

Transdisciplinary Study of Sustainable Enterprise

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ABSTRACT

Our research explores more holistic ways of understanding and creating sustainable enterprises. Enterprises and business school scholars are two primary actors in this research endeavor. Enterprises are moving towards sustainability but with a partial and selective understanding of global sustainability. Business school scholars generally study sustainability in their respective functional areas, such as management, accounting, finance and marketing, with some notable exceptions. We suggest that transdisciplinarity offers a unique real-world problem-solving framework that crosses disciplinary boundaries and the academic–practitioner divide. We explore the nature of transdisciplinarity and its application to corporate sustainability. We argue that enterprise sustainability requires trans-functional, trans-disciplinary, trans-stakeholder, trans-aesthetic and trans-human knowledge that is possible through transdisciplinarity. We provide an example of transdisciplinary work in art and sustainable enterprise. Copyright © 2013 John Wiley & Sons, Ltd and ERP Environment

Received 1 May 2012; revised 24 August 2012; accepted 29 October 2012

Keywords: corporate; environment; methodology; science; strategy; sustainability; transdisciplinary

Introduction

OVER THE PAST TWO DECADES, BUSINESS SCHOLARS HAVE MADE VALIANT ATTEMPTS AT STUDYING HOW ENTERPRISES can be made more sustainable. Despite good intentions, and a large growing body of literature on enterprise sustainability (Hoffman and Bansal, 2011), the actual sustainability of businesses leaves much to be desired. While progress is being made on many traditional academic fronts, there is good reason for scholars to seek additional ways of making more direct impact on enterprise sustainability performance.

Our research questions address whether and how business scholarship can help holistically understand and make direct impact on enterprise sustainability. Can scholars help enterprises develop a better understanding of sustainability challenges? Can they become part of the enterprise sustainability action? Some scholarship is already moving in this direction with the integration of social and environmental concerns in corporate strategic decisions and measurement of the triple bottom line (Savitz and Weber, 2006; Schaltegger and Wagner, 2006; Hubard, 2009; Schneider and Meins, 2011; van Marrewijk, 2003). Fifka (2011) provides an overview of 186 studies on responsibility reporting by businesses. His findings show that scholars across regions have taken different paths in empirical research and there is wide variation in the impact of specific determinants on social responsibility reporting. We believe that a lot more can be done to develop holistic understanding of enterprise sustainability, and that urgent actions are needed by companies to transition to a green economy, as the Rio + 20 report pointed

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out (UN Global Compact, 2012). For sustainable development to occur we need actions, and not just transparency and communications.

‘Transdisciplinarity’, an emerging and philosophically grounded approach to action research, offers both the possibility of stronger integration of practice and research and a methodological platform for integrating across disciplines. This paper is an exploratory examination of transdisciplinarity as an approach to studying and engaging enterprise sustainability. We begin by describing how in the past enterprises have held rather selective and partial views of sustainability issues. We describe some key characteristics of transdisciplinarity in terms of its ontological, epistemological and value orientations. Sustainability scholars can use transdisciplinary methods in dealing with sustainability challenges more holistically. Finally, we explore transdisciplinarity as a platform for making enterprises more sustainable.

Selective View of Sustainability Challenges in Enterprises

Many enterprises have started engaging sustainability issues in recent years. They are prompted by regulatory concerns, competitive pressures, innovation and market potentials, and a sense of corporate social and environmental responsibility. However, the understanding of many corporate sustainability challenges is not global or holistic; it remains narrowly focused on sustainability issues, touching only their industry and operations (Welford, 1995; Korhonen and Seager, 2008; Seager, 2008). Corporate sustainability and corporate social responsibility have been historically defined in restricted, instrumental, compliance-driven, and profit-oriented terms (Rodríguez-Melo and Mansouri, 2011). It is acknowledged that sustainability orientation should be synergistic with other performance goals (Schneider and Meins, 2011; Tang *et al.*, 2012). There are calls to extend sustainability strategies to caring and holistic approaches (van Marrewijk, 2003; Schaltegger and Burritt, 2005; Shrivastava, 2010).

Business enterprises today face fundamental sustainability challenges. First, the global financial crisis, precipitated in 2008, has led to a global economic slowdown and is prompting an era of degrowth (Schneider *et al.*, 2010). Advanced economies of Europe and USA expect their growth to be limited to 1.4–2%. Japan has been in a non-growth mode between –2% and +2% for over a decade. China and India, which were experiencing 7–12% growth, have started to moderate their growth expectations to less than half these rates. Limits to economic growth are likely to persist because economic activities are now running up against ecological boundaries (Rockström *et al.*, 2009). In an era of economic stagnation, companies are challenged to sustain their economic profitability and competitive position (World Bank, 2012).

Second, global carbon accumulations continue to worsen. The amount of carbon dioxide accumulating in Earth’s atmosphere has caused anthropogenic climate change and is projected to worsen throughout the 21st century. Carbon dioxide in Earth’s atmosphere was at 354 ppm (parts per million) in 1990. It has grown to 394.45 ppm in March 2012 (Mauna Loa Observatory, 2012). This is notable because in 1992 world governments signed the Rio Treaty promising to reduce CO₂ accumulation by 20% of 1990 levels. Businesses are under increasing pressure to measure, disclose, and cut back their carbon emissions through the use of clean (renewable) energy, cleaner production methods, and paying a price for carbon emissions (Busch and Shrivastava, 2012; Stern, 2008).

