

Ways of Seeing: Topographic and Network Representations in Organization Theory

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Organizations (and social systems more generally) have traditionally been represented topographically—as if they were landscapes. Such an image is limited. A network representation of organizations, redescribing the latter as locales over which constellations of relations are woven, is more appropriate to cope with transformation and change. Topographic representations, however, are not useless. To the extent that social life is carried out in institutions concerned with efficiency; and insofar as power, control, and accountability are inextricable features of social systems, network representations will be limited, and topographic representations will not vanish. Organizational representations tend to oscillate between conceiving organizations as objects vs. sets of relations. Neither of these images alone is sufficient to capture organizational functioning.

KEY WORDS: representation; organization theory; space; institutionalization; organizational modeling.

1. INTRODUCTION

The most controversial element in a social system is its boundaries. Should any evidence be necessary it is unsparingly offered in international politics: take a look at Yugoslavia, witness the inter-republic strife in (what was) the Soviet Union, observe the debate on the future of the nation-state within the European Community. As nation-states zealously guard their frontiers from would-be aggressors, organizations similarly buffer in various ways their technical core in order to absorb the uncertainty of the environment, and thus create the conditions that are conducive to obtaining a closed system, within which the efficiency-maximizing logic of the technical core can operate uninhibited (Thompson, 1967).

What this reasoning implies—and there is no reason to assume that similar comments cannot be made on any social collectivity—is that *there are* social

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systems which are relatively clearly distinguished from their environments; that these systems are constituted as well-bounded entities, performing certain functions in a relatively integrated manner, in order to obtain particular results over time. Indeed, there is hardly any textbook in organizational theory that does not describe organizations topographically: there is a transformation process (or the technical core) surrounded by buffering departments which obtain certain inputs from, and discharge particular outcomes to, the outside world. All the grey area outside the organization is designated to be the uncertain environment (see Daft, 1988; Kast and Rosenzweig, 1985; Robbins, 1990). Put it this way, reducing environmental uncertainty becomes the number one task of an organization. Likewise, in the political domain, building up a powerful defense force is the primary duty of a state government.

Drawing boundaries inevitably distinguishes between an “inside” and an “outside,” an “us” and “them.” Moreover, looked at a particular point in time, boundaries have a certain fixity, conveying the impression of quasi-permanence and naturalness. This impression, however, psychologically comforting and cognitively convenient though it may be, conceals the artificiality and conventionality of all boundaries. Ought Jerusalem to be Jewish or Arabic? Should the Serbian villages in Croatia be part of the latter or part of Serbia? Are suppliers and customers part of an organization or not? In short: where do we draw the line? How do we draw the line?

2. THE LIMITS OF TOPOGRAPHIC REPRESENTATIONS

A topographic conception of organizations and their environments is useful but limited. On the one hand it allows convenient analytical distinctions which can be the starting point for building “snapshot” theoretical frameworks. Thompson’s rationalist conception of organizations that has been alluded to above is an example of such a framework, which has provided the inspiration and the base for more elaborate models and theories. Similarly, Beer’s (1981) Viable System Model (VSM) is another example of a powerful conceptualization of organizations stemming from a topographic conception of organizational structure in terms of five necessary systems. On the other hand, however, topographical conceptualizations are faced with some inherent limitations.

First, it is assumed that organizations-as-places have single identities. Differences between organization members—the latter understood both as individuals and groups—are submerged in the name of an overarching organizational rationality, which is usually defined in terms of its competitive relation to the environment (i.e., survival). Moreover, the notion of a single identity is almost always constructed in an introverted manner, by delving into the organizational past in search for internalized origins (Massey, 1991). Looking at it in this way, however, tends to underestimate the fact that it is impossible to think about an

organization without bringing into play a considerable amount of broader history. The identity of IBM or General Motors, for example, cannot be understood by simply studying their life trajectories but also by taking into account the technical, economic, and social conditions that led to significant developments in computing or car manufacturing, the role of governments and broader societal institutions, the background and organization of their employees, etc. In a similar vein, Star (1989, p. 129) has observed with respect to some of the underlying relations shaping pieces of art:

It is the articulations of various kinds of work which create, for example, a school of painting. This is not aesthetics devoid of contingency, but contingency which shapes aesthetics, ranging from union-imposed hours of musicians timing a symphony to the large-scale manufacturing of brushes constraining the width of strokes of paint on canvas. And such work is often invisible to both outsiders and historians, who may come to think of the piece of art as shaped solely by its individual properties, or by an individual artist, devoid of the collective nature of the work implicated in its production.

