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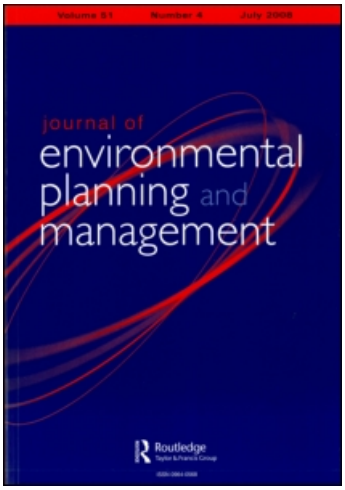

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The greening of Chicago: environmental leaders and organisational learning in the transition toward a sustainable metropolitan region

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The greening of Chicago: environmental leaders and organisational learning in the transition toward a sustainable metropolitan region

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Urban sustainability literature calls for new governance relations to support green urban agendas. Privileging non-hierarchical relations, this literature fails to address the means by which organisations create these capacities. The author interviewed public, private and community environmental leaders in metropolitan Chicago regarding their disposition toward creating boundary spanning organisations (BSOs) in addressing the City's Environmental Action Agenda. Their responses reflect engaged efforts to enhance cross-boundary sharing of information, resources, and power. However, they also reflect the decisive role of central authority in initiating this process. These findings suggest the complexity of urban governance in transitions toward sustainability and the opportunities they provide to explore the implications of on-the-ground practice.

Keywords: sustainability; governance; organisational learning; boundary spanning; Chicago

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1. Introduction: green city initiatives and organisational learning

Cities around the world are undertaking programmatic efforts to address conflicts between urban and ecological processes. Although these efforts are part of a long tradition seeking to align social and ecological systems (Rees 1997, Melosi 2000, Nash 2001, Hall 2002, Young 2009), new environmental and social challenges such as global climate change and quality of life issues are driving contemporary programmes (WCED 1987, Roberts and Hunter 1991, PCSD 1996, Bulkely and Betsill 2003, CEC 2004). In the United States prominent public sector leaders are responding to these challenges by proposing innovative environmental agendas for major urban areas such as New York City, Chicago and metropolitan regions throughout California (Schwarzenegger 2004, City of Chicago 2005, City of New York 2006).

Although the content of urban green agendas vary according to location, they face three interrelated challenges to innovation in metropolitan sustainability: their focus extends across media (i.e. water, land use, the built environment), they call for far-reaching technological and social change, and their scope reaches beyond the powers of the executive branch, or the public sector in general, to ensure their execution. The cross-boundary character of these challenges pose obstacles to

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the co-ordination of information and resources necessary to achieve metropolitan sustainability goals.

Serious efforts to respond to these challenges will require boundary spanning: commitments from public, private and community sector organisations to expand their knowledge and networks across a number of fields. To accomplish this, new competencies will be needed including access to information, skills and resources from different sectors and media as well as the ability to make these inputs relevant across organisational boundaries. In short, they will be required to engage in organisational learning: acquiring knowledge through capturing new information and making it accessible for practical use (Wenger 1999, Wolf and Primmer 2006).

As a result, calls for sustainable resource management must be accompanied by investigation of how organisations acquire and construct cross-boundary competencies. Given managers' influential role in organisational learning, this study asks: how do managers perceive opportunities to develop their organisation's boundary spanning capabilities in response to a municipal sustainability agenda?

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2. Site selection: Chicago

I selected the Chicago metropolitan region as a case study to investigate this question because of the city's history of innovation in municipal resource management, current focus on implementing an environmental action agenda, and visibility as a leading urban influence.

Chicago is the third largest metropolitan region in the United States (Gibson 2000). As the fastest growing major metropolis in the United States at the turn of the twentieth century, Chicago set national precedents for its innovations in environmental and civil engineering, social reform and comprehensive citywide planning (Commercial Club 1909, Addams 1990, Cronon 1991, Miller 1996, Washington 2005, Cutler 2006, Smith 2006).

Community, public and private institutions in the Chicago metropolitan area are now undertaking efforts in the arena of urban environmental sustainability (Johnson 1999, Chicago Wilderness *et al*. 2000, Greenberg 2002, City of Chicago 2005). Mayor Richard M. Daley of Chicago (elected 1989 and re-elected five times through to 2007) was an early adopter of the concept of urban sustainability in the United States. He has encouraged innovations in green urban design and technologies, declaring a centrepiece of his administration to ''make Chicago the greenest city in the United States'' (City of Chicago 2005 p. 1. see also http://www.werf.org/livablecommunities/studies_chic_il.htm).

Daley's Administration detailed this intent with the 2005 release of Chicago's Environmental Action Agenda articulating the City's strategy for 'building the sustainable city'. The strategy targets a range of environmental issues, including greening the city's built environment, improving water quality through the restoration of the Chicago River and reducing pollution from storm water runoff, enhancing energy efficiency and continued support for the City's recycling and alternative transportation efforts. The Agenda states the Administration's intention by directing efforts across City departments and encouraging participation from the private and non-profit sectors to make Chicago a national leader in municipal sustainability.

