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# Knowledge for Sustainable Development: The Role of Knowledge Networks & Organizational Learning

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## ABSTRACT

A critical aspect of corporate social responsibility is the implementation of sustainable development (SD). Knowledge networks comprised of various stakeholders can be viewed as a facilitator of responsibility through the support of knowledge transfer (KT) and organizational learning (OL). Propositions about the relationship between knowledge networks, stakeholders, KT and OL and their impact on SD will be presented.

## Keywords

Knowledge Management, Sustainable Development, Knowledge Networks, Organizational Learning

## INTRODUCTION

A consequence of modern societies' behavior is the diminishment of nature's long-term productive capacity. The cause of nature's reduced productive potential is pollution and the displacement of resources in various ways. Renewable resources are being used up at such a rate that nature does not have time to build new ones. At the same time, there are more and more people on earth in need of these resources as developing countries continue unparalleled growth.

One of the many ways in which today's business environment is starting to change can be seen in the development of a worldwide shift toward *sustainable development* and safer environmental practices throughout global industries. Changes have begun to occur in the agriculture, chemical, pharmaceutical, and manufacturing fields in response to government legislature and public pressure to 'clean up' the way business is conducted in terms of environmental, economic and social practices. Despite ongoing debate over the nature of environmental standards many firms are adopting environmental principles and practices that go well beyond mere compliance (Kennelly Rindova and Ellerbusch 1999).

The state of environment and the increased interest in sustainable development echoes the motivations that are shifting organizations toward a knowledge economy. In this era of knowledge work, knowledge about the state of the environment is plentiful. In the same way that organizations are recognizing the potential of their knowledge assets for generating value, organizations are learning how to use natural resources in methods that increase their value and quantity over time. As well increasing the utilization rate of an organization's knowledge assets, the implementing sustainable development also creates a long-term sustainable advantage through the generation of increasing returns and continued market advantages.

Hendry explained that the emergence of new strategic business decisions to incorporate sustainability into an organization "of necessity...involves significant learning for a firm and its employees and social and political as well as knowledge processes" (Hendry 1996, p. 637). One common tool to provide organizations with the necessary resources to augment learning is a *knowledge network*. Networks provide firms with access to knowledge, resources, markets, and/or technologies. Through membership, the potential for knowledge acquisition by the network members is created.

This paper explores environmental knowledge acquisition from external sources, why environmental knowledge transfer between network members occurs, and the network's influence on an organization's ability to acquire new knowledge and facilitate the transfer of knowledge among network members. Given that networks create access to knowledge for members, we view networks as a key facilitator of knowledge transfer between an organization and the external environment.

## SUSTAINABLE DEVELOPMENT IN ORGANIZATIONS

The concept of sustainable development, while not new, was popularized through the work by the World Commission on Environment and Development. The Brundtland report defined sustainable development as “development that meets the needs of the present, without compromising the ability of the future to meet their own needs” (1987, p. 8). Sustainable development traditionally consists of three separate domains; the environment, society and economy. All three domains are interconnected; the economy exists within society, which exists within the environment. Changes in any one domain, affects the other two as well. This conception implies that attaining sustainable development requires changes and improvements in *all* three sectors (Hopwood Mellor and O'Brien 2005).

While there have been numerous international conferences and meetings, recently introduced government regulations and policy documents (e.g., U.S. Department of Energy, 1994; Umweltbundesamt, 1997; Enquete Kommission, 1997; IDARio, 1997, etc.), awareness campaigns by non-governmental organizations (NGOs) (e.g., The Sierra Club, The Rocky Mountain Institute, Friends of the Earth, etc.), a plethora of research (Bansal and Roth 2000; Bressers and de Bruijn 2005; Clarke and Roome 1999; Delmas and Toffel 2004; Starik and Marcus 2000) as well as increased corporate involvement by leading companies, there is continued failure in the attainment of sustainable development goals in all three domains (Dyllick and Hockerts 2002). Environmentally, the protection of biodiversity and climate change on an international scale has slowed down. Socially, serious attempts to decrease global poverty and inequality are virtually non-existent. Economically, global free trade “which was seen as a major tool to advance economic sustainability” (Dyllick et al. 2002, p. 131) has been stalled. Given these failures, it becomes obvious that more effort, and from our perspective, more research into successful solutions, must be made.