Third, the global biodiversity decline and surpassing of Earth’s biophysical limits is putting significant pressure on natural resource sustainability. With growing global demand we are reaching peak oil and expect scarcities in many raw materials (Rockström *et al.*, 2009). In addition to climate change, we are crossing the boundaries of many of Earth’s biosystems and possible tipping points (Hansen, 2006). Businesses are increasingly expected to consider biodiversity issues in their management practice (Schaltegger and Beständig, 2010; Hanson *et al.*, 2012).

Finally, global poverty and economic inequality have recently emerged at the forefront of social sustainability challenges. Despite marginal improvements in world poverty over the past decade, one billion people live below the poverty line and below \$1 per day (HDR, 2007). This deep global poverty is evidenced by many reports of international public and private institutions. According to the Human Development Report (HDR, 2010) the financial crisis was responsible for 34 million lost jobs and 64 million more people fell below the \$1.25 a day income poverty threshold. About 1.75 billion people (more than a quarter of the world population) live in multidimensional poverty – that is, with at least 30 percent of human development indicators reflecting acute deprivation in health, education and standard of living. Some 1.1 billion people in developing countries have inadequate access to water and 2.6 billion lack basic sanitation; 1.8 million

child deaths each year are related to unclean water and poor sanitation (HDR, 2006, p. 3). Poverty is not limited to developing countries. In developed countries more than 33% of children do not have adequate shelter, 20% of children do not have access to safe water, and 15% have no access to essential health services. Over 16% of children less than five years of age lack adequate nutrition and 13% of all children have never been to school (UNICEF, 2005), p. 10. Nearly a billion people entered the 21st century unable to read a book or sign their names – much less operate a computer or understand a simple application form (UNICEF, 1999), p. 7.

With an unemployment rate of 9–10% in the US and Europe, and 13% in China, the world now has over 300 million people unemployed. Even in countries such as the USA, where there used to be a large middle class, extreme income inequality is now an issue of public debate. Inequity in income distribution and financial squeeze of the middle class has created the Occupy Wall Street movement in rich countries. Income disparities are also leading to political unrest in the Arab Middle East and North Africa.

These trends pose fundamental challenges to the way businesses are conceptualized and operated and their role in achieving sustainability. They call for development of new business models that simultaneously address the economic, ecological and social challenges facing society. It is not sufficient to add on CSR or sustainability programs to current operations. We need innovation in products and services, eco-friendly production and logistic systems, compassionate human resources management and new business models centered on sustainability with possibilities of co-creating value with stakeholders (Boons and Lüdeke-Freund, 2012; Hansen *et al.*, 2009; Schaltegger *et al.*, 2012).

While the big picture of sustainability challenges is clear to sustainability researchers, corporate managers typically do not have the same understanding of the situation. Managers in enterprises have little time to read the IPCC Synthesis Reports, The Stern Report, The Economics of Ecosystems and Biodiversity 2009 and the World Development Reports. Managers are overloaded with information about their day-to-day business operations. They work upwards of 50 hours a week, and most of them have little time to deal with information not directly related to their work responsibilities. They learn about sustainability issues in news snippets and summaries. Often, sustainability-related news is sensationalized, conflicted, filled with uncertainty and incomplete, making it difficult for managers to fully understand these issues (Entman, 1996).

Consequently, few managers think about the global challenges of sustainability and equity. Corporate managers tend to have selective, narrow, instrumental, partial and organizationally specific concerns about sustainability issues for their own company. With this limited understanding, most companies do not act decisively to deal with issues and lag behind in action (Berns *et al.*, 2009). This is also partly a result of corporate values, assumptions and ideologies. Under capitalist ideology it is acceptable to treat environmental issues as externalities – hence not a managerial concern. Some managers deny the scope and magnitude of the sustainability challenge (Carvalho, 2007).

The majority of current managers are only concerned with organizationally specific issues; those that make up a part of their professional responsibilities. Organizational logic and values often encourage some managers to react to regulations and market competition, and they do not feel compelled to act on larger societal challenges in the interest of humanity. The regulatory framework for corporate governance often explicitly states that the primary responsibility of corporate directors is to maximize profits for investors (Emes, 2011). In response, some managers concentrate on meeting the minimum regulatory compliance standards in environmental, labor, consumer and social laws directly affecting their industry. Maintaining operations in compliance with regulatory requirements is a significant organizational challenge in itself. It demands attention of engineering/technical staff, legal staff and financial experts, and can involve large-scale investment projects.

Some analysts would argue that the ultimate goal of corporations is to fulfill the needs of customers within a specific framework of market competition that incentivizes managers to act in the interest of all stakeholders (Freeman, 1984). This fulfilling of 'consumer needs' approach might have been viable if we were not running up against physical and ecological boundaries (Rockström *et al.*, 2009). The transition to sustainability to accommodate an additional 2 billion consumers over the next 30 years requires responsible consumption and reduction of per capita consumption. It is reasonable to acknowledge customer and public needs; however, this must be carried out in a controlled manner and avoid unlimited consumption and perennial growth in profits (Jackson, 2009).

Progressive transitions towards sustainability are real. Increasingly, companies are looking to improve environmental performance by extracting eco-efficiencies from their operations. Eco-efficiencies in the form of energy conservation, waste reduction, time savings, consolidating logistics, transport pooling etc. are the low-hanging fruit that improves environmental performance while improving the bottom line (Kicherer *et al.*, 2007; Möller and Schaltegger, 2005;

Schaltegger, 1998; von Weizsäcker *et al.*, 2009). Another welcome response of companies is the implementation of corporate social responsibility approaches that benefit a broad group of stakeholders (Werther and Chandler, 2011). Through social and sustainable entrepreneurship, individuals and organizations are acting to drive sustainable development with their company (Hockerts and Wüstenhagen, 2010; Schaper, 2005; Schaltegger and Wagner, 2011). Even as genuine efforts are being made to tackle some sustainability challenges, there is also a rush to publicize green claims. Many companies have noticed that consumers respond well to green performance. Moreover, investors are seeking transparency about governance, social and environmental issues. Companies are being pushed to disclose information in the form of social and environmental performance reports through such initiatives as the Sustainability Accounting Standards Board and the Global Reporting Initiative. While some companies are building sustainability messages into their products/service brands, corporate image, and marketing programs, some of this is clearly 'greenwashing' (Dahl, 2010).