Second, organizational identities are usually taken to be quasi-fixed and static. Indeed, as Thompson has asserted, organizations attempt to impose their own logic on, or at least to combat the logic of, an independent, precarious environment. An emphasis, however, on the organization as a discrete entity faced with the problem of survival against a threatening world, neglects the significance of the *systems of relations* in which an organization is embedded, and without which the organization couldn't exist in the first place, thus resulting in egocentric modes of thinking and acting. As Morgan has (1986, p. 243) remarked, egocentric organizations "have a rather fixed notion of who they are, or what they can be, and are determined to impose or sustain that identity at all costs." Any parallel with the behavior of nation-states or ethnic communities is not coincidental. If you believe that the outside world is set against you, the only sensible conclusion is to defend yourself.

Third, the organization-as-place is usually identified with a "community," an assumption that becomes increasingly obsolete with the rapid development of computer networks. The latter have already begun to transform organizations from gatherings of people under the same roof to networks of electronically-connected individuals, as well as inter-organizational alliances (Malone and Rockart, 1991).

3. BEYOND TOPOGRAPHIC REPRESENTATIONS: ORGANIZATIONS AS NETWORKS OF RELATIONS

Having outlined the main limitations of a topographic conception of organizations and social systems more generally, what might be an alternative conceptualization? Massey's (1991) redescription of geographic space may be helpful

in such an attempt. While any particular place can be defined in terms of its conventional boundaries, it can also be reframed in terms of sets of relationships both among its "inhabitants," and between them and the rest of the world. "Network" would be a more appropriate designation for a place than a merely static, fixed *topos*. People's life-paths and their interactions through time-space, individuals' diverse socio-economic and cultural backgrounds, their different experiences of time-space, and their multiple social relations and communications meet over particular locales (e.g., a house, a shop, a square, a suburb, a factory shop floor, etc.). A richer picture emerges if we view a locale as the setting of interactions, itself internally differentiated, specifying the contextuality of interactions, rather than if we treat it as merely a well-bounded geographical area (Giddens, 1985). From the perspective of space-as-a-network-of-relations, Massey (1991, p. 28) defines space as follows:

In this interpretation, what gives a space its specificity is not some long internalised history but the fact that it is constructed out of a particular constellation of social relations, meeting and weaving together at a particular locus. If one moves from [an imaginary] satellite toward the globe, holding all those networks of social relations and movements and communications in one's head, then each "place" can be seen as a particular, unique, point of their intersection. It is, indeed, a *meeting* place. Instead then of thinking of places as areas with boundaries around, they can be imagined as articulated moments in networks of social relations and understandings, but where a large proportion of those relations, experiences and understandings are constructed on a far larger scale than what we happen to define for that moment as the place itself, whether that be a street, or a region or even a continent. And this in turn allows a sense of place which is extroverted, which includes a consciousness of its links with the wider world, which integrates in a positive way the global and the local.

Similar to Massey's redescription of geographic space, the organization can be redescribed as a network of interlocking and shifting relations. Organizations can be seen as the locales of bundles of social interactions and relationships shifting in time. A network image of organizations resonates with the notion of displacement discussed by Zuboff (1988) and Cooper (1992). All techniques of representation in general, according to Cooper, and the process of informing more specifically, according to Zuboff, contain the feature of displacement. The latter is taken to mean a series of transformations along informational networks. In decision making, events, objects, and systems are substituted by their mobile representations (i.e., models, inscriptions, maps, tables, files, etc.). The latter can be processed, rearranged, moved around. The simple juxtaposition between an "inside" and an "outside" is reframed in terms of particular linkages between elements across various "domains." As Cooper (1992, p. 257) argues: "In terms of displacement, organizing activity is the transformation of boundary relationships which are themselves continually shifting."