### The Role of Business in Sustainable Development

Despite the fact that business and industry have caused some of the degradation in today's global natural environment, it is critical that they play a major role in attaining sustainable forms of development for the future. Whereas in the mid-1990's local authorities were typically the most heavily engaged in attempts to reach levels of sustainable development, “the focus has recently shifted strongly towards business as a major actor” (Dyllick et al. 2002, p. 132). Organizations are well positioned to participate in this pursuit as they have the appropriate “levels of financial resources, technological knowledge, and institutional capacity to implement [sustainable development]” (Shrivastava 1995, p. 937).

To play an effective role in this arena, organizations must re-conceptualize their place in society. They must recognize that their activities are directly linked to the fundamental challenges of sustainability. Likewise, progress toward sustainable development must be viewed as beneficial to the organization. Organizations that are more sustainable can see benefits in:

1. Decreased operational costs by making use of environmental efficiencies;
2. Increased competitive advantage through the development of environmentally efficient business solutions;
3. Improved public relations and corporate image through corporate social responsibility;
4. Improved risk management in the areas of “resource depletion, fluctuations in energy costs, product liabilities, and pollution and waste management.”(Shrivastava 1995, p. 955) and
5. Preemptively staying ahead of the regulatory curve, thus keeping the organization in a better business position (Shrivastava 1995).

To become sustainable, organizations must improve their performance in the three core domains of sustainability. Environmentally, organizations need to insure that their activities remain within the environment's natural carrying capacity. This implies that organizations must use natural resources at a rate that is below the natural development of the resource itself. Socially, organizations must add perceived value to their communities, increase the organization's relationships with direct and indirect stakeholders (such as shareholders, employees, social groups, community members, customers, etc.) and must accomplish it through open communication about the organization's activities and values (Cramer 2005; Dyllick et al. 2002; Inkpen and Tsang 2005).

### The Role of Networks in Attaining Sustainable Development

Meeting these sustainability goals are rarely achieved in an organizational vacuum. The intricacy of the relationships between and the challenges within the environmental, social and economic realms are too complex for organizations to solve on their own (Hartman Hofman and Stafford 1999; Roome 2001). These challenges require more frequent and significant interactions with other organizations and stakeholders. Stakeholders can include governments, citizens, academics, NGOs, customers, pressure groups, etc. The interactions possibly occurring between these various groups can be viewed as networks “that

provides a wider input of information, ideas and legitimacy from sources beyond the traditional business model” (Roome 2001, p. 70).

The need for meaningful relationships between various stakeholders was identified as a primary requirement of the disparate audience of the 1999 Seventh International Conference of the Greening of Industry Network (GIN). Academics, policy makers, industrialists, and environmentalists all identified the necessity for stronger networks and better relations within those networks in order to progress toward sustainability (Hartman et al. 1999). Often, many adversarial relationships emerge among environmental stakeholders that currently stand in the way of meaningful network relations. To overcome these challenges, relevant parties need to “break down barriers and forge meaningful exchanges to initiate partnerships for sustainability” (Hartman et al. 1999, p. 256).

Clarke and Roome (1999) have identified four main goals that organizations must work towards when building networks to support sustainability. These goals demonstrate an overall focus on knowledge acquisition and transfer, which can be achieved through collaborative actions involving external parties and stakeholders. They are:

1. To “...acquire knowledge that is not ordinarily found in their existing repertoire or experience”;
2. To “...participate in collaborative action that links traditional business issues to a set of environmental and social concerns”;
3. To develop “knowledge and action (that) involve a broad set of actors with an interest in a company’s activities including strategy, technology management, environmental management and sustainable development”; and
4. To develop a “multi-party mechanism to bring about the development of knowledge and provide the ground for collaborative action for environmental management and sustainable development” (Clarke et al. 1999, p. 297).

