

Metastructuring moves: Synthesizing deliberate and emergent organizational change

Jason Jay, M.Ed.

Organization Studies Group

MIT Sloan School of Management

Abstract

Ethnographic studies of organizational change processes have illuminated the situated, emergent nature of change resulting from people's ongoing accommodation and improvisation in the course of their work. Structuration theory has proved useful in describing and explaining these processes, linking everyday action to the structures it reproduces and alters over time. Such studies have, however, omitted or failed to emphasize people's deliberate interventions to produce change, and the interaction between situated change processes and interveners' intentions and actions. In this paper I argue that this omission is partly encouraged by an inattention to social consciousness and deliberate intervention within structuration theory itself. I import a concept of metastructuring from the information systems literature to augment structural approaches to change, and to help synthesize deliberate and emergent change theories. I then illustrate and refine the metastructuring perspective through a case study of an oil refinery's reliability improvement program. The case highlights interventions by diverse actors – metastructuring moves – that were consonant or dissonant. Emergent change processes in the context created by these interventions produced whole or fragmented structures. I conclude by exploring implications for structuration theory and for building upon it in research on social change processes.¹

Introduction

Contemporary scholars of organizational change, particularly those employing ethnographic methods, have regularly invoked Giddens' (1984) structuration theory to explain the processes they observe (Barley, 1986; Feldman, 2000, 2004; Feldman & Pentland, 2003; Ford & Ford, 1994, 1995; Orlikowski, 1992, 1996, 2000). The theory offers a rich conceptual infrastructure for accounts that weave together stability and change, and the role of structure and agency in both: because people enact structures and social stability through everyday practice, they can also enact change in those same

¹ This research has been generously funded by the Program on Innovation in Markets and Organizations (PIMO) grant at the MIT Sloan School of Management. Special thanks to my research partner George Roth, as well as Wanda Orlikowski, Lotte Bailyn, Nelson Reppenning, John Sterman, Kate Kellogg, John Carroll, and members of the BPS student research seminar for their contributions and input to the study.

structures. The theory has been used at the micro-level, where organizational routines serve as both a source of regularity and an object of actors' improvisation (Feldman, 2000). And it has been used at the macro-level, in accounting for structuring and change in organizational fields (Barley & Tolbert, 1997; DiMaggio & Powell, 1983; Zucker, 1987).

Structuration has been particularly useful for understanding change subsequent to the introduction of new technology. It has helped illuminate technology adoption as a trigger or "occasion" for structuring (Barley, 1986), and highlights the diverse ways that a technology can be taken up and enacted – producing what Orlikowski (2000) calls technologies-in-practice. These studies of change emphasize continuous, endogenous, and emergent processes, or what Orlikowski (1996) calls situated change.

These ethnographic studies have, however, omitted a key aspect of change processes in their focus on everyday work. Although they have been agency-rich, and describe the importance of people's daily actions to emergent change, they have not theorized the agency of interveners who deliberately attempt to foster organizational change. Such interveners are present in the stories but sit in the background. The deliberate introduction of new technology – CT Scanners in Barley (1986) or Lotus Notes in Orlikowski's work – serves as an occasion, backdrop, or initial condition for a process of emergent change. Such interventions are not without agency and intention – Orlikowski (1993) describes the enthusiasm with which Alpha Corporation's CIO encouraged the adoption of Lotus Notes within his organization. The focus of her studies, however, is on the structuring of work practices in people's everyday use of the technology.

As a result, work on "leading change" has been left to a parallel literature targeted largely at practitioners (e.g. Kotter, 1996). As Weick and Quinn (1999) point out in their review of the organizational change literature, such theories tend to be variants of Kurt Lewin's (1951) basic sequence of unfreeze-move-refreeze. They have affinity with punctuated equilibrium approaches to organizational change (Gersick, 1991; Romanelli & Tushman, 1994; Tushman & Romanelli, 1985) that emphasize change as periodic realignment with environmental demands.

These characterizations of planned or punctuated change have two key problems of their own. The first is the omission of ongoing, emergent change processes occurring before, during, and after deliberate change interventions. The second problem is more fundamental – they reify organizations as unitary entities that can be frozen, moved, and unfrozen. This reification derives in part from a Parsonian view of the organization as a functional system; this framing allowed Schein (Schein, 1985/2004) to transpose Lewin's "unfreeze-move-refreeze" concept across levels of analysis, from the individual and group to the level of the organization. While such reifying analogies can be useful, they also have the effect of masking internal diversity and complexity. They provoke evaluation of change interventions as either working or not, as producing "change," "resistance," or "reversion" in the organization as a unified whole.