In pursuing this agenda, Chicago has become an acknowledged innovator in metropolitan greening whose efforts are being tracked by other urban centres

interested in advancing their own sustainability goals (Potter 2007, S. Anderson 2008, personal communication). Chicago's Agenda, released in 2005 preceded the official announcement of sustainability plans in New York, Los Angeles and Boston by more than two years while other major cities in the US have yet to establish their own goals for metropolitan sustainability.

These innovations, past and present, have made Chicago a touchstone in discussions of "the proper direction of modern city life" (Smith 2006, p. 154). Although critics have both lauded and attacked these efforts, Chicago's influence as an innovator in urban planning and management extends well beyond its metropolitan region (Jacobs 1961, Mumford 1961). As Rogers notes in his classic *Diffusion of Innovations* (2003), sponsors of innovative initiatives often gain such influence, significantly exceeding their immediate surroundings:

> Their interest in new ideas leads them out of a local circle of peer networks and into more cosmopolite social relationships. Communication patterns and friendships among a clique of innovators are common, even though these individuals may be quite geographically distanced. (Rogers 2003, p. 282)

This pattern of diffusion is evident in contemporary municipal sustainability efforts, as innovative managers have referenced frequent contact with their peers in Chicago to exchange ideas despite differences in metropolitan scale, governance, and geography (Anderson 2008, T. Wright, 2008, personal communication).

Researchers have called for studies detailing specific efforts by communities seeking to advance metropolitan green agendas (Haughton and Hunter 1994, Hemple 1996, Kettl 2002, Durant *et al*. 2004, Evans and Marvin 2006, Tang and Tang 2006). Given its history, current efforts and visibility in urban natural resources management, the Chicago metropolitan area offers an important opportunity to study organisational learning in the transition to urban sustainability.

3. Boundary spanning

There is an extensive literature covering the role of organisations and organisational learning in innovation (Huber 1991, Dodgson 1993). The bridging of knowledge and networks across disciplinary and professional boundaries is central to this discussion. In response, there have been a number of efforts to synthesise this literature and identify typologies in this process (i.e. Howells 2006, Klerkx and Leeuwis 2008).

Researchers interested in organisational learning have examined the extension of knowledge and networks across boundaries at a variety of scales. At the individual level, the transfer of tacit knowledge to another person or organisation has been considered (Nonaka 1994). Further studies have explored the role of individuals in their function as intermediaries within their own organisations (e.g. Swan *et al*. 2002, Williams 2002).

In addition to examining this question on an individual level, researchers have also considered the role of third parties in brokering information between two or more separate entities. These 'innovation intermediaries' are organisations for whom this function may be subsidiary or have evolved to a central role establishing them as specialised intermediaries (Pittaway *et al*. 2004, Howells 2006, Estrin 2009). Organisations where this role is primary no longer engage in the fundamental

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generation of innovation but enable it through the creation of networks and information transfer (Winch and Courtney 2007). Van Lente *et al*. (2003) distinguish between these new types of 'innovation brokers' and 'traditional innovation intermediaries' who may still function as a source of innovation and organisational learning.

While the growing complexity of social structures lends itself to the emergence of organisations that specialise in facilitating the transfer of knowledge and networks between third parties, there remains a need for organisations to develop this capacity internally while continuing to pursue the primacy of their traditional social functions. To accomplish this, organisations must develop their boundary spanning capacities, not as a specialisation but as a fundamental aspect of advancing their primary missions.

Researchers have identified this type of boundary spanning as a critical factor in organisational learning (Dodgson 2008, Estrin 2009). Through boundary spanning, organisations select, interpret and make internally accessible, external information and resources (Aldrich and Herker 1977). Investigators have identified boundary spanning to be effective in assisting organisations to manage uncertainty caused by the introduction of new technologies, goals or demands for skills (Tushman 1977, Leifer and Delbecq 1978). Additional studies have pointed to boundary spanning's importance in eliminating obstacles to innovation that requires information to cross-organisational boundaries. Boundary spanning can be engaged as a means of reducing the inefficiencies of misinterpretation and miscommunication inherent in such transfers (Leifer and Delbecq 1978, Tushman and Scanlan 1981). By these means, boundary spanners create new pathways for knowledge and resources that increase options and synergies beyond the limited alternatives initially available in standard institutional structures.

Efforts by metropolitan areas to adopt sustainable practices present organisations with both uncertainty and demand for innovation. Emphasis on the adoption of new technologies (i.e. renewable energy systems), the multiplication of goals (i.e. expanding mission statements to include the 'triple bottom line' of achieving environmental, economic and social goals simultaneously), and higher levels of external information exchange (i.e. transparency) confront organisations unprepared to respond to such demands (Thompson 1967, Leifer and Huber 1977). In addition, mandates to address cross-media issues (i.e. water quality and the built environment), and cross-sectoral collaboration (i.e. between the private, public and community sectors), have increased uncertainty and the need for new information to support innovation.