Sustainability Responses in Business/Management Studies

While we can point fingers at corporations and managers for being selectively engaged with sustainability, how are academic scholars doing on this issue? In particular, what are business school researchers doing with regards to studying enterprise sustainability? Our answer is mixed – research is proliferating, but the right solutions remain elusive.

On the positive side, sustainability concerns are being articulated in all the main functional areas of study in business schools – management, accounting, marketing, finance, operations, and decision/information systems. A comprehensive review of all these literatures is beyond the scope of this paper, but we mention a few examples below to show that sustainability concerns are beginning to be addressed in these areas of business.

The management field has taken a leading role in sustainability. For example, there are two divisions of the Academy of Management (the Organizations and the Natural Environment (ONE) Division and the Social Issues in Management (SIM) Division) focused specifically on ecological and social sustainability issues. Numerous themes of research on sustainable management have covered environmental management (Hoffman and Bansal, 2011), stakeholder management (Freeman, 1984; Rodriguez-Melo and Mansouri, 2011), CSR (Fifka, 2011), eco-centric management (Shrivastava, 1995; Purser *et al.*, 1995) and greening human resources (Jackson and Seo, 2010). In the past few years, a number of leading management journals (e.g. *Academy of Management Review* and *Journal of Organizational Behavior*) have created special issues on sustainability. CSEAR and EMAN organize annual conferences on social and environmental accounting research and serve as networks for accounting work related to sustainability. Social, environmental and critical accounting research is well established through journals (*Critical Perspectives on Accounting* and *Social and Environmental Accountability*) and there are numerous studies on disclosure, transparency and accountability (Kolk, 2008), environmental reporting and social accounting (Gray and Laughlin, 2012; Burritt and Schaltegger, 2010; Parker, 2005).

Similarly, in operations management, the Closed Loop Supply Chain Workshops offer a venue and network for green operations research (Curcovic and Sroufe, 2010; Meehan and Bride, 2011; Elliot, 2011). In marketing, the Transformative Consumer Research Association is a community of business school marketing scholars examining the implications of sustainability for the marketing function. They cover a wide range of topics from design of green products and services to responsible consumption practices and sustenance economies (Tang *et al.*, 2012).

In other words, a research 'niche' seems to have emerged in various functional areas of business studies to address enterprise sustainability issues (Korhonen and Seager, 2008). Some niches are bigger than others, but all of them operate under the marginalizing attitude of the dominant orthodoxy of their respective functions. Moreover, there is little unification of concepts and pedagogies across these niches to deal with the complete overhaul needed for holistic enterprise transformation.

Most studies of enterprise sustainability operate under 'scientific' norms, and disciplinary grounding in the parent function or parent discipline of economics, sociology or psychology. They are part of the fragmented functional area silos that divide business studies in general.

Business schools, particularly in North America, operate within university and economic environments, where they are expected to generate surplus revenues – i.e. be the ‘cash cows’ in financially tight times. They are also locked in fierce competition against each other, fueled by accreditation requirements and competitive rankings. The assessment of these business schools is closely related to how well they meet the demands of corporations, who are employers of their graduates and an important source of funding. Their success depends on how well they serve corporate interests and not on how well they produce knowledge ‘for the common good’. We do acknowledge, however, that in Europe and Asia and other parts of the world where many business schools are tax-funded they serve other interests.

To make matters worse, as Mitroff (2004) suggests, business schools may have provided the environment where scandals such as Enron and Andersen could flourish. He argues that these schools are active accomplices and co-conspirators in their criminal behavior. Ghoshal (2005, p. 76) drives the point home, arguing that ‘by propagating ideologically inspired amoral theories, business schools have actively freed their students from any sense of moral responsibility’. Similarly, Pfeffer (2005) agrees that the ‘academic research related to the conduct of business and management has had some very significant and negative influences on the practice of management’ (Ghoshal, 2005, p. 76, quoted by Pfeffer, 2005, p. 98) and that ‘...economics is indeed taking over management and organization science, just as it has taken over political science and law and is making inroads into sociology and psychology. . .’ (Pfeffer, 2005, p. 96).

Mainstream business and management research often remains ideologically bound, seeking to serve private corporate interests. This could in some situations hurt interests of other stakeholders or sustainability concerns. Business sustainability researchers are trying to build a caring, green, climate-friendly, socially responsive and natural capitalism. Most of them operate largely within the paradigm of neoliberal capital markets (Hart, 2007). There is little serious effort to reform the capitalist model *per se*, although we must note that critical management studies do reveal uniformity and standardized discourse for performance and profit in a capitalist mode. They question the stakes, interests and power promoted by this discourse (Alvesson and Willmott, 2002). They favor critical studies of the capitalistic approach, which dominates the organizational world.

In a globalized world, European pluralism, Chinese communism and Indian socialism each have different legislative arsenals, trade-union/labor influences, contextual societal changes and circumstances in which knowledge is formed. However, academic organizational knowledge remains embedded in theoretical frameworks where historical, cultural and political factors are underemphasized. Researchers need to practice reflexivity; they need to become more aware of the interests they serve, of their own political stance, of their cultural anchoring and of their specific and relative voice beyond the organizational polyphony (Alvesson and Kärreman, 2000).