Close analyses of change processes belie this reified view. Orlikowski (2000), for example, depicts multiple technologies-in-practice arising from an implementation of Lotus Notes in multiple areas of the organization. If Barley (1986) saw technology as an "occasion for structuring," Orlikowski's work shows how it can be part of *structurings*

(plural), resulting in the emergence of multiple “technologies-in-practice.” These technologies-in-practice arise through the interpretation and enactment of technology in light of cultural assumptions, values, and norms that have accumulated through specific local histories. A robust theory of intervention must therefore account for both the multiplicity of outcomes and the emergent processes through which they come about. It can not assume a monolithic “refreezing.”

What we need, then, is a more complete synthesis within organizational change theory, one that makes deliberate change interventions – “occasions for structuring” – endogenous. Such a conceptualization would explicitly theorize both the intentions and actions of interveners, and the multiple emergent change processes that occur in their wake. It is this synthesis that the present study proposes. I start by taking a new look at structuration theory itself, and introducing the concept of metastructuring from the IT change literature. I then present a case study of Proactive Manufacturing in Redberg Refinery in the form of four metastructuring trajectories that combine deliberate and emergent change. I conclude with implications for the use of metastructuring in studies of organizational change and other arenas of deliberate intervention such as social movements and institutional entrepreneurship.

Agency, intervention, and social consciousness

To begin, it will be useful to revisit Giddens’ conception of agency upon which he builds structuration theory. This definition can benefit from a slight addendum in order to encompass people’s interventions to produce deliberate structural change.

In the first chapter of Giddens (1984), he outlines the theory of structuration and specifies his definitions of action, agency and intentionality. Giddens describes *action* as a continuous flow, involving the capability to “do things,” to “‘go on’ within the routines of social life” (p. 4). Action “makes a difference” – it results in events that would not occur if the actor hadn’t taken it. Action involves two capabilities of human agents. The first is reflexive monitoring, or what Giddens calls practical consciousness. The second is linguistic rationalization of action to self and others, the basis of what he calls discursive consciousness. *Agency*, in Giddens terms, builds on this definition. It is the capability for effectual action in social life – “To be an agent is to be able to deploy (chronically, in the flow of daily life) a range of causal powers, including that of influencing those deployed by others” (p. 14).

The challenge that arises in using Giddens’ definitions to account for change intervention is a slight mismatch between action and agency. Action is described as resting on a basic set of practical and discursive skills. Yet influencing the causal powers deployed by others – part of Giddens’ definition of agency – requires something more that Giddens neglects. It requires what Fligstein (Fligstein, 1997, 2001) terms “social skill” or what we might call *social consciousness*.

“The basis of social skill is the ability to relate to the situation of the ‘other.’ This means that whereas a given strategic actor has interests, he or she must take other people’s interests into account... to imaginatively identify with the states of others.” (Fligstein, 1997, p. 398)

Fligstein is concerned here primarily with organizational fields and relates social skill to institutional entrepreneurship. An institution is, however, a deeply rooted structure, (Barley et al., 1997) and the same concepts apply at multiple levels of analysis. Social consciousness and skill are relevant whenever actions are attempted in order to deliberately shift or bring about a new structure. That intended structure might be a group norm, an organizational routine, or an institutional arrangement. At whatever scale, such actions – what we might call interventions – involve anticipating what will happen through the reflexive monitoring and rationalization of others’ agency. Accomplishing desired outcomes is contingent on others’ responding to the intervention and enacting intended structures.

In some cases, we might extend this idea of social consciousness toward what Bourdieu calls reflexive sociology (Bourdieu & Wacquant, 1992). This is an imagination not only of the internal states of others but of the institutional arrangements that those others constitute. In accounts of social movements, activists identify political opportunities, shape and deploy collective action frames that can be precisely tailored to specific social contexts (Creed, Scully, & Austin, 2002), and mobilize resources to reshape the landscape of power (McAdam, McCarthy, & Zald, 1996b). Institutional entrepreneurs must “size up the condition of the organizational field and figure out what kinds of action make sense.” (Fligstein 1993, p. 398). As I demonstrate through the empirical case in this paper, a similar awareness and shaping of the context for action can occur in organizational change programs.

For an integrative theory of deliberate and emergent change, we therefore need an expanded definition of agency, or the human capacity for action. Agency involves interwoven practical consciousness, discursive consciousness, and social consciousness – the ability to not only shape and rationalize one’s own actions, but to deliberately shape the context for others’ actions.