Aldrich and Herker have hypothesised that in responding to new sets of external demands an "organization's ability to cope with environmental constraints depends in part on the ability of the boundary spanning individuals to achieve a compromise between organizational policy and environmental constraints ..." (Aldrich and Herker 1977, p. 353). The literature describes such individuals as technically competent, well connected both inside and outside the organisation, and able to comprehend external information and translate its meaning internally (Tushman and Scanlan 1981, Wenger 1999, Rogers 2003).

Although the literature often focuses on individual skills necessary to perform important functions of boundary spanning, systemic change such as those proposed in urban sustainability agendas requires encouraging social processes of innovation. As a result, an organisation's ability to create and support boundary spanning

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individuals will be a critical factor in the broader success of such agendas (Amable *et al*. 1997, Blanc 2003). As Wenger notes in *Communities of Practice*:

> The fundamental principle is to connect and combine the diverse knowledgabilities that exist in a constellation of practices. The challenge of organizational design is thus not to find the one kind of knowledgability that subsumes all others but, on the contrary to coordinate multiple kinds of knowledgability into a process of organizational learning. (Wenger 1999, p. 247)

While knowledgability (unique individual understanding) is a basis for reflexive action, empowerment through social support is vital to realising its broader, collective value (Giddens 1984).

Organisations that successfully create this support can be described as boundary spanning organisations (BSOs). BSOs offer the opportunity to derive new outputs by generating new ecological, technical and social capabilities. They create these capabilities through enhancing internal and external competencies within their organisations (Nonaka 1994, Wolf and Primmer 2006).

Literature on boundary spanning notes the central role of managers in supporting this function within organisations. Managers' influence over the disposition of resources and external engagement plays a critical role in framing opportunities for organisational learning. By recognising formal and informal boundary spanning resources such as staff access to external information and communications networks, managers can actively enhance the functioning of their organisations as BSOs (Edstrom and Galbraith 1977, Tushman 1977, Tushman and Scanlan 1981).

The advent of new urban environmental agendas places managers (i.e. department heads, programme directors and administrators) in the vital role of creating coherence between the broad environmental visions articulated at strategic levels of authority (such as the Mayor's office or corporate and non-profit Boards of Directors), and the operational limitations of organisational technicians (i.e. planners, regulators, engineers, lobbyists, etc.) (Parsons 1956, Thompson 1967, Paavola 2006). Managerial interest in bridging these limitations and supporting innovation by enhancing their organisation's ability to exchange and make use of external resources can positively influence the outcome of metropolitan green agendas.

As a result, understanding how managers perceive opportunities to develop the boundary spanning capabilities of their organisations can help those promoting innovations in urban greening better frame the responsibilities and resources required by such initiatives.

I elected to use organisational leaders' narrative statements to explore this question. Yin has noted that case study interviews are often appropriate for 'how' or 'why' questions (Yin 1994). The introduction of sustainability agendas brings old methods of natural resource management into question while new approaches are still emerging (Mazmanian and Kraft 1999). Researchers have recommended the narrative approach for situations in which clear connections between current and future actions are uncertain. Through narrative research

> ... we can elicit (interpreted) accounts of the social world, the meanings attached to it, and intentions about future action. In turn, we can use these accounts to learn about the generative dynamics from which the urban emerges ... Of particular significance is qualitative change involved in phase shifts. We can employ narratives not just as a

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> means of identifying phase shifts in the past and the present, but also in terms of the imagined potential for change in the future. (Uprichard and Byrne 2006, pp. 669, 674)

The movement toward sustainability is a 'phase shift' of remarkable scope, encompassing social as well as technological transformation. Investigating leaders' narratives about developing the boundary spanning capacities of their organisations offers the opportunity to gain insights into the organisational learning prompted by this movement.

Exploring the perceptions of environmental leaders regarding the development of BSOs is particularly important given blind spots in the literature. For over a century researchers, public intellectuals and urban and environmental activists have argued that to realise their potential as places that unify ecology and society, cities need to undergo significant transitions in their social and physical relations. These critics maintain that reliance upon non-renewable material and energy flows and linear, hierarchical decision making in resource management obstruct the transition toward sustainable urban metabolisms.

They advocate instead metropolitan areas organised around renewable resource use and horizontal networks engaging public, private and community sector actors in the creation of new urban futures (Geddes 1949, McHarg 1969, Berg *et al*. 1987, Roseland 1997, Register 2006). These and similar writers (e.g. Hukkinen 1999, Mazmanian and Kraft 1999, Kanie and Haas 2004, Dryzek 2005) argue that, in addition to new technologies and spatial patterns, this shift requires new modes of practice. In particular, they identify the need for managers to embrace new governance configurations featuring collaborative information sharing and project development between sectors and across media.

