
- Pahl-Wostl, C. (2007) The implications of complexity for integrated resources management, *Environmental Modelling & Software*, 22, pp. 561–569.
- Porter, T.B. (2006) Co-evolution as a research framework for organisations and the natural environment, *Organisation & Environment*, 19(4), pp. 479–506.
- Quinn, R.E. and Rohrbaugh, J. (1983) A spatial model of effectiveness criteria: towards a competing values approach to organisational analysis, *Management Science*, 29, pp. 363–377.



- Rae, I. and Brown, P. (2009) Managing the intractable: communicative structures for the management of hexachlorobenzene and other scheduled wastes, in: P. Brown and S. Benn (eds) *Journal of Environmental Management*, 90(4), pp. 1583–1592.
- Rammel, C., Stagl, S. and Wilfing, H. (2007) Managing complex adaptive systems – a co-evolutionary perspective on natural resource management, *Ecological Economics*, 63, pp. 9–21.
- Ramos-Martin, J. (2003) Empiricism in ecological economics: a perspective from complex systems theory, *Ecological Economics*, 46, pp. 387–398.
- Ramus, C. and Monteil, I. (2005) When are corporate environmental policies a form of greenwashing? *Business and Society*, 44, pp. 377–414.
- Rao, H. (2009) *Market Rebels: How Activists Make or Break Radical Innovations* (Princeton: Princeton University Press).
- Reason, P. (2006) Choice and quality in action research practice, *Journal of Management Inquiry*, 15(2), pp. 187–203.
- Reason, P. and Bradbury, H. (2001) Inquiry and participation in search of a world worthy of human aspiration, in: P. Reason and H. Bradbury (eds) *Handbook of Action Research: Participative Inquiry and Practice*, pp. 1–14 (Los Angeles: Sage Publications).
- Rodriguez, M., Ricart, J. and Sanchez, P. (2002) Sustainable development and the sustainability of competitive advantage, *Creativity and Innovation Management*, 11, pp. 135–146.
- Sandstrom, J. (2007) Extending the discourse in research on corporate sustainability, *Innovation & Sustainable Development*, 1, pp. 153–167.
- Seo, M., Putnam, L. and Bartunek, J. (2004) Dualities and tensions of planned organisational change, in: S.M. Poole, A. Van de Ven, *Handbook of Organisational Change and Innovation*, pp. 73–107 (Oxford: Oxford University Press).
- Snyder, N. and Duarte, D. (2003) *Strategic Innovation: Embedding Innovation as a Core Competency in Your Organisation* (San Francisco, CA: Jossey Bass Business and Management Series).
- Starik, M. (1995) Should trees have managerial standing? Toward stakeholder status for non-human nature, *Journal of Business Ethics*, 14, pp. 204–217.
- Stern, N. (2006) Stern Review on the Economics of Climate Change, Available at [http://www.hm-treasury.gov.uk/independent\\_reviews/stern\\_review\\_economics\\_climate\\_change/sternreview\\_index.cfm](http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/sternreview_index.cfm) (accessed 30 May 2008).
- Tregigda, H. and Milne, M. (2006) From sustainable management to sustainable development: a longitudinal analysis of a leading New Zealand environmental reporter, *Business Strategy and the Environment*, 15, pp. 219–241.
- Turner, R. K. (1992) Speculations on weak and strong sustainability, Centre for Social and Economic Research on the Global Environment, University of East Anglia and University College London CSERGE WORKING PAPER GEC 92–26. Available at [http://www.uea.ac.uk/env/cserge/pub/wp/gec/gec\\_1992\\_26.pdf](http://www.uea.ac.uk/env/cserge/pub/wp/gec/gec_1992_26.pdf) (accessed 26 May 2008).
- Uhl-Bien, M., Marion, R. and McKelvey, B. (2007) Complexity leadership theory: shifting leadership from the industrial age to the knowledge era, *The Leadership Quarterly*, 18, pp. 298–318.
- Waage, S. (2007) Re-considering product design: a practical ‘road-map’ for integration of sustainability issues, *Journal of Cleaner Production*, 15, pp. 638–649.
- Waddell, D., Cummins, T. and Worley, C. (2007) *Organisation Development and Change*, 3rd edn (South Melbourne: Thomson).
- Winn, M. and Zietsma, C. (2004) The war of the woods: a forestry giant seeks peace, *Greener Management International*, 48, pp. 21–37.
- York, R. (2004) The treadmill of (diversifying) production, organization & environment, Vol. 17, pp. 355–362.

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