This clarification of the definition of agency opens the door within structuration to a range of intervention processes that have been approached elsewhere in the organizational literature. These include sensegiving (Gioia & Chittipeddi, 1991), issue selling (Dutton & Ashford, 1993; Dutton, Ashford, Lawrence, & Miner-Rubino, 2002; Dutton, Ashford, O’Neill, & Lawrence, 2001), and leadership (Kotter, 1996; Schein, 1985/2004). It also provides a way to talk about categories of agents who are engaged in structural change interventions such as change agents (Rogers, 1995), champions (Andersson & Bateman, 2000; Chakrabarti, 1974; Howell & Higgins, 1990; Lawless & Price, 1992; Schön, 1963), tempered radicals (Meyerson & Scully, 1995), social movement activists (Creed et al., 2002; Davis, McAdam, Scott, & Zald, 2005; McAdam, McCarthy, & Zald, 1996a), and institutional entrepreneurs (Clemens & Cook, 1999; Fligstein, 1997, 2001; Greenwood & Suddaby, 2006; Levy & Scully, 2007).

Metastructuring as a theory of intervention and change

While social consciousness expands on the idea of agency, this is half of the picture – we need to similarly expand the idea of structure and structuring. Doing so will help explain what interveners actually do when they act from their social consciousness, and how those actions produce or trigger structural change. Having done so, a synthesis of deliberate intervention and emergent change theories will be possible.

Once enhancement to structuration emerges from the idea of metastructuring, offered by Orlikowski et al (1995) in the literature on IT change. This concept was originally defined as “second-order structuring” of technologies in use, involving “influential actions taken by individuals when they deliberately adapt computer-mediated communication technologies and their use to particular contexts and change those contexts to accommodate use of the technology” (p. 424). This concept is illustrated by the authors through ethnographic observations of moderators in an online discussion forum. Moderators carried out *metastructuring moves*, including defining the news-system, promoting the news-system, creating newsgroups (and moving posts among them), and modifying definitions and rules for use of the system. Within the context of the IT system, these moves shaped the context for action, in this case the writing of newsgroup posts.

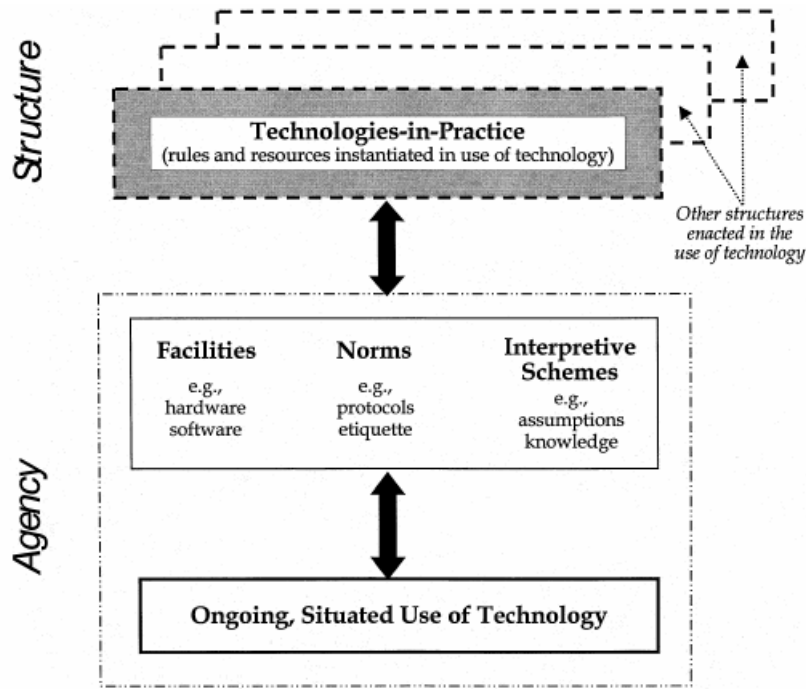
Although metastructuring might serve as a useful metaphor for change interventions, the use of the concept has thus far been limited to the literature on IT change in organizations. The contribution of the present study will be to extend this idea of metastructuring, embed it more fully into Giddens' structuration theory, and use it to describe a variety of interventions during an organizational change program. In so doing, I hope to open up metastructuring as a more general lens with which to analyze processes of deliberate action to effect systemic change, which should be applicable in studies of organizational change and perhaps social movements and institutional entrepreneurship as well.

Rooting and generalizing the idea of metastructuring first requires going a bit deeper into Giddens' (1984) formulation and Orlikowski's (2000) use of structuration. Here we find that between the layers of action and structure, the theory includes a layer of *modalities* for structuring, which we can think of as the "stuff" of which structures are made. These include:

- *Facilities* – more or less tangible land, buildings, technology, and artifacts as well as money.
- *Norms* – protocols, etiquette, codes of conduct, and scripts for action. Norms arise through explicit and implicit modeling and reinforcement of behavior.
- *Interpretive schemes* – categories, assumptions, and knowledge arising through communication and the use of signs and symbols.

