LOCAL UNDERSTANDINGS: BOUNDARY OBJECTS IN HIGH CONFLICT SETTINGS

BRENT MCKNIGHT
Richard Ivey School of Business
University of Western Ontario
London, Ontario, Canada, N6A 3K7
Email: bmcknight@ivey.uwo.ca

CHARLENE ZIETSMA
Richard Ivey School of Business
University of Western Ontario
London, Ontario, Canada, N6A 3K7
Email: czietsma@ivey.uwo.ca

ABSTRACT

This study explores the processes and characteristics that comprise successful boundary objects. Through a longitudinal exploration of an extensive qualitative database, we identify characteristics of both successful boundary objects and the processes by which they are created. It further discusses the life cycle of a boundary object, and the challenges associated with the use of boundary objects in knowledge retrieval and transformation processes.

Key Words: Boundary Objects; Knowledge Translation; Organizational Learning

Organizations are continually scanning their environment attempting to discover and institutionalize knowledge that facilitates their survival. This is a difficult activity made more challenging when organizations attempt to learn from those who are operating in different social worlds with different "local understandings" of knowledge and often, different and perhaps conflicting values and objectives. Resolving the incompatible views resulting from these two sets of understanding is a monumental task and learning from organizations with these different views can be even more challenging.

Boundary objects have been identified as a means by which individuals and groups from different social worlds can communicate with each other (Bechky, 2003). They are defined as "objects which both inhabit several intersecting social worlds…*and* satisfy the informational requirements of each of them" (Star and Griesemer, 1989:393 emphasis original). These boundary objects can exist between a single pair of actors or among multiple parties each with their own opinions and perspectives.

While these objects can facilitate learning, not all boundary objects are created equal. Some perform better than others and different boundary objects may be appropriate under specific conditions. In this paper we seek to address the following research questions: What are the characteristics of boundary objects that most successfully facilitate learning or joint knowledge creation among groups in conflict with one another? When groups are in conflict, by what processes are successful boundary objects created? Further, how do boundary objects adapt through environmental turbulence and change?

To address these questions we investigate the characteristics and development of two boundary objects active between multiple adversaries within our study context of the BC forest industry. We examine how the Eco-system Based Management (EBM) protocol was developed through a partnership between forest companies, environmental non-governmental organizations (ENGOs), governments, First Nations and community members. We also investigate the development of Forest Stewardship Council (FSC) standards by the members of its four chambers: economic, social, indigenous peoples and the environment. Throughout we attempt to address how these boundary objects come into being and the characteristics that make them more or less successful.

Our contributions in this paper are two fold. First, we describe the characteristics of successful boundary objects with respect to creating a mechanism for inter-group learning. The successful elements of both the boundary objects themselves and the process by which they are created are discussed. Secondly, the work extends theory on boundary objects by addressing their application with respect to multiple diverse organizations and in high conflict scenarios. It further extends boundary object theory by discussing the changes in boundary objects over time.

This paper proceeds in four parts. First we review the literature on boundary objects and their application to learning. Next we describe our methodology and review our study context. We then present our results and finally present insights garnered from the results of the study.

1 LOCAL UNDERSTANDINGS AND THE ROLE OF BOUNDARY OBJECTS

Organizational learning researchers describe the importance of scanning and searching routines that facilitate the knowledge acquisition process for individuals within an organization (Crossan, Lane and White., 1999; Huber, 1991). These routines are used to find and acquire knowledge from both inside and outside the organization. This learning often involves a simple process of knowledge transfer between two individuals or groups such as when an employee learns a new procedure on the job or in a classroom. However, frequently the two parties have different "local understandings" which complicates the knowledge acquisition process from one of simple transfer to that of translation (Bechky, 2003).

These local understandings arise as a result of boundaries that effectively separate groups of people (Lamont and Molnar, 2002). Groups on either side of a boundary frequently possess differing stocks of knowledge and beliefs and this separation has been found to negatively influence knowledge transfer across a boundary (Keegan, 1974; Carlile and Rebentisch, 2003). Boundaries impede knowledge flow by affecting the processes of

knowledge storage and retrieval, and confounding the interpretation of common meaning across the boundary (Carlile, 2004). While boundaries appear salient to discussions of knowledge transfer, their impact on organizational learning remains unclear (Hazy, Tivnan and Schwandt, 2003).