In reanalyzing Latour's (1988) account of the work of Louis Pasteur on

the development of a vaccine to the anthrax bacillus, Cooper (1992) notes the series of displacements in which Pasteur had engaged. Rather than viewing Pasteur working in isolation in his laboratory attempting to combat a threatening bacillus existing in the French farming environment, it is the transformation of aspects of the environment into laboratory practices and *vice versa* that more adequately captures Pasteur's pioneering work. It is not the opposition between two discrete entities (the laboratory vs. the farming countryside) that delivers results but the reframing of shifting linkages between these entities. Pasteur reproduced in his laboratory an event that had occurred outside (i.e., the lethal bacillus that threatened the French cattle with decimation). Isolating the anthrax bacillus in his laboratory, Pasteur was in a position to transform a hitherto unknown microbe that was invisibly lethal in the countryside to a bacillus whose behavior could be rendered visible, and thus controllable, inside the laboratory. Finally, by reproducing certain laboratory practices in the French countryside, Pasteur could demonstrate to the farmers the effectiveness of his vaccine. Every French farm was transformed, in terms of certain hygiene procedures, into Pasteur's laboratory—a necessary condition for administering the vaccine effectively.

4. A CASE STUDY: LITHONIA LIGHTING

The usefulness of the network image of organizations can be further illustrated by looking at the case of Lithonia Lighting, an American company manufacturing lighting equipment. The following report, describing some important changes that had occurred at Lithonia, appeared in *The Economist* (October 6th, 1990, p. 111).

In America lighting equipment is usually sold through a web of contractors, distributors and agents. For a new building, "specifiers" draft the basic facts about the lighting system needed for the project, then put the job of installation out to tender. The winning contractor orders the system's components from an electrical distributor, which tends to sell several manufacturers' products. The distributor buys from an independent sales agent. These are usually linked to a single manufacturer: Lithonia follows industry practice by letting its agents stock complementary, but not competing, products.

This network of relationships was the key to Lithonia's transformation [...]. At the start of the 1980s Lithonia was market leader, but its competitors were catching up. How could it remodel its business, become more competitive and turn itself into the world's lowest-cost, highest-quality maker of lighting equipment?

Mr Charles Darnell, a senior vice-president at Lithonia and architect of the firm's change, felt that exploiting the industry's dispersed structure and ditching Lithonia's conventional organizational hierarchy would give it an edge. He put Lithonia's independent agents at the hub of a spoked network. Grouped around the hub were the specifiers, contractors and distributors, plus Lithonia's various decentralised product divisions, its field warehouses and its headquarters team.

This process made Lithonia rethink its business links. It was not, as it had supposed, at the top of a hierarchy, with strong links only to its agents (the second

tier of the hierarchical "pyramid"). In reality, the lighting-equipment business revolved around the agents. These had the local knowledge and customer relations necessary to get Lithonia's products chosen for lighting projects. A plan emerged: help make the agents more efficient and more profitable, break down the boundaries between Lithonia and its partners in the network, and business would boom. Lithonia has spent \$20m turning that plan into practice.

Computers now link each bit of Lithonia's network, from specifiers to agents to Lithonia's own factories. Computer-aided design and artificial-intelligence systems help specifiers design a lighting layout to suit any project. Automated, flexible manufacturing systems (linked into the overall computer network) mean that Lithonia can swiftly modify its product lines; feedback from customers and agents helps design new products. Product catalogues can be tailored to show specific ranges and prices for individual customers.

Contractors, distributors and agents check the availability of products and order them from Lithonia on-line. The company's software automatically directs the various components of each order to the relevant Lithonia product division. The progress of each order can be tracked throughout the system. Even Lithonia's delivery trucks will eventually be linked into the computer network so that customers will know exactly when their orders will arrive.

[...] A measure of Lithonia's faith in its strategy is its plan to take it a stage further. It hopes to bring its suppliers, too, into its burgeoning network by the end of 1991. They should then be able to help the firm design and develop new products. Lithonia sees no reason why its suppliers and customers should not talk to each other via Lithonia's network, if it means a better lighting fixture is eventually produced.