Most business researchers publish in journals that managers do not read. They are part of a self-centered discourse among academics. In his 1993 presidential speech to the Academy of Management Annual Meeting, Hambrick (1994, p. 13) spoke about the incestuous relationship in the academic community: ‘Each August, we come to talk with each other: during the rest of the year we read each other’s papers’ in our journals and write our own papers so that we may, in turn, have an audience the following August: an incestuous, closed loop. It is time for us to break out of our closed loop. It is time for us to matter.’

Since then, some scholars have tried to build bridges to challenge the *The Knowing–Doing Gap* (Pfeffer and Sutton, 2000). Rousseau (2007) looks for better diffusion of results through evidence-based management among practitioners by taking into consideration that a very small number of them read academic journals. Others see managerially useful knowledge as mixed and scalable, derived from the community of researchers and practitioners, mobilizing diverse disciplines (Tranfield, 2002; Gibbons *et al.*, 1994). Van de Ven and Johnson (2006) promote engaged scholarship among a pluralistic collective of researchers and practitioners with intellectual arbitrage to create practitioner-meaningful research. Boisot and McKelvey (2010) try to bridge the intellectual division between modernist and postmodernist, which appears as an unfruitful competition, by echoing complexity science (Morin, 1992). Sandberg and Tsoukas (2011) invite scholars to adopt a practical rationality based on phenomenology.

As interesting as these contributions are, they are constrained by the academic limitations and boundaries of article writing in academic journals: ultimately dominated by institutional pressure for high-level publication. Moreover, these contributions fail to propose a complete methodology that bridges disciplinary boundaries into holistic studies of sustainability.

Finally, the social utility of traditional disciplinary research, critical research and practitioner-oriented research has become problematic. Mainstream literature conveys the purpose of implementing evidence-based management.

Critical research evokes emancipation. Both are far from the reality of organizations and also equally far from the ecological and social stakes of society. Conferences and journals make it possible for the academic world to function with several political and cultural colors while remaining dedicated in theory to the management of organizations. Despite the varying strategies, which ultimately feed the ongoing debates between researchers, the academic world uses only one language (Americanized English). Tung (2005, p. 240) in her Academy of Management Presidential address called it the 'North American research template'. Notoriety and recognition are involved in the same systems of international notation and classification. This self-referential system is geared to maintaining the status quo among the institutions of teaching and research.

In this context, transdisciplinarity offers some very attractive options. In the next section we examine what transdisciplinarity is and propose some ways that enterprise sustainability research can use it to leapfrog traditional disciplinary boundaries and limitations, while leveraging a greater impact on real world sustainability problems.

From Inter- and Multi-Disciplinarity to Transdisciplinarity

Scientific inquiry has been enormously productive as a method of knowledge production. It has a robust underlying scientific method that makes knowledge claims refutable and publicly verifiable. It allows researchers to produce deep and cumulative knowledge. Within each discipline, rules can be made and maintained, training can be imparted and scholars can engage in debates as a community. Scientifically verified knowledge can be transferred to users in a well established and understood scientific system that has worked reasonably well over the past two centuries. The shortcoming of disciplinary research is that disciplines have become increasingly fragmented and isolated from each other (Jacobs, 2009).

Mainstream business research tends to be isolated on three levels. First, as mentioned earlier, it is isolated from the real world of practice. Second, it is isolated from alternative thinking, despite the growing production of critical studies, which can be considered as alternative thought. Both academic and practitioner research remain captives of a utilitarian and/or idealist framework within the scope of traditional academic journals. Third, business research is isolated from sustainability concerns and associated ecological and social stakes. Even when researchers address natural resources, they seek 'rational' exploitation of resources in the context of Western capitalist economies (Banerjee, 2003).

We see the common roots of this isolation in Western scientific and ideological assumptions and seek contrasting insights from transdisciplinary methodology, which is particularly suitable for studying a holistic topic such as 'sustainability'. Sustainability is about creating conditions for a flourishing life on Earth (Ehrenfeld, 2008). It cannot be understood in narrow partial pieces delimited by disciplinary and ideological boundaries. Critical to comprehending sustainability of the whole Earth and of enterprises on it is the understanding of interdependencies between parts of the system and the deep embeddedness of systems in each other that give it complexity and dynamic balance. Enterprises as mediators of virtually every human activity are deeply implicated in making life sustainable (or not). Enterprise sustainability needs to have a broad focus that transcends narrow disciplinary concerns: a focus that can see interdependencies between variables and trends from many disciplines.

The notion of sustainability transcends the recurring alternative between economic and social development, especially for management studies. It transforms the binary debate of profit versus people, to include a third P – the planet (Elkington, 1997). This last actor (planet) can be theorized only in a transdisciplinary field, which involves going beyond the traditional definition of managing profit in a juridico-economic way (with a legal regulation) to a definition that encompasses an ecological stance.

Over the past 700 years the number of disciplines has grown enormously. In the year 1300 there were only seven disciplines (the University of Paris had four departments in 1251). The number of disciplines increased in the 20th century. In the 1950s there were 54 accepted disciplines. By 1975 the number of disciplines had leaped to 1845 according to the Joint Academic Classification of Subjects, a UK-based government statistics service. In 2010 the US National Science Foundation Register recorded over 8000 disciplines (Nicolescu, 2010). Interestingly, business research is listed not as a 'discipline' but rather under 'professional studies', along with hundreds of other areas of practical study. From within its own silo, business studies cannot understand sustainability.