While researchers have addressed this requirement by examining sectoral constraints to realising urban sustainability there has been little effort in the present literature to explore dispositions toward boundary spanning activity that would make such transformations in governance possible (Mazmanian and Kraft 1999). In addition, the research emphasis on individual and private sector actors in boundary spanning has limited the range of knowledge in this field (Van Lente *et al*. 2003). Given green urban agendas' reliance on new technologies and cross-sector and cross-media solutions, a broader spectrum of perceptions including public, community and private sector leaders toward developing boundary spanning organisations is an important target for research.

4. Methods

4.1. Purpose and research framework

The purpose of this case study is to explore managers' perceptions of opportunities for organisational learning through boundary spanning in the context of Chicago's efforts to implement an environmental agenda. In particular, I focus on the interest of public, private and community environmental leaders in providing opportunities for information and resource exchange as well as capacity building and possible practice improvements within and between organisations engaged with the City's Environmental Action Agenda.

My framework focuses on perceived changes in internal capital, external networks and governance as the basis and motivation for organisational learning. I derived this framework from Wolf and Primmer's research on organisational

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learning that prioritised the role of people, organisational resources and networks in establishing competencies to support innovation in natural resource management (Wolf and Primmer 2006).

Enhancing internal competencies and diversifying external networks are central to an organisation's ability to support cross-boundary enterprises. By asking managers involved with the City's Environmental Action Agenda about changes in their organisation's expertise, capacities, knowledge and networks, I sought to explore their engagement in organisational learning. I used this exploration to gain insight into the transition to new forms of metropolitan resource management and its implications for urban governance. I pursued this framework mindful of Forester's caution against 'theory first', and allowed the narrative stories of those interviewed to flesh out the framework's subcategories and specifics (Fischer and Forester 1993).

I interviewed upper-level managers of public, community and private sector organisations in the Chicago metropolitan region. I selected organisations based upon their involvement in the promotion of urban greening projects central to Chicago's Environmental Action Agenda. I defined urban greening projects as those aiming to reduce environmental degradation, conserve existing natural resources or enhance ecosystem-health. This included projects focused on restoring the health of the Chicago River and metro-region waterways, managing the City's water supplies, reducing Chicago's storm water runoff, managing natural resources within the city and greening the city's neighborhood and built environments.

For interviews I selected environmental leaders drawn from 13 organisations working on projects related to two central issues in Chicago's Environmental Action Agenda: water quality and the built environment. I defined environmental leaders as executive directors or ranking staff persons from organisations engaged in advocating or implementing sustainable resource management policies in metropolitan Chicago. I viewed these individuals as early adopters in the field of urban sustainability. As an ideal type early adopters speed diffusion of innovations and "serve as a role model for many other members of a social system" (Rogers 2003, p. 283).

I selected initial organisations and interviewees through information provided by key informants (managers from City agencies represented in Mayor Daley's Green Initiatives Steering Committee). I solicited from them names of leading organisations in the public, community and private sectors engaged in issues of Chicago's water quality and built environment until snowballing produced repetitive results.

In addition to in-depth interviews ($n = 19$) with these managers, I also derived background information from the City of Chicago's Environmental Action Agenda (2005) as well as statements made by organisations in their official literature and to the press (Rogers 2003). I also assembled evidence from administrative documents, studies, and the press as background to the interviews (Baxter and Eyles 1997).

4.2. Interviews

Focused, open-ended interviews provided the basis for this study (Merton *et al.* 1990, Yin 1994). I conducted the interviews in the offices of the persons being interviewed. The same set of questions was asked of each interviewee and each interview lasted for approximately two hours. Questions centred on the history of the organisation and its relationship with Chicago's Environmental Action Agenda; managers'

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perceptions of the changing role of knowledge, expertise and organisational capacities in response to its objectives; and governance relations leading up to and following the Agenda's introduction in 2005. Interview texts were based on detailed note taking during the interviews and same-day transcription. I read each transcript and by open-ended coding identified each of the framework's sub-categories. By allowing the subcategories to emerge from the narratives I sought to avoid what Forester terms the 'rush to interpret' – asserting too selective a template to guide the interviews (Fischer and Forester 1993). In this manner I was able to present a fundamental theoretical framework for testing without prescribing the details of the framework or imposing too fine a grain of specificity on the questions that might prompt responses from interviewees that they might not have otherwise made.

From the interviews I derived information about leaders' perceptions regarding opportunities to develop the boundary spanning capabilities of their organisations. In particular, I examined the leaders' disposition toward enhancing internal capital (through training, hiring and creating centres of expertise) and external networks (through sharing information, resources and power) for themselves and their staff (Wolf and Primmer 2006). By counting the number of responses in each category and subcategory to determine perspectives and themes I sought to prevent 'cherry-picking'. I then used a narrative form to present the themes found through the coding and counting process (Gillham 2000).