Numerous organizations are beginning to find proactive solutions to sustainable development through a variety of networks and multi-stakeholder relationships (Halme 2001). These firms are increasingly viewing society as one comprised of networks, constantly adapting to innovations such as information technology and communications media. In reaction to concerns about complex environmental and social consequences of industrial activity, organizations have begun to notice the value in more frequent and meaningful engagement between companies and stakeholders. This in turn has helped organizations recognize the need for collaboration in the development of innovative ecological practices. This form of collaboration can be viewed as a network that provides a wider input of knowledge, ideas and participation from sources beyond traditional organizational boundaries. Socially, networks are helping governments to create ‘consensual’ and ‘voluntary’ environmental practices that involve the establishment of new shared social values amongst industry, NGOs, local communities and the government (Hartman et al. 1999).

Specific examples of the benefits of networks can be seen in a plethora of recent research projects. Halme (2001) investigated the use of networks in six European tourism organizations and found that the process of network learning resulted in new actionable sustainable development knowledge for the whole network. Networks between industry and local community members with traditional knowledge have also been shown to be successful in conservation and natural resource management projects. Costa-Neto (2000) found that local fishermen’s knowledge in North-Eastern Brazil was sufficiently accurate and in depth to be used in the development and management of fish resources in the area. As the region is becoming urbanized because of new tourism in the area, Costa-Neto concluded that the sustainability of local knowledge, culture and environment would only be possible through active participation of the locals in the tourism development program. Drew (2005) found that traditional local knowledge has in some areas (such as Micronesia and Belize) been used to establish formal ecological management practices upon which resource management and conservation plans can be built. Finally, a Canadian utility successfully used networks of learning and action to engage other businesses in the same industry, to shape and organize its own environmental management and sustainable development programs (Clarke et al. 1999).

### **KNOWLEDGE TRANSFER NETWORKS**

The transfer of environmental knowledge to support sustainable development strategies requires an organization to extend its knowledge transferring ability to across the organizational boundary. Appleyard (1996) defines knowledge transfer as the sharing of useful knowledge (tacit or explicit) or information not only internally, but across company boundaries as well. In any network, knowledge transfer is the process through which one network member is affected by the experience of another. Knowledge transfer internally in organizations can be viewed as the process through which one unit shares, disseminates, acquires and uses the knowledge of another unit (Argote and Ingram 2000). Knowledge transfer manifests itself through changes in knowledge or performance of the recipient unit, and can be central to the evolution of a partnership or collaboration effort (Inkpen et al. 2005).

Argote and Ingram (2000) state that successful knowledge transfer is one of the major mechanisms through which learning can be effectuated at the organizational level. Chonko et al. explained that: “(1) learning must be shared if its potential to affect behavior and results is to be realized and (2) when an individual learns... that person takes on the potential for behavioral and results-oriented changes”(Chonko Dubinsky Jones and Roberts 2003, p. 936).

According to Roth (2003) there are at least two different activities that organizations must continuously be involved in to capitalize on the benefits of transferring experience and knowledge. The first involves effectively translating ongoing experiences into distinct knowledge entities. The second involves transferring those entities across boundaries of time and space. O’Dell & Grayson (1998) pointed out that while transferring knowledge across time and space is difficult, the process can yield enormous benefits to an organization. The transfer of knowledge across an organization has been presented by Koch as “one of the most important components of organizational learning and competitiveness” (Koch 1999, p. 48).

Strategic networks are composed of intra- and inter-organizational ties that are enduring and strategically significant for the firms entering them. A taxonomy of network forms can be established based on the different positions network members occupy within the business environment, and the extent to which network governance is structured. Based on these two variables (network position and level of governance), networks can be labeled as intracorporate networks, strategic alliances, industrial districts, franchises, trade associations, or R&D consortiums (Inkpen et al. 2005).