Transdisciplinarity

Transdisciplinarity as research uses real life challenges as a starting point. It is phenomenon driven, not theory driven. It deals with complex practical challenges. Dealing with complexity requires collaboration with multiple actors, from academia, enterprises and civil society. There is no single discipline or perspective that can offer complete answers to sustainability challenges. Transdisciplinary research seeks joint clarification of the problems under investigation, as well as an iterative search for collaborative solutions. Researchers and practitioners work jointly to choose problems and define research agendas. However, as Max-Neef (2005) points out, getting together teams of specialists from different areas is not enough. Each member of the team must commit to integrative synthesis. Transdisciplinarity is co-evolutionary in the sense that research and application occur iteratively, modifying each other. There is no strict separation between knowledge creation and knowledge transfer. These are parallel and interactive activities. The interactive process directly tests, contests, modifies and refines results (Morin, 1992).

The word 'transdisciplinarity' first appeared in the talks of Jean Piaget, Erich Jantsch and Andre Lichnerowicz. It referred to systems theory, systems analysis, modeling, collaboration, action learning and other approaches to research-based problem solving (Choi and Pak, 2006). As stressed by Hirsch Hadorn *et al.* (2008), the implementation of transdisciplinarity is still being developed for selected issues and it faces strong resistance within academia, which is deeply committed to disciplinary knowledge.

The physicist Basarab Nicolescu (2008) worked out a transdisciplinary epistemology. The logos of transdisciplinarity is compatible with a great number of different methodologies, since it embraces multiple levels of reality, logic of the included middle, and complexity (Nicolescu, 2002, p. 68; Morin, 1992). Accepting multiple levels of reality is compatible with wisdom traditions, quantum physics and mathematics. It was Heisenberg (1998) who proposed an original formulation of 'level of Reality', suggesting that what is true at one level of reality is not true at another. Knowledge of reality must be obtained at all levels. Given that sustainability deals with multiple levels of reality about human beings and the natural world, transdisciplinarity offers a way to integrate natural and human sciences.

Transdisciplinarity is also fundamentally concerned with complexity (Morin, 1990, 1999; Morin and Kern, 1999). Morin goes beyond the cognitive horizon of complexity. Instead of resorting to reassuring ideological certainties and scientific hubris, Morin thinks that 'science can exist and make progress, if it can go beyond its singular territories and if it can approach new objects without any possessive pretenses' (Madonnato, 2004, p. 457). Morin has especially advocated the crossing of complex bio-cultural stratifications because it is necessary to think beyond them and also beyond 'subject' and 'object' relationship (Madonnato, 2004).

In line with these defining characteristics of transdisciplinarity we want to elucidate some ontological, epistemological, methodological and ethical assumptions of transdisciplinarity.

- Transdisciplinarity seeks open non-reductionist inquiry into the human condition and human–nature relations. Ontologically, it accepts that reality is manifested at multiple levels (physical, social, emotional, spiritual etc.), each governed by different types of logic (Nicolescu, 2002).
- Epistemologically, it assumes that many forms of knowledge are not only possible but necessary. It opens all disciplines to that which is beyond them, because transdisciplinary research is an 'interface practice' at the juncture of societal and scientific practices (Lang *et al.*, 2012, p. 27). It aims for semantic and practical unification of meanings to achieve pragmatic solutions to real problems.
- Methodologically, transdisciplinarity favors rigor, openness and tolerance. Rigor in argument, taking into account all existing data, is the best defence against possible distortions. Openness involves an acceptance of the unknown, the unexpected, the unforeseeable, even the unknowable. Tolerance implies acknowledging the right to ideas and truths opposed to our own. Therefore, it works in a collaborative design (Lang *et al.*, 2012).
- Ethically, transdisciplinarity is about dialogue and discussion, regardless of whether the origin of this attitude is ideological, scientific, religious, economic, political or philosophical. Shared knowledge should lead to a shared understanding based on an absolute respect for the collective and individual otherness, united by our common life on Earth.

Transdisciplinary research deals with complexity, and is difficult for both researchers and practitioners to apply. Some attempts have been made in the past to identify key components and design principles of how to do transdisciplinary sustainability. Lang *et al.*, (2012) synthesized the most important previous models to propose a conceptual

model of an ideal–typical transdisciplinary research process. They structure design principles into the three phases of transdisciplinary research: (a) design principles for collaborative problem framing and building a collaborative research team; (b) design principles for co-creation of solution-oriented and transferable knowledge through collaborative research; (c) design principles for (re-)integrating and applying the created knowledge.

Transdisciplinarity presupposes an open-minded rationality by re-examining the concepts of ‘definition’, ‘objectivity’ and ‘boundaries’, and by questioning knowledge conception from its Western philosophical roots. Although, in reality, there are no clearly defined boundaries between disciplines, these boundaries have been created artificially and arbitrarily as if knowledge was discrete. This discretization of knowledge is rooted in Western philosophies as shown by Jullien (2006) and Rorty (1989). These dissident philosophers question the Platonic belief that knowledge as a mental abstraction is superior to human entanglement within the real world. This belief led to a gap between the visible and sensuous world on the one hand, and the invisible and intellectual world on the other (Abram, 1996). In order to deal with this tangible versus intelligible distance, management scholars have not only to go toward inter-, pluri- and multidisciplinary, they must also engage life in transdisciplinary ways.