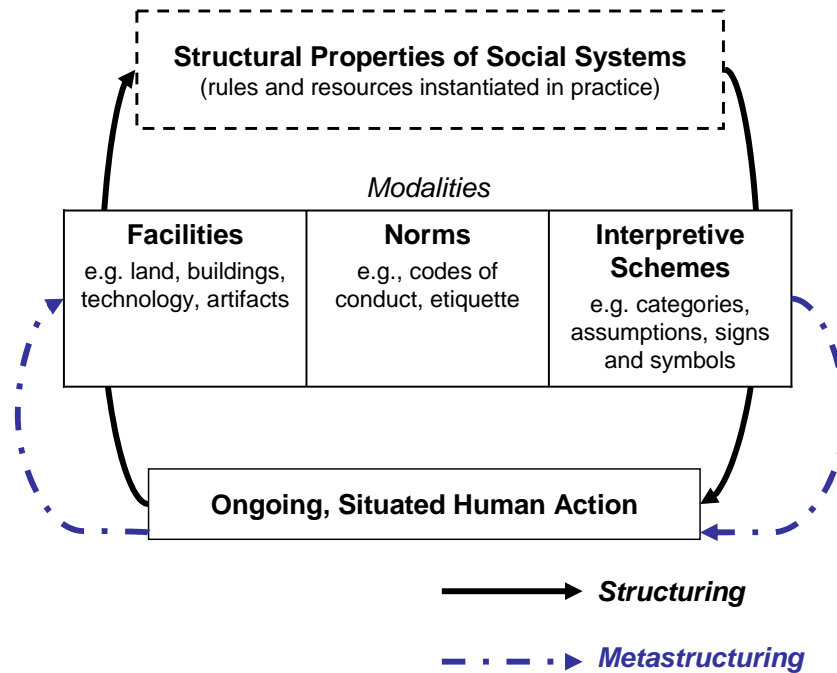
This layer has been particularly useful in the application of structuration to technological change – the introduction of a CT Scanner (Barley, 1984) or Lotus Notes (Orlikowski, 2000) is a change in the array of facilities. Depending on the ambient norms and interpretive schemes, however, that facility can be taken up differently to enact different *technologies in practice*, illustrated nicely in Orlikowski's (2000) diagram (Figure 1):

Figure 1 - Modalities for structuring and technologies-in-practice, from Orlikowski (2000)



Such technology introduction is, however, a special case of metastructuring, and the concept can be expanded to include all three types of modalities. Therefore I define metastructuring as *the deliberate offering or alteration of facilities, norms, and/or interpretive schemes in order to effect change*. We can represent this process through the following diagram in Figure 2:

Figure 2 - Metastructuring is the deliberate shaping of modalities for structuring



Here structuring is depicted as the enacting of structures through drawing on existing facilities, norms, and interpretive schemes. Metastructuring is action that deliberately seeks to shape the available facilities, norms, and interpretive schemes - the context for action - and thereby influence people's ongoing action.

We can see how this scheme maps onto concepts from the social movements literature. First, as emphasized in the resource mobilization tradition of social movement theory, movements can appropriate tangible facilities (such as Black churches in the American Civil Rights Movement) and create new sources of power and dependence, for example votes, donations, consumer spending, and expert allies (McAdam et al., 1996a). Second, activists deliberately create interpretive frames that attempt to invalidate the taken-for-granted by asserting a new way of seeing the world (Snow, Rochford, Worden, & Benford, 1986) and a new set of ideals in service of which people might engage in collective action. Activist frames can also describe a collective identity, and therefore become a resource in people's identity construction (Polletta & Jasper, 2001), a process intimately bound up with the making of sense and meaning (Weick, 1995). Finally, social movements can encourage new norms, both through proclamation in speeches and through "prefiguration" – activists' deliberate modeling of new rules for action in visible or influential contexts. Gamson (1992) gives the example of norms of authenticity and equality enacted among members of the Highlander School, which served as a prefiguration of a more egalitarian society in the Civil Rights Movement. All of these actions shape the modalities for structuring in an attempt to bring about a desired set of structures within society.

Where the social movement literature offers a kind of grass roots, bottom-up account of metastructuring, organizational change programs can offer a more manager-centered, top-down form of metastructuring. Architects of organizational change – often managers and

consultants – begin with an *intended structure* in their minds. In the case described below, for example, a refinery manager had a vision for his organization in which cross-functional teams engage in continuous improvement as a matter of routine. The hope was that this activity would promote high reliability and organizational performance, ensuring a steady flow of money and attention to continue the process. But such an intended structure can not be created by fiat. It must be brought into reality through enactment by organizational members.