How might the developments in Lithonia Lighting be understood? A topographic conception of organizations is of limited help in accounting for the changes reported above, although it may be a useful model in offering a snapshot representation of Lithonia at a particular point in time. The key to understanding the changes in Lithonia is to replace the notion of organization-as-a-place with the notion of organization-as-a-network-of-relations. Lithonia's senior management has been able to conceive of the company not in terms of its own static, internally generated, historically-oriented identity (i.e., the producer of lighting equipment to particular standards in a particular way) but in terms of a set of "mobile and non-localizable associations" (Cooper, 1992, p. 257) between Lithonia and key actors in the lighting industry (i.e., agents, specifiers, etc). The company has been able to appreciate the plethora of contextual relationships upon which it depends for its functioning, and instead of treating these relationships as merely the "background," it brought them forward to become part of the "figure." In breaking down the boundaries between itself and its partners, Lithonia is able to understand itself as being a part of a set of relations, and that its identity is not so much derived from its own history as from its place *within* this network of relations. Its ability to transform certain links within its network of relations has created new patterns, thus allowing its identity to evolve along with that of the wider system (Morgan, 1986).

Lithonia does not recognize the environment as an independent domain

against which it has to struggle in order to survive. Nor does it simply emphasize certain features of the environment that had remained previously neglected. In a much more active manner, in its attempt to achieve some form of closure in its relation with the environment, Lithonia helps *enact* a different environment (Weick, 1979). By looking at its environment afresh Lithonia creates an opportunity for understanding itself, and by understanding itself it helps shape its links with other actors in the lighting industry in its own image.

On a philosophical level, such an extroverted notion of obtaining knowledge resonates with Aristotle's conception of human understanding: it is by gaining an understanding of the world that human beings come to understand themselves. As Lear (1988, p. 8) comments on Aristotle's concept of *epistemophilia*: "We cannot gain self-knowledge merely by turning our gaze onto ourselves. Because we desire to understand, because we are at bottom systematic understanders, self-understanding must to some extent be indirect. [. . .] It is by looking out to the world that man's soul maps the structure of the world. Once he has come to understand the world, not only has he become what he most fundamentally is, a systematic understander, but he can also look to the world to see the structure of his soul mapped there."

The inextricable loop between thinking and doing, ideas and practices—which has persistently been emphasized by, among others, Checkland (1981)—underlies the most essential ingredient of systemic wisdom, namely that generating action in the world is never purely an instrumental effort but is simultaneously an act of self-discovery and learning. Conversely, the latter cannot be achieved unless action is taken. Any attempt to break this loop results either in idealist thinking and arrogant rationalism; or it yields egocentric behavior and unreflective action, unable to learn and develop.

To sum up, if the above remarks are accepted, organizing is seen as an active process of transformation of particular linkages in socio-technical networks, rather than as a schematic opposition between a certain "us" and a particular "them." While a topographic conception of organizations implies the distinction between center and periphery—the two being in a relationship of authority and obedience respectively, with the latter usually serving the former—a network view of organizations reframes the latter in terms of sets of transformable relationships between actors. Instead of being concerned with fixed substances, a focus on relationships and interactions captures the crucial fact that organizations are not frozen entities, but interlocking processes shifting in time (Bateson, 1979; Eden *et al.*, 1979; Weick, 1979). On such a view, there is no reason why what is conventionally labeled "the organization" should be egocentrically privileged (which, by the way, means that the *status quo* is unreflectively asserted in all circumstances), but rather the appreciation and management of a plethora of relations within which the "organization" is embedded becomes necessary (Morgan, 1986).

5. BACK TO ORGANIZATIONAL TOPOGRAPHY: THE LIMITS OF NETWORK REPRESENTATIONS

Transcending conventional boundaries allows one to see wider patterns of associations; it encourages an extroverted view of the world, and it highlights the temporariness of all apparently stable formations. It focuses on movement and inclusion, diffusion and openness, rather than stasis, exclusion, and stubborn defensiveness. It isn't, perhaps, a mere coincidence that all major spiritual traditions have emphasized the necessity for human beings to transcend the boundaries of their own ego and strive to come to a communion with the world. Spiritual growth and internal integration stem, as Fromm (1976) has highlighted, echoing Master Eckhart's views, from transcending the mode of having, making oneself open and not letting one's ego stand in one's way.