The discretization of knowledge has greatly contributed to the production of isolated silos of knowledge disciplines. The concepts of ‘interdisciplinarity’ and ‘transdisciplinarity’ have appeared in the sciences because of an emerging need to build bridges between disciplines. These concepts differ from those of ‘multidisciplinarity’ or ‘pluridisciplinarity’. Multidisciplinarity is about putting together many areas of knowledge without making any connection between them, whereas pluridisciplinarity implies cooperation between disciplines without coordination (Max-Neef, 2005, p. 6).

Transdisciplinarity views humans in an evolutionary, planetary and cosmic context. Human appearance on Earth is one of the stages in the evolutionary history of the universe (Berry and Swimme, 1994). Humans may have a nationality, but as inhabitants of the Earth they are also transnational, with no single culture being privileged over any other. This deliberately open vision sees the natural sciences in dialogue and reconciliation with the humanities and the social sciences, as well as with art, literature, poetry and spiritual experience.

For sustainability, this implies that authentic knowledge cannot value abstraction over other forms. It cannot remain at an ideal level as pure knowledge. It must be contextual and concrete but also global and local at the same time. It values the role of intuition, imagination, sensibility and the body, in the creation and transmission of knowledge. In particular, management researchers engaged in creating enterprise sustainability have multiple missions in recognition of their entanglement with businesses and society. They must promote an institutional discourse in order to legitimize sustainability policies for the ‘common good’. Their daily concrete mission must include engaging themselves in a sustainable and strong relationship with business managers, through consulting, coaching and teaching (Wiek *et al.*, 2011). Finally, their research must be actionable. It means a design of research based on collaboration between actors within and outside academia and co-creation of solutions. Scholars have to engage actors from outside academia for enterprise sustainability (Lang *et al.*, 2012).

Implication of Transdisciplinarity for Enterprise Sustainability

Enterprise sustainability and transdisciplinarity are closely related because of the complex nature of sustainability issues. Transdisciplinarity implies simultaneous understanding and integration of three main dimensions: economic, ecological and social in a socio-historical context. With globalization of the economy, sustainability has become a planetary concern, which requires transcending traditional geographical and national boundaries. Morin (1998) depicts these major problems as transversal, transnational, multidimensional, transdisciplinary and global. Transdisciplinary enterprise sustainability implies the primacy of humans over economic institutions. It advocates that the economy/institutions serve humans and humans take responsibility for stewardship of nature. Transdisciplinarity permits understanding of the complex challenges, personal responsibilities and action possibilities for sustainable living. According to Costanza (2003, p. 651), transdisciplinarity dissolves the frontiers between traditional disciplines and ‘will allow us to build a world that is both sustainable and desirable and that recognizes our fundamental partnership with the rest of nature’.

Knowledge for Sustainable Human–Nature Balance

The ‘ways of knowing’ that are used for understanding the nature–human balance are a big part of the problem. Much of our knowledge about humans, nature and relationships between them is scientific, discipline based and highly fragmented. We are overdependent on one type of knowledge, which is rational, cognitive and scientific, and we ignore emotional, embodied and intuitive forms of knowing (Schaltegger, 2007; Shrivastava and Ivanaj, 2011). It is imperative to integrate different elements such as time, space, knowledge systems, disciplines, policy, social systems and information, emotion and intuition to cope with sustainability problems (Dovers, 1997). Dovers (2005, p. 3) points out that ‘the imperative of integration stems from recognition of the interdependence of human and natural systems, expressed in the research and policy agendas of sustainability’. This integrative approach concerns both academic disciplines and international political or economic systems, public or private organizations and various types of intervention. Many higher educational establishments in many different domains (engineering science, politics, geography, management, sociology etc.) are beginning to explore inter-, multi- or transdisciplinary theoretical approaches, allowing them to create and use new skills to deal with sustainability issues (Bussey, 2008; Edwards, 2009).

We discuss this integrated transdisciplinary knowledge in terms of its trans-functional, trans-discipline, trans-stakeholder, trans-aesthetic, trans-human and trans-cultural characteristics.

Trans-functional – Whole Organization

Today’s management mainly relies on goals and conventional analytic means to achieve them. It is largely devoid of emotions and feelings of employees. Caring for employees and potential difficulties experienced outside the workplace is rarely an organizational concern. However, creativity and productivity, and consequently the overall long-term progress of organizations, is directly influenced by the emotional life of employees. To be more sustainable, organizations have to rethink and reinvent their methods of producing goods and services and their relationships with stakeholders, and especially with their employees. Using a transdisciplinarity approach means considering employees and organizational functions in holistic ways and not in separate functional siloes. It implies being open to trans-cognitive or trans-instrumental stances.

The educational implication of trans-functionality in the context of business studies is to go beyond traditional functional areas of business. Currently, business education is divided into functions of marketing, finance, accounting, operations and management. This orientation reinforces a functional optimization mindset while de-emphasizing the larger sustainability goal of designing and implementing life systems in a sustainable way. Instead of or in addition to the above functional orientation, sustainability business education can be designed in terms of managing water, food systems, habitats, transportation, entertainment, climate change and other systems of modern life.

Trans-discipline – Unified Knowledge and Common Values

Nicolescu (2002) underlined that a good decision-maker must be able to have a dialogue with different kinds of experts from economy, information systems, biology, politics etc. Transdisciplinary unified knowledge seeks understanding and wisdom, whereas disciplinary knowledge is more about knowing facts and their relationships. As a new form of knowledge, it represents a balance between intellect, feeling and the body, while disciplinary knowledge is oriented largely to analytic intelligence.