What is clear is that the presence of boundaries is, for learning, both a necessary precursor and highly problematic. When groups are separated by boundaries, meaning becomes heterogeneous such that individuals from different groups interpret information differently (Bechky, 2003). Individuals learn within a specific context and have difficulty translating that learning from one context to another (Brown and Duguid, 2001). In environments characterized by heterogeneous meaning, simple knowledge transfer is impossible due to a lack of referential meaning (Bechky, 2003). Knowledge must first be translated from the meaning ascribed by one group, to that of another. Carlile (2004) suggests that the level of knowledge transfer or translation depends on the characteristics of the boundary with complex boundaries requiring more complex translation processes.

Boundary objects are a member of the set of boundary spanning techniques, and are entities that exist between two different social worlds, facilitating knowledge translation. According to Star and Griesemer (1989: 393) boundary objects must be "plastic enough to adapt to local needs" yet sufficiently robust to maintain their identity when used in multiple settings and sites. They are practical and "permit diverse groups to work together" by providing a "locus for communication, conflict and coordination" (Yakura, 2002: 968).

Boundary objects do this by acting as a repository for organizational knowledge that is meaningful to actors in different social worlds. Boundary objects can be repositories of knowledge or ideal types like maps (Star and Griesemer, 1989). Boundary objects work when all parties pour in their perspectives. As an example, engineers create drawings (an ideal type) that facilitate communication between those who design products (engineers) and those who build them (assemblers). These drawings translate the engineer's concept of a product such that others can build it (Bechky, 2003). This process of translating knowledge between two "local understandings" can be very challenging. In these situations, the two parties have to co-create a common ground or language that facilitates translation of the knowledge from two different "local understandings" to one that both parties can understand (Star and Griesemer, 1989; Carlile 2004). With this shared understanding intact, the actors can continue their knowledge transfer activities.

While boundary objects facilitate knowledge transfer across boundaries, all boundary objects are not created equal. In this paper we investigate that which constitutes a more or less successful boundary object from creation throughout its life. The following discusses the methodology used to pursue our research questions.

2 METHODOLOGY

In order to investigate what characteristics of boundary objects lead to more successful knowledge transfer and learning, a context is required in which multiple boundary objects exist and with varying levels of success. To this end, the paper employs an existing database containing detailed data for the BC forest context between 1985 and 2006. The database contains extensive information on the industry, government, environmental

organizations, and five leading forest companies that were all participants in extensive conflict throughout the period of study.

2.1 Data

The data consisted of interviews, organizational documents, news articles, press releases, meeting minutes, and other documentation. A total of 69 semi-structured interviews were conducted covering a wide cross-section of the study context. The interviews averaged 90 minutes and were conducted between 1996 and 2004. In addition 147 company and NGO press releases and over 50 news articles pertaining specifically to proto-institution development as well as 5 extensive news summaries detailing the BC forest industry were gathered. Historical documentation pertaining to the origination and development of the Forest Stewardship Council (FSC) and Joint Solutions Project (JSP) by way of their organization's website, meeting minutes and standards documentation. Secondary reports were also gathered including annual federal government reports on Canadian forests, firm annual reports, and academic accounts of the context.

2.2 Analysis

To answer our research questions, we traversed the extensive data set looking for characteristics of boundary objects, and the processes by which they were created. As we developed preliminary hypotheses, we iterated between data and emerging hypotheses to develop a deeper understanding of the phenomenon and validate our emerging understandings. We paid particular attention to differences in characteristics and creation processes between those boundary objects which were successful and those that were less successful. We defined success as the diffusion in use of the boundary objects, and the legitimacy that actors associated with the boundary objects. This method has resulted in a description of successful boundary objects that is grounded in the data from the BC forest context.