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5. Case study: the greening of Chicago

5.1. Findings

During the interviews, environmental leaders in the Chicago metropolitan region addressed three areas in their organisation's transition toward engaging the City's Environmental Action Agenda: executive initiative, the development of internal capital and the development of external networks.

The first, executive initiative, highlighted the managers' sense that central authority had been critical in rapidly advancing a sustainability agenda for the City of Chicago. The second, internal capital, underscored the frequency with which managers looked within their own organisations to develop centres of expertise in sustainability and augment skills through training opportunities rather than new hiring. The third, external networks, reflected how managers relied upon the external networking capacity of their staff to compensate for the absence of general sustainability metrics, practical support from the scientific community, or the opportunity to bring on new staff as means toward effective organisational learning. As a long-term response to relying on informal support, managers were very interested in seeing innovations in organisational learning institutionalised into the norms of their organisations and the City as a whole.

5.2. Executive initiative

Chicago's engagement with urban sustainability is reported to have begun almost by fiat. Although several organisations in the metropolitan region have a relatively long history of working on issues of land use, water quality and neighbourhood redevelopment, interviewees repeatedly affirmed that it was signal action by Mayor Richard M. Daley that launched Chicago's widespread effort to become a sustainable city.

According to environmental leaders in Chicago it was the mayor's exposure to urban greening efforts in Europe that sparked his interest in advancing a green urban agenda (see Beatley 2000). Although 17 interviewees noted his interest in nature and improving the city's quality of life as main drivers, two took a broader perspective on motivating factors including the desire to increase Chicago's competitive advantage in the twenty-first century and the fact that the mayor had figured out that the environment "was good politics". The latter statement corroborates the view of another interviewee who noted that public awareness of environmental issues had been brought to the point where the mayor's actions would be well received.

However, despite such impetus and preparatory work, 18 interviewees credited the mayor with making an urban green agenda a central focus of policy. For example, this comment by a City department director was representative:

> It was a top down mandate for people who had never worked any other way before. [What gave it authority was] the fact that it came from a mayor with a lot of tenure and support at the cabinet level. For a more grassrootsy mayor seeking a lot of input, it wouldn't have happened; too much chance to rationalize your way out of it. Like Curitiba [Brazil] it was a dictatorship.

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5.3. Internal capital

5.3.1. Training

Chicago's history of powerful mayors is reflected in the depiction by interviewees from all three sectors of the mayor's office as both a vital ally and an effective stick to drive organisational change. Thirteen of the environmental leaders interviewed discussed the importance of enhancing their organisation's internal capital in reaction to the mayor's environmental commitment elaborated in Chicago's Environmental Action Agenda (2005).

Advancing staff comprehension of new, environmental technologies and opportunities through training was identified as an important element of enhancing internal capital. Although public sector leaders expressed the most interest in investing in formal training opportunities (i.e. workshops and conferences) for staff, 13 interviewees mentioned the importance of training even if the only opportunities offered were informal. Leaders valued training not only for enabling staff to more effectively perform tasks and advance new ideas but also as a means of maintaining their organisation's relevance in the emerging environmental arena. As one director whose department oversees elements of the city's built environment noted, his staff were:

> ... becoming familiar with LEED [Leadership in Energy and Environmental Design] so we can control the process with contractors because we will know it better than them. There is no end to the many benefits. We are pushing further than anyone else. We know more about green roofs, for example, and other folks want to hear from us, so our expertise as a group has made us unique.

5.3.2. Centres of expertise

The conclusion of the director's remarks point to another widely held perspective. Although the leaders interviewed commonly made reference to the importance of training, they also described the importance of having skilled individuals within their departments comprise a centre of specific sustainability expertise. The director's

comments reflected those of other leaders who saw this attribute as legitimate with regard to their organisation and a valuable source of the power it wielded. Sixteen managers noted that having their membership perceived by others as constituting a centre of sustainability expertise brought prestige as well as opportunities for inclusion in broader projects and networks whose information and resources could be of value to the organisation.

Despite these benefits, three leaders recognised self-identification as a centre of expertise as potentially harmful, noting that this internal sense of authority could generate resentment toward their staff or a self-imposed sense of isolation, both of which could obstruct opportunities for broader learning and engagement. "We hurt ourselves by saying we are the best", one leader noted. "Therefore it's not a thing but an idea that gets in the way and it keeps us from being motivated. We have so much to learn".

5.3.3. Hiring

Few leaders emphasised new hires as an immediate means to bring fresh knowledge into their organisations. Although four noted the necessity of hiring at the management level in response to the demand for expertise in sustainability, beyond training, attitudes toward changes in staff disposition or skills centred on attrition and replacement by a rising generation that it was hoped would be socialised in sustainability. One leader whose organisation had had significant turnover noted that the immediate benefits of insight into environmental issues brought on through younger staff were offset by the loss of organisational memory and contacts of departing employees.