Another important feature of transdisciplinary knowledge is the inclusion of values that are excluded by disciplinary knowledge. Scientific disciplines attempt to be value free. Transdisciplinary knowledge, on the other hand, is contextualized by values and commitments and evolves with changes in context. It is embedded in social and cultural historical evolution of societies. It does not deny the role of values but instead embraces them and makes them explicit and worthy of debate.

Trans-stakeholder – Private to the Common Good

All knowledge serves human interests (Habermas, 1972). It is important to know whose interests are being served. Especially in the social sciences and business studies, knowledge is contested. It is used for settling conflicts over resources, benefits and responsibilities. Business schools tend to openly serve the interest of their primary

stakeholders – business and corporations. Sustainability is a trans-stakeholder cause. Knowledge for sustainability decision-making needs to transcend private interests, to achieve the common good.

Trans-analytic – Aesthetic Practices

Shrivastava *et al.* (2012) argued that we can obtain better action and behavioral commitments to sustainability by using aesthetics to develop passion and emotional connection for sustainable organizing and living. Realizing the importance of aesthetics for enterprise sustainability, academics, educators and artists are networked through the ‘Arts, Aesthetics, Creativity, and Organization Research Network’ (AACORN), to develop and promote the field of organizational aesthetics by connecting art, aesthetics and creative practice within organizational and work settings (Strati, 1992). Aesthetics offers enterprises new ways to awaken workers creatively, and to learn about one’s self and others. Aesthetic practice can help employees better deal with the unknown and overcome fear of the unfamiliar. It encourages them to stretch beyond their comfort zones and beyond self-perceived limits that they would usually not reach using classic analytical approaches. For example, aesthetic practices that use music, poetry, theater, painting etc. are being used to learn about leadership, teamwork, communication and innovation (Taylor and Hansen, 2005).

Trans-human – Including Other Species and Nature

In a transdisciplinary sustainability framework, humans are not separate from nature but a part of it. Today the concern for ecocentric and compassionate management is stigmatized because it dilutes the economic purpose in favor of social purpose. In general, anthropocentrism is a flaw in most management studies because it ignores ecology, which is the very basis of human existence (Purser *et al.*, 1995). Under anthropocentric assumptions, corporate greening is accompanied by a process of amoralization (Crane, 2000). Transdisciplinarity suggests a view of economic and social purposes as the two banks of the same river, which has only one bed, forged by the assumptions of humanist thought. Transdisciplinarity calls for socially sustainable ecocentric management, including humans and other species as part of nature. Some researchers also refuse to consider human beings only as ‘resources’, because of humanism, moral concerns or benevolence (Sims *et al.*, 1990; Tsoukas, 1994).

Trans-cultural – Beyond the Usual Cultural Studies

With the emerging importance of China and India, a transdisciplinary approach recognizes alternative modes of thought. While there is some contemporary ‘management’ literature in these countries that is not influenced by Western thought (Chen and Lee, 2008; Zhang, 2012), most companies and academics mimic Western management ideas. These countries’ cultures are based on very different worldviews from the West. Their different deep wisdom traditions and ways of knowing can inform and enrich human development practices very different from those of the West. To avoid Western isolation of management studies, we need to acknowledge the Eastern alternatives.

Even if these emerging countries are less sensitive to sustainability issues, they could be more gifted for the ‘trans-’ character of transdisciplinarity because they offer holistic approaches, different from analytic approaches all too common in the classic sciences. A holistic approach is more naturally able to cross disciplines and to engage dialogue with art, poetry and literature.

Global firms that are not under the control of national governance should be able to lead in transdisciplinary policy development. A dialogue is needed between international governance institutions and global firms (Pies *et al.*, 2009, 2010). Transdisciplinarity requires ‘coaches’ and ‘translators’ to facilitate communicative dialogue between policy-makers for adopting transdisciplinary methodology beyond national or corporate interests.

Illustrative Case Example

We end this paper with some observations about how transdisciplinarity can support sustainable development of organizations. We provide an illustration from our own transdisciplinary research project on ‘Art and Sustainable Enterprise’ at ICN Business School in France.

Transdisciplinarity can foster sustainability at enterprise level in the following ways.

- *Globalizing vision and goals of organizations* to include local, social and ecological responsibilities: going beyond the injunction 'think globally, act locally' to 'think locally and act globally'.
- *Encouraging collaboration* between corporations and civil society members, between public and private organizations and among researchers from multiple disciplines. Entering into long term dialogues.
- *Allowing interplay of many forms of knowledge* (intuition, foresight, wisdom traditions, empirical and logical) to inform analysis and decision-making in organizations.
- *Making ecocentric values a key aspect of organizational culture.*
- *Empowering employees* to act on their own ecological and social impulses and commitments.

The case example we present here is a project on art and sustainable enterprise that we have been engaged with since June 2010. It took the form of an International Research Chair on Art and Sustainable Enterprise (www.ircase.org). It is an extension of the ARTEM alliance (Art, Technology and Management) towards sustainability, in collaboration with the David O'Brien Centre for Sustainable Enterprise, Concordia University, Montreal. ARTEM itself is a consortium between the Ecole des Mines de Nancy (Graduate School of Mines/Engineering), the Ecole Nationale Supérieure d'Art de Nancy (National School of Art) and ICN Business School. It is an alliance of people, artists, engineers and business people, that encompasses the disciplines of art, science, technology and management. IRCASE initiated an agenda of global, collaborative, transdisciplinary ecocentric research and action. It uses aesthetic inquiry and arts-based methods to understand enterprise sustainability issues integrating arts, technology and management with sustainability.