3 BC FOREST CONTEXT

The forest industry has been the most powerful engine for economic growth in British Columbia (BC) in terms of both job creation and the generation of tax monies for the government. The forest industry thus wields significant power in BC. However, this dominance was threatened with the emergence of environmental groups appearing in the late 1970s (Wilson, 1998). These groups attacked the forest industry's harvesting practices as unsustainable and decried the harvesting of old-growth forests.

The wars between environmentalist groups and forest industry factions intensified and internationalized through the 1990s. In the summer of 1993, over 700 environmentalist protestors were arrested for blockading logging roads, and protestors also conducted many media stunts and occasionally vandalized, forest company property. Actors from all sides of the debate had become heavily entrenched in their own positions resulting in clear "us" vs "them" boundaries between the groups of actors (Lamont and Molnar, 2002). Not only were the groups separated by ideology, but each had different understandings about what constituted sustainable harvesting. Into this space, multiple attempts at reaching agreements to end the dispute were made. Two of those attempts were particularly significant in the breadth of their work and their analysis forms the basis of the results for this paper.

3.1 The Joint Solutions Project

The Joint Solutions Project (JSP) was born in early 2000 as a joint initiative between a group of six forest companies called the Coast Forest Conservation Initiative (CFCI) and a group of four ENGOs called the Rainforest Solutions Project (RSP)[*]. The JSP met secretly at first working towards a truce to include the cessation of logging in environmentally important regions and a promise from ENGOs that they would not explicitly target firms (Shaw, 2004). When the existance of these talks was leaked to the public, there was significant outcry from stakeholders who were not invited to the discussions, such as logging communities, governments, and others not consulted (Shaw, 2004). The JSP participants immediately reconfigured into a more inclusive process, subsumed within two government-sponsored multi-stakeholder planning committees: one on the north coast, and one on the central coast. The group was tasked with generating "new solutions to old conflicts over coastal temperate rainforests" (Shaw, 2004: 380).

The JSP worked to build consensus among the various participants in what had become known as the "War of the Woods". They funded independent scientific analysis[†] and sponsored "scientific, technical and socio-economic research" to generate ideas for how to resolve the conflict in the woods (Shaw, 2004:381).

In 2001, the JSP introduced a set of sustainable harvesting guidelines called Eco-System Based Management (EBM)[‡] for the committees to consider, backed up by research and a set of documents constituting the EBM framework. The two multi-stakeholder committees ratified the EBM framework in 2003 and 2004, and the BC government endorsed it in early 2006. Since forests in BC are publicly owned, the JSP did not have formal decision making authority, however through a funding agreement between the government and the JSP participants, the Coast Information Team was created to coordinate future planning of forest management.

3.2 Forest Stewardship Council

In 1993 the international Forest Stewardship Council (FSC) was created in response to global concerns over inappropriate forest harvesting around the globe. The purpose of the organization was to create a set of global principles to which firms could be certified to adhere. The FSC certification is a chain of custody labeling program that certifies end products only if all links in the supply chain from logging to milling to manufacture are certified.

While FSC is a global standard, the ten global principles undergo an intensive regionalization process. Multiple layers of specificity are added to the principles by stakeholders representing four local chambers: economic, social, environmental and indigenous peoples. These members are responsible for representing the interests of their respective constituencies

[*] http://www.coastforestconservationinitiative.com/about_us/joint_solutions.html, May 2, 2007
[†] http://www.savethegreatbear.org/thecampaign/buildingsolution/dialogue, May 2, 2007
[‡] http://ilmbwww.gov.bc.ca/citbc/b-PrinciplesGoalsEBM.pdf, May 2, 2007

The BC regionalization process began formally in 1996 and initial draft standards were circulated in 2001. After substantial edits and negotiations, the first FSC BC regional standards were ratified by the international FSC body in 2005.

4 SUCCESSFUL BOUNDARY OBJECTS

In the BC forest context multiple boundary objects were being constructed including certification systems, government protocols and sustainable forest harvesting schemes. Each were being used to varying levels of success to communicate across the boundaries between forest companies, governments, communities, First Nations and environmental groups.