Fromm (1986) further argues that the overcoming of separateness which humans experience upon entering the world is one of the most fundamental existential questions posed to human beings. A reflective awareness of individuality, while at the same time establishing a productive association with fellow human beings and with nature, is the road to human maturity and spiritual strength. "Well-being is possible" says Fromm (1986, p. 36), "only to the degree to which one has overcome one's narcissism; to the degree to which one is open, responsive, sensitive, aware, empty (in the Zen sense). Well-being means to be fully related to man and nature affectively, to overcome separateness and alienation, to arrive at the experience of oneness with all that exists—and yet to experience *myself* at the same time as the separate *I* am, as the individual" (for similar remarks see Jung, 1958; Schumacher, 1977).

An existential view of human beings could be equally extended to human artifacts such as organizations. The latter are often described in anthropomorphic terms which, contrary to what some researchers have argued, is not always misleading—in fact it can be quite illuminating. Organizations are active subjects interpreting and acting in the world in a manner which is, in some respects, analogous to human beings. For example, similar to the above remarks for the necessity of individuals to integrate their internal world and align productively themselves to the outside world, Kanter has argued that highly entrepreneurial organizations are characterized by an integrative logic: "the willingness to move beyond received wisdom, to combine ideas from unconnected sources, to embrace change as an opportunity to test limits. To see problems integratively is to see them as wholes, related to larger wholes, and thus challenging established practices—rather than walling off a piece of experience and preventing it from being touched or affected by any new experiences" (Kanter, 1983, p. 27).

There are, however, limits to purely existential accounts, and to the associated view of organizations as networks of shifting relations. These limits stem, primarily, from the highly institutionalized nature of life in modern social sys-

tems and, secondarily, from the principle of efficiency, the exercise of power, and the demand for accountability. Human interaction in modern social systems occurs on a constrained, patterned, and regularized basis, thus creating taken-for-granted routines and necessitating the emergence of distinctive, circumscribed institutional roles. Routines allow predictability, economy of effort, require low levels of attentiveness to regularized actions, and stabilize human interaction. This stability, in turn, makes possible the division of labor between individuals and opens the way for creativity and innovations that demand a higher level of attention and awareness (Berger and Luckmann, 1966). The routinized character of social life allows for the possibility of “freezing” routines and formally representing them so as to make them mobile, processable, and simplified—think, for example, of the function and utility of subroutines in a computer program. What we conventionally call a “social system” is nothing else but patterns of recurrent activities which are situated in a particular time-space; a (concrete) social system is, as Giddens (1979) has observed, different from a (virtual) social structure.

Institutionalization renders representations of social-systems-as-sets-of-relations inherently limited for two reasons. First, the principle of efficiency or, more generally, the principle of turning losses into gains (Cooper, 1992), in combination with the routinized character of most of social life, entails the submergence of recurrent relations and interactions within the same boundaries which, once labeled, can be treated as entities in themselves. Organization design theorists have suggested various ways in which grouping recurrent organizational activities may be achieved: by the degree of interdependence between activities, information-processing requirements, natural breaks in the transformation process, geography, time, technology, etc. (see Galbraith, 1977; Hanna, 1988; Mintzberg, 1979; Thompson, 1967).

Drawing boundaries around a group of interactions and activities allows for the “area” so bounded to be treated as an entity in itself, or, if you prefer, to be reified. Reification goes hand in hand with conceptualization. The dynamic, continuous nature of human perception of experience, which is emphasized by representing social systems as sets of interlocking, shifting relationships, is inevitably segmented and codified—viz, it is to some extent reified—via the mediation of conceptual language. Concepts are mental representations of classes and they enhance cognitive economy (Smith, 1988). By carving the world into classes and representing classes by concepts, individuals decrease the amount of information they must learn, remember, process and transmit. In addition to cognitive economy, concepts allow individuals to link perceptual and non-perceptual information, and thus provide them with expectations to guide their actions (Smith, 1988). If, for example, it is known from past experience that reciprocal interdependence is the most demanding form of interdependence between activities and, therefore, requires the highest amount of coordination,

whenever in the future a concrete situation shows signs of mutual interdependence, the same expectation with respect to coordination can be used to direct human action.