Although strategies for organizational change intervention vary widely in practice, the metastructuring perspective calls attention to three activities corresponding to the three layers of Figure 2 **Error! Reference source not found.** above. First, the intended structure itself can be elaborated through communication in order to provide an image or vision of the future state (Kotter, 1996; Porras & Silvers, 1991). Doing so can enroll others in the process of metastructuring. Second, at the level of action, change agents can create opportunities for immediate local action through a “small wins” strategy (Kotter, 1996; Meyerson et al., 1995; Weick, 1984). Finally, a change program can offer people modalities through which to enact the intended structure in an ongoing way - facilities, norms, and interpretive schemes. Each of these layers, but particularly the third, is involved in metastructuring.

The example of TQM

We can illustrate these ideas further through the familiar realm of Total Quality Management (Deming, 1986; Hackman & Wageman, 1995; Zbaracki, 1998), which has been framed both as a movement and as an organizational change process. In the language of structuration theory, TQM offers a set of modalities for structuring. TQM offers language, symbols, and narratives that encourage an *interpretive scheme* – for example framing an everyday problem solving effort as part of a “continuous improvement” or “total quality” effort. It offers *facilities* in the form of money for sanctioned activities, statistical process control tools that can serve as boundary objects, skills offered through training, sanctioned space and time for work, etc. And it helps to generate *norms* of what one should or shouldn’t do – for example, how to carry out a “5 why’s” root cause analysis procedure – in order to exemplify the spirit of the program. In order for the change program to be *enacted*, however, actors must take up these potential rules and resources in the course of their work.

The metastructuring perspective highlights the fact that a range of actors, distributed within and across organizations, are engaged in shaping and offering the modalities of structuring in TQM. These deliberate interventions result in emergent outcomes as those new modalities are taken up and enacted amid existing ones. Zbaracki (1998) nicely illustrates a process in which norms requiring communication of success rather than failure cause people to foster an overly optimistic view of TQM implementation. In parallel, the absence of statistical skills among managers leads them to omit the statistical tools from TQM implementation. Together these processes can produce a rhetorical TQM sustained through discourse and a watered down reality of its implementation – two different enacted structures analogous to Orlikowski’s (2000) technologies-in-practice. Hackman and Wageman (1995), through a higher level review of the TQM literature, point out similar challenges – that TQM arrives in contexts where the allocation of

financial gains and distribution of organizational authority tend to work against front-line worker empowerment. Giddens would call these structures of domination, which are enacted through a competing set of norms focused on obedience to supervisor authority. TQM also gets blended with norms from other management philosophies and programs of change, for example pay-for-performance schemes that are in fact contrary to the principles of TQM (Hackman et al., 1995). This clashing and blending of norms produces unanticipated outcomes in action, highlighting the importance of ongoing diagnosis, monitoring and adaptation by interveners. Again it points point towards the social consciousness necessary to produce coherent systemic change.

What the TQM studies do not offer, however, are examples of active resistance that further complicate change interventions in organizations. Architects of official change programs are not the only actors engaged in metastructuring and they can trigger active resistance, just as social movements can spur counter-movements (Meyer & Staggenborg, 1996). In mobilizing resistance, opponents of managerial change programs must similarly mobilize facilities and offer norms and interpretive schemes that justify non-participation or active opposition. The case below will illustrate some of these dynamics and the fragmentation of structures that can result when multiple actors' interests and intentions are projected onto the stage of action.

I turn now to the Proactive Manufacturing program at Redberg Refinery, a specific empirical case for illustration of these ideas in greater depth. Here, the metastructuring lens sensitizes us to the fact that change programs must be made to work through people's taking up, enacting, and then continuing to shape modalities for structuring offered by interveners. I will highlight the skillful metastructuring moves undertaken by change program architects, people mobilizing consonant follow-on change processes, and those mounting resistance to managerial change efforts. And I will show how the collision of these various metastructuring moves produces a diverse array of structures analogous to technologies-in-practice. Based on the observations here and extant theory, I explore implications for theory and practice in the Discussion below, as well as directions for further research.

Methods

In the tradition of Eisenhardt (1989), this mixed-method case study is designed for developing social theory and posing research questions. It retrospectively examines the implementation of "Proactive Manufacturing," a program of organizational change at the Redberg oil refinery that was intended to produce improvements in reliability and financial, safety, and environmental performance in the plant. The data collection period for this study was January-March, 2007, nine years after the Proactive Manufacturing program began in 1998 (see timeline below). I developed the research design, gathered data through two separate week-long site visits, and carried out the analysis and theory development. George Roth, a colleague and former consultant to the Redberg refinery, assisted with data collection, which included interviews, observations, and archival data analysis.