A successful boundary object is one that simultaneously provides legitimacy to members on both sides of the boundary but allows for learning and knowledge diffusion across it. While each of these boundary objects enjoyed some success in that forest companies would adopt the standard or ENGOs would endorse a standard, a truly successful boundary object requires acceptance by multiple parties. Effective communication across the boundary in a conflicted setting is a means to gain legitimacy and resolve conflict. In the BC forest context, the FSC and the EBM standards appear to be the most successful standards with respect to their functioning as boundary objects. More successful boundary objects had a number of features evident in both the process by which the boundary object was created and the boundary object itself.

4.1 Boundary Object Creation Process

Most critically, more successful boundary objects were the product of a *multi-stakeholder development process*. The FSC and the EBM were both characterized by this type of multi-stakeholder approach. The FSC approach involved two representatives from each of four chambers: Economic, Social, Environmental and Indigenous Peoples. Behind this formal representation, the representatives met with members of their expanded communities such as other forest companies, community groups and environmental organizations. Throughout the standards development process "considerable effort was expended on ensuring widespread consultation" (Gale, 2004: 69). Similarly, the EBM standard arose out of multiple stakeholder talks between the government, community, First Nations, forest companies, ENGOs and even other users of the land, including mining companies, sports fishing and hunting guides and others. These talks were iterative and participants engaged a broad cross-section of community participants throughout.

Other approaches characterized by single or dual stakeholder discussions were invariably unsuccessful. A first example is the early efforts of the JSI team in building the EBM standard. This process began as a dialogue between a group of ENGOs under the banner of the Rainforest Solutions Project (RSP) and a group of forest companies constituting the Coast Forest Conservation Initiative (CFCI). While multiple forest companies and ENGOs were involved, the group had did not at first include representation from First Nations, the BC government, and the affected logging communities. The process was threatened when the omitted parties refused to lend their support and called for government intervention.

A second example is the creation of a Variable Retention (VR) standard by a leading BC forest company. Threatened by heavy environmental activism, disruptions to operations

and pressure from its customers, the forest company developed a forest harvesting scheme that identified a range of different types of forests and a corresponding appropriate harvesting method. While the forest company consulted with various stakeholders, including environmental groups, the stakeholders were not directly involved in the creation of this standard. While the standard was initially supported, it lost favor with the environmental groups and its use diminished. Lessons learned from the VR standard ultimately informed the EBM.

Similarly, competing certification standards including the CSA and SFI standards were mainly the product of industry-sponsored activity. As a result, their use as a boundary object between ENGOs and forest companies was limited. The ENGOs were clear in their rejection of these standards and even dropped out of negotiations for the CSA standard in protest.

Successful boundary objects employed *experimental and iterative boundary objects* during the development process. Experimental boundary objects included test forests, public consultations and widely circulated drafts. These experimental boundary objects were used iteratively and served to facilitate greater shared understanding between conflicting groups and they reached a broader set of stakeholders. The test forests provided the ability for forest companies to test the standard's operational implications, while also allowing other parties to test the standard's environmental impacts.

Successful boundary objects had *nested structures,* in that their design moved from broad principles down to specific tangible activities. This format appears to offer greater success since actors could begin their negotiations agreeing in principle to ambiguous goals while having flexibility in their interpretation (Weick, 1995). Actors then commit to the goals, without necessarily having a clear idea of the requirements of implementation. It is likely that committing to the high level principles can provide benefits to the process by which the boundary object is constructed. When conflict arises during the process, actors can return to the more basic principle to which they all committed, and proceed from that shared goal back towards a solution. The FSC standards follow a highly nested model drilling down through four layers of details for each of the 10 principles. The intention of each principle was further clarified with an intention section. The EBM boundary object also proceeded from a set of high level principles established at the start of the boundary object creation process.