An entity that has been conceptualized lends itself to reification, thus enhancing cognitive economy and offering more chances for instrumental intervention via formal representation. Once an entity has been formalized it can be manipulated without having to understand what actors are doing. Reasoning about the entity can be carried out by purely manipulating symbols, divorced from meaning or understanding (Reeves and Clarke, 1990). Beer's (1981) VSM is a good case in point. By formally representing organizations in the object language of cybernetics, abstraction is raised to such a high level so that organizational specificities are discarded in search for literal identities and invariances (see also Boulding, 1987). Moreover, the specific concepts used in the VSM, developed in an analogical manner from the source domain of the human nervous system, do not really matter as such. What matters is that the relationships in the source domain are isomorphically mapped onto the target domain (Tsoukas, 1991, 1993). This is what leads Beer (1984) to claim that his viable system model is not merely a metaphor of organizations, but that an organization and the human nervous system are *identical* over a specified area of activity—that is, identical once an invariance has been established. In using the VSM, one does not have to know about how the VSM was developed nor to understand the technical intricacies of human physiology and cybernetics; not unlike assembling a do-it-yourself piece of furniture, pure symbol manipulation, without reference to understanding or meaning, is good enough for achieving particular results.

In summary, conceptualization is synonymous to abstraction and, taken to the limits, to the creation of formalisms. The latter seek to represent a social system in such a way so as to capture its most crucial features and, hopefully, fundamental dynamics. Formalisms are necessarily, and by default, one-sided and generic. As Star (1989, p. 129) argues: "Information presented in formalisms is the most portable and the most unchanging, precisely because it is both abstract and recoverable." Formalisms enable symbol manipulation without reference to understanding.

The second reason why representing social systems as sets of relations is precarious is that it does not allow for the possibility of what Latour calls "agonistic encounters" between social actors—namely power, control, and accountability. In agonistic encounters the winner is the one who is able to "muster on the spot the largest number of well aligned and faithful allies" (Latour, 1986, p. 5). The outcome of a dispute will be determined by finding new ways—more economical and generic—of representing the object of dispute: progressively more abstract representations that mobilize a larger number of events in one spot (e.g., in the recent Gulf War, satellite intelligence possessed

by the Allied forces was infinitely more powerful than the Iraqi reliance on international media and, possibly, spies for information on their opponents' moves).

The transformation of real-life entities like organizations, animals, individuals, etc., into formal inscriptions is, as Latour (1986) has argued, an impressive means of enhancing power and control. This is the case because working with formalisms presents certain advantages over working directly with the entities they represent. First of all, formal inscriptions are mobile. An organigram, Mintzberg's (1979) five organizational configurations, or Beer's (1981) VSM can move, whereas organizations cannot. Second, formalisms are immutable when they move. Information can be transmitted over a distance without the representation itself being changed. Thus formalisms allow for the possibility of remote control: by manipulating variables, figures, pictures, or text one can effect control at a distance—as it was impressively illustrated by the American administration during the Gulf War. By reducing a complex entity to fewer and simpler formalisms one goes “from slower to faster mobiles, from more mutable to less mutable inscriptions” (Latour, 1986, p. 22), thus allowing for the entity to be more easily controllable at a distance.

Beer's VSM is a powerful representation of organizations which embodies all the above properties of formalisms. Using Beer's inscriptions, crucial aspects of organizations can be talked about, reflected upon, and rearranged. Their representation is immutably mobile, it can be reproduced and recombined with other representations. Not unlike an explorer looking at relevant maps, an organizational strategist can now *view* those aspects of the organization that have been taken to be its most significant, assess the current performance of Systems 1–5, and take appropriate action. Insofar as the VSM is a generic representation of organizations it is meant to be applicable in all sorts of contexts. By using it, organizational diagnosis followed by the appropriate actions becomes possible.