In gathering archival and interview data, I focused on the period from 1992 onward, which provided an understanding of events before, during, and after Proactive Manufacturing that have affected the program's outcomes. This retrospective methodology draws upon guidelines for "learning histories" from the work of MIT's Organizational Learning Center (Kleiner & Roth, 2000; Roth & Kleiner, 2000; Roth & Kleiner, 1995). Such methods are especially suited for the questions addressed in this paper: they provided detail about situated change processes while capturing a fifteen year trajectory – a longer time period than would have been feasible through traditional ethnography.

Site – Redberg Refinery

The specific choice of Redberg refinery was based on four criteria. First, the Proactive Manufacturing program implemented there offers a provocative example of an intervention to produce systemic change, allowing application of the concepts developed in this paper. Second, the improvement of reliability in oil refineries is valuable to study because it is both a private and public good: breakdowns and incidents not only create price spikes and economic slowdown, but can result in significant damage to human health and the natural environment, as illustrated by BP's Texas City refinery explosion in 2005 (USCSB, 2007). Third, during the period under study, Redberg has enjoyed significant increases in financial performance and avoided major safety or environmental incidents, making understanding this success critical for both practice and theory.

Redberg Refinery is a mid-sized American oil refinery, processing over 300,000 barrels of oil per day and producing jet fuel, diesel fuel, and gasoline for a variety of markets. The plant employs around 800 people full time, 600 of whom are hourly workers organized by four different unions. A few hundred contractors also work at the plant on any given day, working on new construction or non-routine maintenance.

Over the past twenty years, the refinery has undergone three changes in ownership, each of which has brought in a new plant manager. These changes were significant for the refinery workforce, bringing with them changes in policies, compensation, management philosophy, and job security. It was one of these plant managers, Eli Larson,² who implemented the Proactive Manufacturing program, having worked with it in his previous position at another refinery. Eli retired when the Redberg refinery was purchased in 2005, bringing in a new plant manager from elsewhere in the new owner's corporation. The data collection period for this study was January-March, 2007, roughly a year and a half after this transition.

For most of its history, Redberg synthesized its products from the industry standard West Texas Intermediate (WTI) crude oil. This changed, however, when the refinery's owners negotiated a contract for heavy, sour crude oil from a foreign supplier at a guaranteed spread below WTI's market price. Because this more difficult raw material requires special equipment to process, the company secured financing for a significant \$850 million capital expansion at the plant. As refinery capacity shortages nationwide

² This and all other names in the document are pseudonyms, with the exception of Winston Ledet, whose name is impossible to disguise given his invention of The Manufacturing Game.

increased the market price of finished products, this guaranteed price spread was exceeded and became an even greater profit margin.

Proactive Manufacturing was initiated during the capital expansion as a way of improving the reliability of existing equipment and thereby optimizing the return on investment in new equipment. The combination of technical capabilities from the plant expansion, contract for the sour crude, market conditions, and reliability improvements worked synergistically to improve the plant's financial performance by an order of magnitude.

This concurrence of management changes and capital expansions challenge understanding of the effects of the organizational practices implemented during that time. While multiple changes are a limitation for evaluation research, they are also what make the present study more interesting. We found that people at the refinery have as tough a time understanding what causes performance improvements as we did. This uncertain causality has kept the sensemaking process active, and has allowed divergent perspectives to endure about the value of Proactive Manufacturing relative to other changes in the plant. This diversity served as the most consistent and provocative observation during my study, and stimulated the theorizing in this paper about consonant and dissonant metastructuring trajectories.

Interviews

The primary source of data for the study was a series of 66 interviews with 48 people which George Roth and I conducted between December, 2006 and March, 2007.³ All but four of the interviews were conducted face to face during visits to the Redberg refinery. Most were conducted as one-on-one interviews behind closed doors, but there were five group interviews with up to four people in a meeting room or operations control room.

Selection of interview subjects began with Winston Ledet, the consultant involved in conducting Proactive Manufacturing, and former plant manager Eli Larson. It then continued through a snowball process that was coordinated by the manager of maintenance for the plant. Characteristics of interviewees are depicted in the table below.

³ George Roth had been a consultant at Redberg Refinery and served as an invaluable partner in securing access to the site, conducting the first round of interviews, and the first phase of data analysis.

Table 1 - Number of interview subjects by job category and functional department

Function	Hourly	1 st Line Supervisor	2 nd Line Supervisor	Manager	Staff	N/A	Grand Total
Clerical		1					1
Engineering		1		1			2
Finance				1			1
HR				1			1
HSE				1	1		2
IT					1		1
Maintenance	3	7	5	1			16
Management				2			2
Operations	9	2	1	1			13
Services				1	3		4
Training					3		3
Consultant						1	1
External ⁴	1						1
Grand Total	13	11	6	9	8	1	48

The maintenance manager was our primary contact inside the plant. As a result of following a snowball procedure that began with him, our set of interviewees is by no means representative of the organizational structure of the plant. It is weighted towards salaried managers, supervisors, and staff (n=34) with hourly workers making up a small part of the sample (n=13), particularly given that of the roughly 800 employees on payroll, close to 600 of them are hourly. It is also weighted towards the Maintenance function (n=16), whereas Operations is a far larger organization within the refinery.