More successful boundary objects also took a longer *time to complete*. The processes associated with developing the FSC standards in BC began informally around 1996[§] and were not completed until late 2005. While not as extreme, the Joint Solutions Initiative got its start in 1999 and finished its mandate with the completion of an EBM framework document specifying the agreed upon standards in 2004. Whether the relationship between time to complete and success is a result of the lengthier time requirements for stakeholder consultations, or whether it reflects a longer, more thorough development process is unclear.

[§] http://www.fsccanada.org/BritishColumbia.htm

4.2 Outcome of Boundary Object

While successful boundary objects originated from high level principles, they were also characterized by a *high level of specificity* that clarified in great detail how actors should behave. High specificity provides less room for interpretation meaning greater predictability, uncertainty reduction and stability. Forest companies could be confident that they were following the standards as prescribed and other parties such as environmental groups could clearly identify whether the standards were being followed. Both the EBM and FSC standards contained very specific and clearly stated standards and practices while the CSA and ISO standards reflect looser performance requirements.

Successful boundary objects resulted in an *adaptive boundary object* designed to stand the test of time. The boundaries between the actors in the BC forest context are the result of deeply rooted differences that are highly persistent. Boundary objects must remain effective over a variety of conditions, so they must adapt as the relationships between the actors change and as the characteristics of the environment shift. Successful boundary objects did this by building in renewal points where the boundary object is up for renegotiation. For example, the four chambers of the FSC review the certification standard on a regular basis.

5 DISCUSSION

The results presented above describe a number of characteristics of successful boundary objects and the processes used to create them. Successful boundary objects are created by a process that involves multiple stakeholders, iteratively leverages the use of experimental boundary objects, works down from high level principles, and is time consuming. The resultant boundary object has high specificity and the ability to adapt to changes in the relationship and the environment.

The following are additional insights pertaining to successful boundary objects. First we discuss how the factors described above can predict a successful boundary object. Then we delve into an analysis of the life of boundary objects, discussing how they are built, adapted and eroded.

5.1 Predicting Boundary Object Success

The success of a boundary object is not a simple calculus due to the pre-eminence of some success factors over others. For example, a multi-stakeholder process is absolutely essential for boundary objects situated between multiple parties whose relationship is characterized by high levels of conflict. Unilateral boundary object creation appears to result in boundary objects that are ineffective and/or illegitimate from the perspective of one or more actors.

Further, boundary objects differ in the extent to which they satisfy the success factor. The competing certification standards claim to have multiple-stakeholder consultation processes, but they do a poor job of bringing the pertinent stakeholders to the table. For example, the SFI standard body has ENGOs as one third of its members, however the members are moderate ENGOs, and not reflective of the wider ENGO sentiment. Similarly, the CSA certification standard requires multiple-stakeholder discussions, but adhering to the results of these discussions is voluntary. Furthermore, when leading

ENGOs left the CSA process because they could not support the standard, CSA claimed the support of a broad constituency, though only small and moderate ENGOs were involved in the process. The success of a boundary object then relies on a confluence of appropriate factors that are appropriately accomplished.

5.2 The Life of a Boundary Object

From the factors described above, we are in a position to discuss characteristics of the life of a boundary object in the context of environmental changes. The following describes how boundary objects are built, adapt and erode over time.

5.2.1 Boundary Objects are Built Not Born

A successful boundary object is not born, it is built. This means that the boundary objects we describe as unsuccessful may yet emerge as effective boundary objects able to effectively translate knowledge between groups of actors depending on changes in both the boundary object and the environment. The CSA and SFI SFM standards provide excellent examples of these types of boundary objects. Each has existed for over a decade and has gradually been building strength as a boundary object.

5.2.2 Adaptive Boundary Objects

The context under study presents a scenario whereby the boundaries and boundary objects between groups of actors were highly enduring within a long tradition of conflict. While boundary objects have facilitated knowledge translation between ENGOs and forest companies, the boundary clearly remains. Boundary objects must then adapt through the life of a boundary in order to maintain effectiveness.