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5.4. External networks

5.4.1. Information

While the leaders identified limited use of formal training (seminars, conferences, workshops) as a means to bring new sustainability ideas and competencies to the membership of their organisations, all noted the central importance of informal networks in performing this function. As one manager commented:

> Part of the green thing is that you start talking to other city green people and you make a network ... People have been coming out of the woodwork and we welcome each other at our events. It's a whole 'nuther world that has come to my knowledge.

In addition to opportunities to make new contacts within and outside of city government, the leaders also identified contacts from previous education and employment experiences as potentially important informal sources of information for themselves and their members. For one interviewee the private informality of such contacts offered the opportunity to communicate more openly: "My graduate student buddies help bring information in about who knows what's happening with [urban sustainability] practitioners because I can be clear with them without fear".

For another, contact with professional colleagues provided for a two-way, cross-boundary exchange of knowledge:

> I have good relationships with consultants from being a consultant. Some of my friends are [environmental] professionals. I am not bashful about asking them what to do.

> What's going on in Cleveland? They want to help and don't want to appear not to have an answer. I share information back with them. Some are under contract but many are just informal relations. I know some people smarter than me who are friendly enough to help. Brainstorming: who doesn't like that? There's no resentment yet from them about me asking for information without paying for it. What I give them is insight into the world of the department.

Although leaders supported such informal channels as valuable across a spectrum of uses, from getting information on policies to current best practices, the absence of metrics was identified as a major impetus for developing formal or informal access to outside assistance. Regardless of sector or media all but two leaders interviewed noted a lack of centralised, legitimate, agreed upon means to measure progress toward urban sustainability. For example, one representative described the lack of internal agreement on what might constitute proper measurements:

> A department recently seized on the number of trees they were planting as a good indicator. That's not really a decent indicator; it's a data point. What I'm talking about us engaging is not data points like how many trees have you planted, but indicators like how does the quantity of trees you've planted affect surface temperature and rain water runoff? To understand the type of job we are doing environmentally, the City needs failures and successes to study and use the metrics from them to figure out how successful (or not) we've been.

Opinions regarding the role of university scientists in filling this knowledge gap were mixed. Although there was agreement that including scientists in developing such assessments would be helpful, all but three interviewees were sceptical of the possibility. While one leader of a well regarded community organisation noted they rarely enlisted scientists as formal advisors (''The tendency is to approach people who are connected with fundraising possibilities and we usually don't think of scientists in that manner''); others stated that when they did: ''We find that their study interests are mostly on esoteric topics''. One department head noted that they tried to address this issue directly through issuing funded requests for proposals on aspects of urban sustainability for which they required scientific research.

Six leaders were sympathetic as to why researchers would be resistant to reconfiguring their datasets in a way that would make their information useful to practitioners. However, many expressed that approximate accuracy, rather than exactitude was sufficient to reflexively advance policy. ''We don't need clear correlation. We just need to be able to point to it'', one noted. Another saw the role of science as less important to supporting innovation than getting the cultural politics right:

> I would like to see [my department] have a strong science background but this isn't about science, it's about culture and behavior. Those are what the things we're going for are. The science comes in further down stream like in the BMPs [Best Management Practices]. We wanted to show them to be viable and implementable (i.e. swales and rain water infiltration) and that the science works.

5.4.2. Resources

Leaders in 10 of the interviews mentioned regional foundations as potential sources of funds to support the work necessary to address the absence of metrics. However, outside of establishing benchmarks for monitoring urban sustainability programmes,

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only three mentioned lack of resources as obstructing their ability to support new efforts in enhancing internal capital or advancing external networks and projects.

Many credited a court settlement with a regional utility as the means by which their organisations had been able to finance a range of urban environmental agenda initiatives. This, they noted, joined by the City's donation of key brownfield properties and contributions by the private and community sectors of technology and expertise, enabled the development of several state-of-the-art training facilities in Chicago for sustainable urban design. Seven of the leaders interviewed mentioned these facilities as important resources for educating and networking both their own people and others interested in sustainability in the public, private and community sectors. As one facility's director explained: "No one has the answer; they're all trying to figure it out. They're all engaging in a game of leapfrog to figure it out. This is one of the places they come to figure it out. [This facility] provides a platform".

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5.4.3. Power

With the advancement of Chicago's Agenda and the short-term future of the settlement funds, 17 of the leaders expressed a desire to begin to see the knowledge and networks they were establishing within their organisations codified. While the contacts and expertise moving their organisation's sustainability efforts forward were personal to them and the staff they perceived to have empowered, they articulated an interest in these resources becoming institutionalised. Encoding green requirements in municipal regulations, procurement requirements and hiring descriptions, they hoped would move their boundary spanning actions from leadership to organisational behaviour and protect these changes from external power shifts. In Chicago where clout's famous catch phrase is, "Don't send me nobody nobody sent" one interviewee bluntly stated, "I'd like to see them put green into the job description so that we don't even have to look at people without those qualifications".