With these limitations in mind, we did attempt to speak with structurally significant members of the under-represented groups, including the heads of the three largest unions of the plant. For the purposes of this study, which is to identify structuring processes surrounding the Proactive Manufacturing program, this sample was adequate to capture the local complexity and the array of metastructuring trajectories described below.

Interviews lasted from 30-120 minutes, with most being 60 minutes long. They were recorded on digital audio files that were compared to handwritten field notes and transcribed where the handwritten notes failed to capture the nuances of the conversation. Interviews consisted of three phases. In the first phase the informant was asked for a brief career history, and we recorded the sequence of jobs they had filled both prior to

⁴ One interviewee was a union leader at the refinery where Eli Larson had previously carried out Proactive Manufacturing.

and since arriving at the refinery. In the second phase we presented our informants with a timeline of events at the plant, divided into two columns: one column for business events and results (e.g. the capital expansions and changes in ownership) and another column for improvement programs, including Proactive Manufacturing. After presenting them with the timeline, we asked them to tell us stories about events they found significant in the plant's history or about those they were directly involved in. If we had omitted any events they thought significant, we encouraged them to tell us, and we progressively edited the timeline with each interview. The third phase of an interview involved asking specific questions, or clarification of what the respondent said that might have differed from what we heard from others.

Observations

In addition to formal interviews, I conducted approximately eight hours of ethnographic observations in control rooms, in morning meetings of maintenance managers, at supervisors' morning handoff meetings from the night shift, at a maintenance planning meeting for a section of the plant, and at a root cause analysis meeting for an equipment failure. During these observations, I took hand-written field notes which I transcribed with additional observations and reflections each night, along with notes and reflections from interviews. As mentioned above, George Roth had been involved in a consulting, training, and facilitation role for plant managers and supervisors from 1998 to 2002. Records from that clinical engagement served as a documentary data source to supplement his recollections.

Documentary sources

To supplement the interviews and observations, we collected a great deal of archival and documentary material from the plant. This material included:

- Record keeping about the Proactive Manufacturing activities, including The Manufacturing Game®, action teams, CI Forum, and Natural Work Teams, including attendance
- Documentation of CI Forums, including video recordings of three sessions and PowerPoint slides from almost all of the meetings
- Historical interviews of Redberg's managers: One set were interviews with plant management team members conducted in 2000 by the consultant introducing The Manufacturing Game®. Another set of interviews and notes were conducted by George Roth and provided as feedback in facilitating a series of quarterly leadership team learning meetings from 2000 to 2002.
- Financial records, including variable costs for oil and energy purchase and operational fixed costs including expenditures on labor and maintenance. These records only date back to 1995; before that the records are the property of a company with whom we did not have a research agreement
- Safety and environmental records, including OSHA and EPA recordables for the years before, during, and after the Proactive Manufacturing Program

- Feed Rate and Reliability records for each of the major processing units in the plant, from the period of 1991-2007

Analysis

Analysis of the data was primarily qualitative and highly iterative, using methods of qualitative analysis described in Becker (1998) and Miles and Huberman (1994). At each stage in the process, transcriptions of field notes and key portions of interview recordings, along with other archival documents, were imported into a database and analyzed using the *Atlas.ti* qualitative data analysis software. I coded elements of these texts using concepts emergent from the data and from the academic literatures on organizational learning and change, structuration theory, social movements, and institutional entrepreneurship. This coding, and preliminary drafts of findings, were reviewed and discussed with colleagues at each stage. Some concepts were linked and grouped into themes in order to build the theoretical insights described in this paper. Specialized queries and searches in *Atlas.ti* allowed some in-process hypothesis testing and verification, along with gathering of quotes cited as evidence below.

Where appropriate with the quantitative time series data, simple regression analyses were conducted to detect linear and quadratic trends over time, using the *Stata 9* software package.

Data gathering, analysis, and theorizing in this project can be divided into three rough phases. The first phase began with a pair of visits to Redberg by myself and George Roth. Our initial assumption was that Proactive Manufacturing was a successful case of distributed leadership for systemic change that needed to be described and explained. As mentioned above, this assumption was derailed when we discovered that perceptions of the value, the meaning, even the sequence of events involved in Proactive Manufacturing differed sharply across interviews. Some informants were clearly advocates of the program, saw it as an approach and philosophy of work, and believed it had been critical to the operational and financial success of the plant. Others thought the program was a fine idea but irrelevant and poorly implemented, paling in comparison to the capital expansions occurring in parallel or the changes in management before and after the program. Still others, particularly in the hourly ranks, were opponents of the program, who thought of it as an attempt by management to get them to work harder without additional compensation, and that the net impact on the plant has been deleterious. Furthermore, the quantitative data did not seem to arbitrate among these perspectives.