Boundary objects must be "plastic enough to adapt" (Star and Griesemer, 1989: 393) to the contexts in which they are applied. Successful boundary objects have mechanisms built in for renewal, change and adaptation making them living things. The FSC certification standard is adaptive in that its application is accomplished by fitting a forest company's operations with the certifier's interpretation of the FSC regionalized standards. This interpretation provides room for negotiation and permits the boundary object to be applicable across a wider domain of situations. Further, adaptive boundary objects have mechanisms built in for renewal. The FSC reviews their standards on a regular rotation and updates them to incorporate the latest perspectives from all sides of the debate.

5.2.3 Permanent Gateways

Successful boundary objects within the BC forest context created permanent gateways that represent acceptable avenues for conflict resolution. In the case of the BC forest context, these permanent gateways took the form of processes that engaged participants on either side of the conflict, leveraging the codified rules found in the EBM and FSC standards to guide participants towards an acceptable resolution. The EBM boundary object produced by the Joint Solutions Initiative was eventually encompassed within a broader land and resource management planning process that permitted the input and negotiation of nearly all affected parties. Similarly, FSC certification is a process beginning with the identification of a desire for certification, the selection of a certifier and a matching of certification standard to harvesting practice.

5.2.4 Boundary Object Erosion

Not all boundary objects are able to adapt in response to changes in relationships or the environment. Some boundary objects erode such that they fail in their knowledge translation role. The precursor to the EBM standard, Variable Retention, was a boundary object that eroded from a highly useful and promising boundary object facilitating knowledge translation regarding sustainable harvesting techniques. While VR began as a strong boundary object, seemingly able to engage ENGOs in a fruitful discussion of forest management, over time the ENGOs perspectives of what was required for sustainable forest management extended beyond VR. VR could not keep pace and eventually it was absorbed within the JSI EBM standard.

5.3 Boundary Object Repository

A boundary object can be considered a repository for multi-stakeholder knowledge storage. Similar to the way in which organizations take their experiences and knowledge and store them in a knowledge repository, multiple organizations embed their learning into a boundary object. What makes boundary object repositories unique from organizational repositories is the way in which they are retrieved and updated.

Carlile and Rebentisch (2003) describe a knowledge storage, retrieval and transformation cycle that is relatively fluid. With boundary object knowledge repositories, the act of retrieval and subsequent application is conducted by actors that are different from the ones that are able to store and transform the contents of the knowledge repositories. The certifiers in the case of FSC or the government in the case of EBM control the retrieval of the shared knowledge. However, the storage and transformation of knowledge can only be conducted by the wider multi-stakeholder decision making process.

As a result, the knowledge storage, retrieval and transformation cycle is broken. This break implies that the speed and accuracy with which actors can adjust the characteristics of their boundary objects will be reduced. Actors must be cognizant of these difficulties and work diligently to ensure the boundary objects remain effective.

5.4 Limitations and Future Research

This research is not without limitations. This study investigates the use of boundary objects in situations characterized by high levels of conflict where actors frequently hold incommensurate views. The findings from this study might not generalize to conditions characterized by less polarized conflict. Further, the boundary objects discussed in this paper exist at the macro level between organizations or groups of organizations.

Future research could examine highly conflictual relations between two groups within an organization such as those delineated by functional roles or union lines. Additional research could investigate how unsuccessful boundary objects develop into more successful ones. Since the boundary objects identified as successful have not removed all conflict and differences between the groups of actors in the BC forest context, it is possible that their utility will erode and other, as of yet unsuccessful, boundary objects will fill their place. To investigate this within an even longer view will be required.

6 CONCLUSION

This study has examined and discussed the processes and characteristics that constitute successful boundary objects. We have identified characteristics of successful boundary objects including elements of the boundary object creation process including the need for multiple stakeholders, the presence of high level principles and the application of experimental boundary objects. Resulting successful boundary objects have high specificity and strong ability to adapt.

We have further detailed challenges in drawing a direct link between these factors and the success of a boundary object. We then discussed the life cycle of a boundary object, highlighting the need to build boundary objects, continually adapt them and guard against boundary object erosion. Finally, we have discussed the implications of the multiple-actor nature of boundary objects with respect to knowledge retrieval and transformation processes.

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