These different forms of networks facilitate and influence knowledge transfer in different manners. For transferring environmental knowledge across external boundaries, these networks can each play divergent roles in the process. Usually an organization will be very limited to the type of knowledge networks it can create (an in most cases will be limited to only one), therefore the form of network is a crucial part of any knowledge transfer strategy. We extend Inkpen and Tsang’s taxonomy of networks in Table 1 to include their potential for facilitating the transfer of environmental knowledge within a network and into the organization.

<b>Network Type</b>	<b>Potential Environment Knowledge Transfer</b>
Intracorporate Network	Knowledge exchange between various subsidiaries, through distributed organizational learning.
Strategic Alliance	The alliance can either have the main goal of creating or sharing environmental knowledge, create knowledge through residual activities, or transfer environmental knowledge in order to achieve its main purpose.
Industrial District	External knowledge specialists may create access for the district to environmental knowledge. Furthermore, the district may create knowledge through its activities which generates value through sharing and possibly new network members.
Franchise	Environmental knowledge is shared either top-down from the central corporate unit, or bottom-up, with each franchise contributing individual knowledge which is consolidated at the top.
R&D Consortium	Environment knowledge created by the consortium is shared to participating members.
Trade Association	Knowledge that can benefit the industry as a whole is shared to participating firms, or between member firms.

**Table 1. Environmental Knowledge Transfer in Different Networks**

### **ORGANIZATIONAL LEARNING**

Organizational learning can be viewed as a social process with multiple actors interacting in unique ways to create new knowledge and change organizational behavior (Carlile and Reberich 2003). New knowledge, especially external knowledge can be a strong stimulus for organizational change and improvement. Organizations participating in networks

have the opportunity to tap into a pool of tacit knowledge that is unavailable to competitors. In fact, inter-organizational networks can be seen as “custodians of tacit knowledge because of the skills generated in the course of complex problem solving” (Wagner 2003, p. 106).

The importance and value of fostering an organizational learning environment within strategic networks is manifold. Organizational learning is at the heart of an organization’s ability to adapt and respond to a changing environment, as it allows an organization to identify new threats and opportunities, and possible strategies as a response. The ability to adapt and respond to a changing environment can ultimately lead to improved business performance – which will benefit all organizations pursuing sustainable development ahead of the regulatory curve (Husted and Michailova 2002; Marquardt 2002). Organizational learning can also help improve decision making as well as garner further support for the decisions that are made (Walsh and Ungson 1991). When all of these benefits of attaining sustainable development are considered, it is possible to comprehend the potential for network-based knowledge transfer and organizational learning to create a sustainable advantage for the firm.

## **KNOWLEDGE NETWORKS AND SUSTAINABLE DEVELOPMENT**

From the above discussions of sustainable development and knowledge network frameworks, a link between the two concepts becomes evident. Sustainable development manifests itself in corporations through their management of the use of natural resources, emission and waste management, and both their relationship and communication with their external community (Dyllick et al. 2002). A helpful framework that can be used to view the organization’s relationship and communication with outside stakeholders is Inkpen and Tsang’s taxonomy of networks. Different forms of networks emerge that influence how information and knowledge is transferred between the organization and the external operating environment. These may result in intra-corporate networks, strategic alliances, industrial districts, franchises, research and development consortiums, or trade associations (Inkpen et al. 2005).

Networks can serve as the main facilitator of knowledge transfer between those possessing valuable environmental knowledge and the organization. Stakeholders, which may be any of government, citizens, academics, NGO’s, customers, or environmental advocacy groups, become actors within the networks creating knowledge which is desirable to the organization (Cramer 2005). Organizations often require this external knowledge to implement sustainable development, and through proper strategic initiatives they can help achieve a higher level of sustainable management that may result in lower operational costs, stronger competitive advantages, better public relations, better risk management, and tighter compliance with environmental regulations (Shrivastava 1995). Furthermore, organizational learning and environmental knowledge creation increases through participation in such networks (Appleyard 1996; Argote et al. 2000).