Six leaders phrased this transition as putting themselves 'out of business'. One reflected this opinion when stating the hope that specific levels of expertise and effort would become institutionalised as the province of the whole organisation:

> Organisationally we should have the [specialized sustainability unit] put itself out of business and have the department mainstream be where it goes back into. It should get to where the training is so ubiquitous that you don't need specialists. Put it in the ordinances so that LEED is unnecessary. Have LEED and the [unit] just be there to push the envelope instead of doing basic support for projects.

Another echoed this sentiment wishing to see it extend throughout the norms of the City's municipal workforce.

> I don't want green to be one guy or department or bureau. To make a successful green program it should become something where you don't need to have a program but it is just what you do. You shouldn't need a Department of the Environment. It should be implicit in the mission of each operating department. I want a successful integration of green ideas from janitor to the mayor and back to the janitor.

Although codifying tacit sustainability knowledge (i.e. personal contacts, commitments and individual relationships) into explicit organisational regulations and procedures (i.e. building codes, official job descriptions, etc.) was an end most leaders

stated they sought, building it into their organisation's culture was expressed to be the ultimate end. As one environmental leader stated:

> I am making those inroads and being an advocate for [sustainable resource] management and getting other departments involved in what we are doing ... who want to develop relationships with the department so I can step back and the *process* will introduce new people and ideas to the department. I want to create a natural flow of information between departments that won't require my presence. Once connections are made between [our] staff and staff in other departments then those relationships will continue on their own without my intervention. Hopefully those people will just pick up the phone and call each other if they have an idea or need information or help.

6. Discussion

Efforts in Chicago to build a sustainable future for the region are clearly generating considerable excitement and enthusiasm. The interviews with environmental leaders in the metropolitan area reflect their interest in developing the boundary spanning capabilities of their organisations through the acquisition of new knowledge and abilities for their members. In response to new technological and social demands managers report themselves engaged in a range of strategies for enhancing both internal and external competencies.

This engagement suggests a synergy between top-down policy formation and decentralised organisational development. Managers report their organisations pursuing this development with the resources they have on-hand; however, opportunities remain to expand such efforts. Augmenting their organisations' internal capital as well as external networking capabilities can be sought more actively. In addition, managers can take action to institutionalise new informal boundary spanning relationships and secure the financial resources necessary to long-term success.

The interest of Chicago's Mayor (historically a strong administrative position) in driving sustainability policies is clearly reflected in statements by the interviewees. Although one noted the importance of the last several decades of environmental activism in preparing the ground for the Mayor's initiative, there was agreement that action by a centralised, strong administration was the impetus to change. As one Administrator noted: "I don't feel any groundswell [from the grassroots] and I've heard that they [City officials] will do it because the mayor wants it ...".

This aspect of Chicago's political structure, a strong mayor and a robust culture of hierarchical deference, may explain some of the enthusiasm of managers to embrace the City's Agenda. However, the genuine sense of excitement managers expressed about the Agenda, its possibilities for new forms of metropolitan resource management and the Mayor's continued interest in its projects seems to have encouraged an atmosphere of experimentation.

Despite the formal, hierarchical origin of the agenda, the majority of managers found in it opportunities to horizontally broaden their organisation's mission and capacities. The result is an intriguing synergy between the possibilities of command and control and boundary-crossing organisational structures in the building of a sustainable metropolitan region.

6.1. Internal capital

While acknowledging the importance of new knowledge in advancing their organisation's efforts to implement the new sustainability agenda, most environmental

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leaders expressed the intention of 'working with what they had' rather than relying upon new personnel to transform their organisations. Formal and informal training and developing internal centres of expertise were emphasised over hiring new staff as an effective means of enhancing organisational knowledge and abilities.

Engaging new expertise through attrition-based hiring can be slow. Managers can remain within budgetary restraints that preclude hiring staff or engaging consultants by adopting more active strategies to increase their organisation's sustainability expertise. Developing formalised internship or volunteer programmes is an effective way of introducing new ideas and perspectives into organisations at minimal expense. 'Brownbag' seminars, organised around speakers from different offices, departments or organisations, held during working hours are a similar method of bringing in new information at low cost. While some organisations in Chicago use these methods, their general adoption as a strategy could prove efficacious in advancing the region's urban environmental agenda.