Compared with conventional organigrams (see Mintzberg, 1979), Beer's VSM is much more abstract, generic, and immutably mobile—hence more powerful in allowing for the control over organizational activities in a way common-sense based organigrams do not (as Latour, 1986, p. 18 epigrammatically says “He who visualizes badly loses the encounter”). The VSM, being highly abstract, discards unnecessary experience-based organizational variety and attempts to isolate (and formally represent) deep crucial properties of organizations that account for the effective (or ineffective, as the case may be) operation of organizations. By manipulating those crucial properties the possibility of control on a large scale, and at a distance, is enhanced. This was revealingly epitomized by Beer's attempt to lay the foundations for the regulation, along the principles of VSM, of the entire Chilean economy under the late President Allende in the early 1970s (see Beer, 1981). Common-sense models of social

systems, being too concrete and close to the reality of daily experience (and thus more mutable than formal ones) are unable to help decision makers achieve key control objectives.

Related to the issues of power and control being a limit to representations of social systems as networks of interlocking and shifting relations is the question of accountability. Accountability is an essential feature of the domination structure underlying all social systems (Giddens, 1979). Drawing upon a particular domination structure, organization members hold others accountable for particular activities. It is difficult, however, to make decision makers accountable for mere interactions and invisible social relations, but it is relatively easy to hold them accountable for economic-cum-technical and/or behavioral outcomes judged according to some set of standards. This is so because accountability implies the possibility of regulation over the person(s) made accountable.

For regulation to be effective, it must possess cybernetic validity (Beer, 1981; Green and Welsh, 1988); that is, stimuli are first registered by transducers and then turned into responses according to the transfer function of the sensorium. Finally, negative feedback corrects responses in relation to fluctuating stimuli. Enhancing cybernetic validity implies an increase in the clarity of standards of performance, as well as improving the registration of stimuli and the measurement of performance. For social intervention to be possible, and for its outcomes to be assessable, social systems need to be rendered visible (Cooper, 1989). Even when such outcomes are not well defined or easily measured (e.g., in psychotherapy, teaching effectiveness, "correcting" people in disciplinary organizations, etc.) decision makers are held responsible for their achievement, although the manner in which vaguely defined outcomes may be achieved is far from clear in a techno-economic sense. Adopting prevalent institutionalized norms and socially appropriate procedures, embedded in their outer and inner contexts, is the dominant manner in which organizations attempt to secure their legitimacy and persuade their constituencies that organizational accountability is not in doubt (Meyer and Rowan, 1977).

More generally, it can be said that the more accountability is considered important in a social system, the more likely it is to lead toward the adoption of procedures rich in cybernetic validity. The latter are associated with higher formalization of the representations of a social system which, in turn, is linked to higher formalization of the system's functioning. Disciplinary procedures in organizations to guard against racial or sexual discrimination; safety procedures installed following the occurrence of industrial accidents; or the work organization accompanying the introduction of total quality management systems are good examples of the intrinsic links between accountability and formalization. In short, the more accountability is embedded into the social fabric and becomes one of the institutionalized myths underlying the operation of modern social systems, the more the latter will be represented via formalisms and the more

formalized their functioning will be. This, in turn, implies the relative decoupling of the manipulation of certain formal procedures from their underlying meaning.

6. CONCLUSIONS

Topographic representations have been the commonest way of thinking about social systems. Unless something can be shown on a map it is difficult even to acknowledge that it exists. On a societal level, the recent upsurge of fierce nationalism in Europe illustrates this kind of thinking. Entire communities look back to an idealized past in order to locate the mythical beginnings of their existence. In a similar, though less dramatic manner, organizations that have evolved a certain identity by developing a set of assumptions and behaviors in their dealings with their "environment" find it difficult to envisage their future identity in terms other than those that have helped them create their history. Facing an unpredictable future, social systems take recourse to the only certain stock of knowledge: interpretations of the past. As Kierkegaard said, life is lived forward but understood backward.