From the above literature, we develop an agenda for future research linking knowledge management to sustainable development through presenting theory-based propositions that are subject to empirical evaluation. In the process of sustainable development, organizations must build relationships with their environmental communities through communication (Costa-Neto 2000; Cramer 2005). Sharma (2000) identifies two strategies where stakeholders can directly influence environmental strategies, either through direct influence, or by withholding resources or support. These interactions between individuals within the network determine the structure of the environmental knowledge transfer (Milchrahm and Hasler 2002). The different types of stakeholders that are able to form relationships with the organization will affect the sustainability process through their unique contributions and knowledge. Therefore, we believe:

*Proposition 1. The various stakeholders an organization interacts with have an affect on sustainable development.*

Stakeholders can affect sustainable development directly through their participation and contribution with an organization. They have an indirect influence on sustainable development through their impact on the types of knowledge networks that are created. Organizations create new knowledge through interactions with actors, who can be involved in one or more knowledge networks (Carlile et al. 2003; Paquette 2005). In many cases the transfer of individual tacit knowledge is quite challenging, however networks are a device that can help overcome barriers to knowledge transfer (McInerey 2002). As stakeholders contribute their unique knowledge to the network and generate the benefits an organization can achieve from such a network, we believe:

*Proposition 2. The various stakeholders an organization interacts with have an affect on the type of knowledge network that is created.*

Similarly to the second proposition, the different forms of knowledge that are accessible through a network can have an impact on an organization, including its efforts to increase sustainability. Clarke and Roome, state “ Effective environmental management and sustainable development require companies to use networks of stakeholders ...” (Clarke et al. 1999).The relations formed with stakeholders of a sustainable development initiative can shape the type of network that develops

(Husted et al. 2002), linking the stakeholders and the organization. The ability of the network to influence the actors involved (Selman and Wragg 1999; von Malmberg 2004), the strength of the relationship, and the forms of knowledge available directly impacts the sustainability of an organization. Therefore, we believe:

*Proposition 3. The type of knowledge network created has an affect on the factors of sustainable development.*

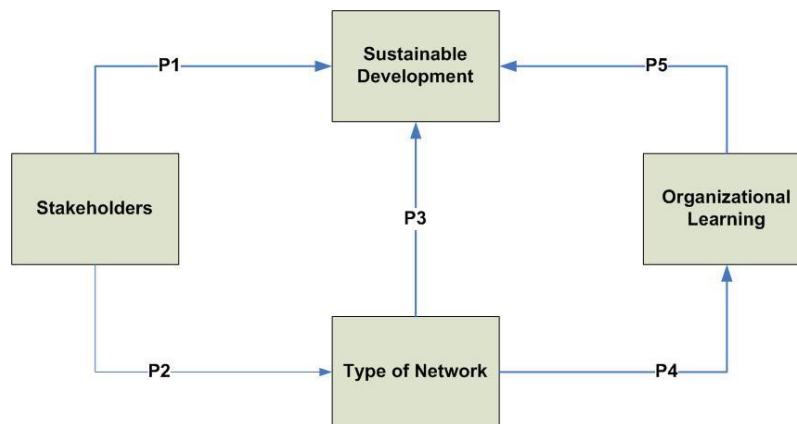
Networks are key contributors to organizational learning (Argote et al. 2000; O'Dell et al. 1998), and can facilitate the knowledge transfer necessary for sustainable development. Various types of networks interact differently with an organization depending on the stakeholders and knowledge involved (Kogut 2000), the role of the organization with in the network and the control mechanisms that govern the network (Inkpen et al. 2005). The formation of these networks becomes the foundation for organizational learning. Therefore, we believe:

*Proposition 4. The type of network created has an affect on organizational learning within the organization.*

Organizational learning helps an organization create new knowledge in order to adapt to the business environment (Bontis Crossan and Hulland 2002; Inkpen 1998). This increased ability to adapt can benefit all organizations pursuing sustainable development as they provide means to keep ahead of the regulatory curve, build relationships with stakeholders, and adopt sustainable strategies (Husted et al. 2002; Marquardt 2002). Roome (2001) further states that interaction and learning with stakeholders can lead to innovation supporting sustainable development. As shown in the research by Clarke and Roome (1999), action networks are able to create processes that allow organizations to learn from multiple parties, including their stakeholders, in order to improve sustainable development. An openness to learning and knew knowledge is linked with the ability to take action regarding environmental and sustainable development issues. We believe that because of the strong influence on an organization’s abilities and strategies that:

*Proposition 5. Organizational learning has a positive influence on an organization’s implementation of sustainable development.*

These propositions are depicted in Figure 1 to illustrate the relationships between stakeholders, networks, organizational learning and implementing sustainable development.



**Figure 1 Conceptual Framework**

**DISCUSSION AND DIRECTIONS FOR FUTURE RESEARCH**

Recent studies in the fields of networks, knowledge transfer and knowledge in sustainable development have been reviewed above. However, “... apart from a few exceptions (e.g. Boons, 1998, 1999; Clarke and Roome, 1999), there is little data about how knowledge is created, and sustainable development acted upon” in networks designed to facilitate the attainment of business sustainable development (Halme 2001, p. 101). As Starik and Marcus (2000) explain, research on the connection between the natural environment and how organizations enact sustainable development is a recent scholarly phenomenon. The propositions presented in the above section regarding the effect of stakeholders and networks on organizational learning

and sustainable development are intended to serve as a guide for future research which will contribute to this recent body of scholarship.

In the fields of global sustainability and collaboration research, Hartman et al.(1999) have called for additional theoretical foundations for sustainable development research. They suggest considering “relevant perspectives from *established* theories involving collaboration, stakeholder analysis, social networks and collaborative learning to name just a few” (Hartman et al. 1999, p. 246). Future research can explore these links by using theories of knowledge transfer and organizational learning in networks to identify the impact of various stakeholder relations and networks on an organization’s ability to implement sustainable development.

By examining these issues, this paper aims to respond to a number of specific calls for additional research. For instance, future research based on our conceptual framework should help respond to Starik and Marcus’s (2000) call for work in the area of sustainable development to help identify the means by which organizations can respond to the challenges presented by the environment. Empirically testing our propositions will also examine the role that different partnerships (between various stakeholders and within differing network types) play in the development of more sustainable organizational designs (Hartman et al. 1999).

Similarly, it is hoped that our research will be able to illuminate some of the processes, contexts and factors that facilitate and constrain organizational learning through sustainable networks – a research goal that was suggested by Roome (2001). Finally, testing the propositions in this paper should help respond to the call for more research to “address more explicitly the question as to whether specific types of partnership are likely to become ‘locked in’ to a path of incremental change (eco-efficiency) or provide the potential for more radical system change” (Hartman et al. 1999, p. 264).

This preliminary review of some of the challenges involved in knowledge transfer, while brief, signals an awareness of the existence of a multitude of factors that will need to be managed in conducting empirical research on our propositions. This paper has used knowledge management based theories of networks and knowledge transfer to hypothesize about how organizations may create and acquire environmental knowledge and enact that knowledge to increase sustainable development within their organization. Examining how organizational networks can help facilitate and support organizational sustainability, this research will also help address a number of calls for additional research to identify organizational forms that can be more sustainable (for example Shrivastava (1995); Starik and Marcus (2000). Finally, it is hoped that our proposed research will help elaborate on the value of and identify additional means to support the use of various types of stakeholder networks to help organizations learn how to implement sustainable development.

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