The goals of IRCASE included (1) developing conceptual frameworks to establish the intellectual connection between art and sustainable development of organizations and (2) developing instrumental or practical projects allowing the design of tools to enhance managerial practice of sustainability and creativity in organizations. These goals are accomplished by working on research and practical projects, international network building and teaching/pedagogy.

The IRCASE conceptual framework is built around multiple disciplinary streams of literature such as 'design thinking', use of arts-based methods for learning management skills, sustainable and environmental art, aesthetics theories, epistemological needs of sustainability, and psychology of aesthetic perception. All of these streams address connections between arts, sustainability and enterprise. This is supported by empirical and intuitive testing of 'facts', practical validation of concepts and development of 'aesthetic practice', and their application to make enterprises more sustainable. These elements of the program illustrate some of the transdisciplinarity dimensions we discussed above.

Globalizing vision and goals of organization

Research projects in IRCASE are mostly developed by collaborative research teams, which offer a way to talk and act together among different people committed to sustainability (artists, engineers, managers), coming from different places (local, national, international), belonging to different organizations (universities, businesses, associations, communities) and addressing different issues of sustainability (leadership, HR, sustainable technologies etc.). Team members have different perceptions of concepts of values, morality, utility, truth, business, performance, principles, outcomes etc. The phase of collaboratively sharing common vision and goals is an important part of the project. It matches Phase A of transdisciplinary research process proposed by Lang *et al.* (2012, p. 27), 'building a collaborative research team collaboratively framing the problem', but also echoes trans-functional and trans-discipline characteristics.

Encouraging collaboration

IRCASE serves as an open space for innovative thought and collaboration, rather than an area for exercising specialized expertise. Sustainability is not only relevant for experts; instead, it is a learning space for people to collaboratively consider and engage in sustainable life styles. The involvement of collaborators in an IRCASE project team is voluntary and proactive. Project team members are passionate about their project and its innovative and transdisciplinary nature.

Allowing interplay of many forms of knowledge

IRCASE encourages different types of research involving a multitude of forms of knowledge such as

- use of visualization to make legal contracts easier and more implementable (law-art),
- sustainable technologies and innovations (management-technology-sustainability science),

- human resources linked to the stakes of compassion and sustainability (management–art),
- art fostering ethical sensitivity (ethics–art–sustainability),
- entrepreneurship and managerial behavior with bounded rationality and evolutionary psychology (management–psychology),
- use of music to explore organizational rhythms (art–management),
- use of dance to explore sustainable leadership, teamwork and communications (art–management),
- use of transdisciplinary aesthetic practices and pedagogies for building creative and sustainable organizations (education–art–sustainability–management),
- an eco-fashion swishing (clothes swap) where used clothing is recycled illustrates the interplay of multiple knowledge forms that connect nature and culture, body and mind.

Making ecocentric values a key aspect of organizational culture

Although people, research topics, knowledge forms, specializations and leadership of IRCASE vary from one project to another, art and sustainability serve as common denominators in all of them. Culture is not isolated from nature. Ecocentric values are socially designed as a living process of mind, body, spirit in engagements echoing trans-human scope.

Empowering employees

Through aesthetic practice workshops, our researchers offer a space for collective co-creation to foster sustainable behavior among employees and/or teams. Exposing art outside the artist's realm provides a powerful lever to build shared knowledge for sustainable enterprise. This aspect leverages the trans-human and trans-analytic characteristics of transdisciplinarity for sustainability innovation. Enterprises are increasingly relying on creativity and innovation to become more sustainable (Hall and Vredenburg, 2003; Nidumolu *et al.* 2009; Ehrenfeld, 2009), making sustainability a key driver of innovation.

Improving employee satisfaction and fostering holistic personal growth leads to better environmental protection, better use of natural resources and improved design of eco-friendly and innovative products and services. Arts can help companies deal with sensory and emotional aspects of organizational sustainability, which are a strength of aesthetic inquiry. IRCASE is developing instrumental ways of using art techniques (from music, dance, painting, photography etc.) for teaching and training on sustainability issues. These art practices serve as a conduit for evoking human passion. They infuse passion into the pursuit of sustainability, and build enduring commitment to it.

In summary, IRCASE shows how enterprises can learn from the arts about creativity and innovation, systemic and contextual thinking, improvisation, resilience and conflict resolution (Shrivastava, 2010; Shrivastava and Ivanaj, 2011). Business students and managers can learn about sustainability through collaboration with artists and communities. It pursues collective social and environmental goals, encouraging participants to make a connection between art and sustainable enterprise.

Conclusions

In light of these transdisciplinary reflections, business researchers should consider reorienting enterprise sustainability studies to radically re-imagine what enterprises can become. Organizational stakeholders are urging business enterprises not to rely solely on profit as motive and justification for business. Business organizations need to serve a larger social purpose that enhances the common good.

Transdisciplinarity suggests that local and partial approaches that protect only investor interests can be fruitfully replaced by global thinking that takes into account the diverse and sometimes conflicting interests of multiple stakeholders and nature. Businesses are an opportune lever to change behaviors towards the common good. They can open a way towards sustainability.

We business scholars need to open our minds, as well as our journals, and go beyond the frontiers of scientific rationality. This special issue is a welcome demonstration of how transdisciplinary studies can be used to foster enterprise sustainability.

Acknowledgments

Based on a keynote panel presentation at the Leuphana University Sustainability Summit, 2 March 2012. We thank two anonymous reviewers and Andrew Ross of the David O'Brien Centre for Sustainable Enterprise, Concordia University, for their comments on this paper. We thank Professors Stefan Schaltegger, Markus Beckmann and Erik G. Hansen, Centre for Sustainability Management, Leuphana University of Lüneburg, for feedback on earlier versions.

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