Topographic representations of organizations (and social systems more generally) rely on three problematic assumptions. They assume the existence of single and fixed identities, and identify the organization-as-a-place with a particular "community." In short, an introverted way of representing organizations finds it difficult to cope with change. Change tends to be viewed in linear, organic terms: the future is an extension of the (monolithic) past.

Representations that focus on a relational view of organizations emphasize that the latter are the locales at which constellations of relations among various actors are woven together. Understanding the identity of an organization is achieved by placing it within a wider network of relations, experiences, and understandings. Organizations are not conceived in perpetual struggle against their threatening environments; the two are rather redescribed in terms of shifting linkages between actors and events. Organizing is seen as the transformation of particular linkages in socio-technical networks. Egocentric interventions in the world are replaced by systemic wisdom, that is the ability to understand and appreciate networks of relations that are continually shifting in time. In summary, a network representation of organizations reframes the opposition between discrete, static domains in terms of mobile, non-localizable associations among actors.

Where topographic representations of social systems see fixity and stability, network representations see fluidity and impermanence. Interestingly, there are significant parallels between seeing organizations as constellations of shifting relations, and the teachings of all major spiritual traditions urging human beings

to be open, receptive, selfless, and to strive to come to a communion with the world. The attainment of human maturity and spiritual wealth at the individual level seems to have something in common with the achievement of innovation and learning at the organizational level: the capability to transcend boundaries—be they the boundaries of the individual ego or the boundaries separating functions, departments, and hierarchical levels. It should not, perhaps, be a surprising conclusion: humans create artifacts in their own image.

Despite, however, its numerous advantages, the network representation of organizations is inherently limited. Social systems do not only lend themselves to potential creativity and innovation, nor are they exclusively oriented toward change; they are also concerned about stabilizing human interaction. Recurrent, goal-oriented human interaction creates regularized patterns of behavior, generates taken-for-granted routines and gives rise to circumscribed roles. The routinized character of social life allows for the possibility of conceptualization, abstraction, and ultimately the construction of formalisms, which attempt to capture and codify some of the underlying features of social routines. Combined with the need for efficiency, routines submerge recurrent relations and interactions, thus lending themselves to be treated as objects. Reification offers cognitive economy and allows certain predictions to be made. Once relations and interactions have been subsumed into reified routines, they can be formally represented. Formalization allows actors to manipulate symbols with the view of obtaining certain ends without reference to meaning or understanding.

Power and accountability are two additional reasons why network representations of organizations are limited. Representations that reduce organizations to progressively immutable mobiles (the power—and the violence—of abstraction again!) offer their users more power over their rivals. Control at a distance is especially augmented via the creation of formal inscriptions, insofar as the latter, compared to common-sense descriptions, can mobilize a greater number of events on one spot. The modernist demand for accountability also reinforces the invention and use of formalisms that possess cybernetic validity. For someone to be made accountable, he/she has first to be rendered visible. The more the myth of accountability takes hold, the more formal procedures are expected to be instituted for ensuring it.

In his wonderful poem “Ithaka,” Constantine Cavafy (1984, pp. 29–30) alludes to the ambivalence of all purposeful action: setting out for Ithaka involves a long, arduous, fascinating, disappointing, and intriguing journey. A certain destination forms the occasion as well as the pretext for the journey, which in the end may become more important than the destination itself:

Ithaka gave you the marvelous journey.
 Without her you wouldn't have set out.
 She has nothing left to give you now.
 And if you find her poor, Ithaka won't have fooled you.
 Wise as you will have become, so full of experience,
 You'll have understood by then what these Ithakas mean.

To the extent that organized activities are primarily focused on public results, they inevitably underplay the *process*, which is always subjectively experienced. Results are susceptible to intersubjective scrutiny, debate, and decision-making; they are visible and thus provide the basis for legitimation, power, control, and accountability. Human beings experience the process in their own unique ways without having to demonstrate its utility or validity to anyone else. Results, however, are there to be seen, mobilized, registered, and, potentially, reified. The asymmetry between privately experienced processes and publicly available results is, perhaps, one of the reasons why organizational representations oscillate between the images of *objects* and *relations*.

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