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6.2. *External networks*

Outside of training, managers identified informal, external networks as a principal means of developing the boundary spanning function of their organisations. Given their recognition of the importance of these networks, managers can further enhance this aspect of their staff's boundary spanning capabilities. As noted by several managers, multiplication of informal 'green' events and gatherings have accompanied formal emphasis on sustainable urban policies. Managers can encourage and provide opportunities for staff to attend such events in order to strengthen their networks outside of their own organisation. This opportunity can be of particular importance to staff members whose previous work or educational experience has not afforded them the chance to develop contact with people in the field of sustainability.

6.3. *Institutionalisation*

While generally supportive of informal networks, managers expressed concern that such channels be transformed into formal structures of cross-boundary resource and power flows. While many described the initial successes which their organisations had achieved, the majority of managers expressed an interest in seeing the informal, unrecorded, tacit knowledge (i.e. contacts, personal experiences and norms) of boundary spanning individuals within their organisations transformed into more explicit institutional structures (i.e. codes, regulations and hiring practices) that will make the boundary spanning activities necessary to implement the sustainability agenda a component of both the mission and culture of their organisations.

The near unanimous interest managers expressed in institutionalising internal capital and external networks suggests that collective action can be taken to formalise these aspects of boundary spanning capacity. For example, they can encourage all departments to review hiring guidelines for opportunities to incorporate expertise in sustainability as a component of relevant job descriptions.

6.4. *Financial support*

Managers expressed concern about the future availability of the financial resources necessary to continue efforts in greening the metropolis. The articulation of

environmental agendas by Chicago, New York City, California and a host of smaller communities offer the opportunity for bi-partisan efforts to encourage support for metropolitan sustainability at the federal level. The geographic diversity of these communities joined with their high population concentrations provides the basis for the political power necessary to influence federal policy. Communities can co-ordinate efforts to increase urban sustainability at the regional level by encouraging federal agencies to target grant programmes, incentives and regulatory reforms to ensure support for local, state and regional programmes whose environmental outputs benefit the nation as a whole.

6.5. Governance

What does the Chicago experience suggest to advance organisational learning in support of environmental policies and management? As noted above, the importance of the mayor's office in driving Chicago's green agenda, coupled with the response of organisations and departments to engage in horizontal networks to further the agenda, offer opportunities to revisit discussions in the field of governance. The case study narratives support arguments favouring decentralisation as a means toward greater inter-organisational engagement. However, central authority's key role in initiating and motivating these efforts makes constructs that privilege either hierarchy or decentralisation as the primary path toward creating a more sustainable metropolitan region overly simplistic. While initiation of a green agenda has spawned considerable boundary spanning activity it is not clear that such activity, in the absence of a strong mandate from above, can bring about the agenda's objectives independently.

7. Conclusion

Current efforts to increase the environmental and social sustainability of metropolitan regions are part of a long history of seeking to reduce antagonisms between social and ecological systems. Present initiatives to formulate this objective into actual policy goals and programmes allow an important opportunity to reflexively explore the nature of such on-the-ground efforts.

Both historical and contemporary literature suggests that in order to achieve higher levels of sustainability metropolitan regions will be required to eschew hierarchical, specialised management regimes and engage in broader cross-sectoral and cross-media collaboration. While the interviews with environmental leaders in the Chicago region reflect a disposition, and in fact at times an enthusiasm to embrace such integration, their responses reflect the critical and decisive role of central authority, embodied in the Mayor's office, in the creation and promotion of Chicago's urban environmental agenda.

However, while much of the impetus for the sustainability agenda may originate from traditional power sources and emanate along traditional lines, managers are verifying the propositions of regional theorists such as Patrick Geddes and Ian McHarg, as well as contemporary governance researchers, by expressing an active interest in developing the boundary spanning capabilities of their organisations in response to this initiative (i.e. Kanie and Haas 2004, Breton *et al.* 2007). The enthusiasm these leaders articulate toward enhancing this function is further reflected in their stated desire to institutionalise these types of open information and

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resource flows across organisational boundaries, with the ultimate goal of eliminating the necessity of central authority or external specialists to drive the green agenda.

While engaging in studies such as this allows researchers the opportunity to help focus policy efforts toward more effective metropolitan greening initiatives, more in-depth ethnographic and evaluative studies of managerial decision making and comparative studies between cities and across sectors and media will allow researchers to refine these findings and provide more detailed support. While this initial exploratory study suggests that a culture conducive to boundary spanning organisations may be emerging in Chicago, several options for further research suggest themselves. The first is to pursue follow-up studies in Chicago to track whether managerial perceptions are being translated into on-the-ground changes in environmental management in the Chicago metropolitan area. The second is to initiate enquiries encompassing several cities to further test the theoretical and practical implications of organisational culture and the growth of urban sustainability agendas. This work could be framed regionally, by scale or by the institutional characteristics of the cities. Finally, as the ultimate purpose of these studies should be to assist in the success of these agendas, we also need to improve boundary-crossing efforts between researchers and environmental leaders in the field in order to connect such studies to the policy makers developing and implementing these agendas.

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