While at first I thought these perspectives would map neatly onto categories of people, further coding and analysis of the interview transcripts revealed that many of the respondents had mixed views. Often they would talk about the value of the program and its early successes, and point to ways that current practice reflects the ideals they learned. Then they would add additional stories about failures to invest in necessary maintenance improvements or about subsequent management behaviors and programs that undermined the spirit of cross-functional collaboration. Given this complex picture, it seemed more accurate to organize the data in terms of *narratives* and *accounts* rather than opinions or attitudes (Czarniawska-Joerges, 1997; Ewick & Silbey, 1995; Garfinkel, 1967). Instead of forcing the data to fit into an assumption that people hold unitary views, this more ethnomethodological mode allowed me to analyze accounts as the raw material in

ongoing processes of sensemaking (Weick, 1995). It also allowed me to triangulate events by hearing multiple accounts and narratives used to describe them. Nevertheless, the contested narratives posed a puzzle that required further inquiry.

The second phase began with my second visit to the refinery, in which I sought to understand the origins of these different accounts and the relationships between them. In analyzing this second round of interviews and observations, I began to see how certain storylines fit together, for example the development of a distinctive subculture on the South Side of the plant where much of the new construction had occurred. Realizing that structuration theory might be useful in explaining the emergence of these distinctive substructures, I went back to the literature and connected Orlikowski's (2000) idea of technologies-in-practice to what I was seeing. Framing the data in terms of *structuring processes* producing multiple parallel structures revealed more coherence underlying the divergent viewpoints. I also began to see how quantitative data about plant performance was used in sensemaking and sensegiving processes that helped solidify these structures.

The puzzle in this second round of analysis, however, was that people's participation in these structuring processes was not equal. Certain key players – the plant managers, an outside consultant, the union heads, a supervisor, a supplier, an inspired hourly operator, and certain corporate executives – had made moves that had particularly strong influences on the structuring processes I wanted to describe. This distinction prompted a third round of reading and analysis, in which I sought to describe and explain the impact of these influential actors.

Again using structuration theory, but building upon its basic tenets, I began to frame the distinction among actors and actions in terms of actors' offering vs. taking up of modalities for structuring. I examined the literature on social movements for descriptions of moves by activists, which mapped onto these ideas nicely. I then imported the idea of metastructuring in Orlikowski et al (1995). Metastructuring provided a necessary framework for the two tiers of action I was noticing. More importantly, it sensitized me to some metastructuring moves being made by an even greater range of actors than I had considered. As such, it provided a rich and more critical grounding for the ideas of distributed leadership I had originally undertaken to study.

What follows, then, is a presentation of my data as four metastructuring trajectories – sequential interactions among metastructuring moves and structuring processes. Each of these trajectories has produced an enacted structure in the organization analogous to a technology-in-practice. They highlight deliberate interventions to produce change, situated and emergent change processes that followed, and ongoing adaptation by interveners to these processes. I begin with the Proactive Manufacturing program itself, because it set the context for structuring in the other trajectories. Throughout these stories, however, I will refer to events occurring before, during, and after Proactive Manufacturing. It is therefore helpful to include the following timeline of events for reference (Table 2). A summary of all four trajectories can then be found in Table 3.

Table 2 - Timeline of events at Redberg Refinery

Year	Refinery management regime	Event
Late 1980's	OldCo	TQM implementation – early attempt at workforce involvement in continuous improvement
1992	OldCo	OldCo reduces dual train refinery to single train refinery, massively cutting personnel from 3000 to 800 and decommissioning equipment to shave operating costs in preparation for sale
1995	SmallCo – Sam Taylor	SmallCo purchases Redberg for \$89 Million
1995-1998		Efforts by new managers to reach out to hourly workers lead to conflict with supervisors. Early investments in reliability improvements
1998		Announcement of deal for heavy, sour crude and Heavy Oil Upgrade Project (HOUP)
1998	SmallCo – Eli Larson	Arrival of Eli Larson as plant manager
1999		Manufacturing Game and action teams begin “Boris the Bug” imagery and slogans posted
2000		Continuous Improvement Forum established
2000		HOUP construction begins, financed by \$650M in loans.
2001	SmallRefCo – Eli Larson	SmallCo sells off retail, becomes refining-only company SmallRefCo
2001		Natural Work Teams (NWT's) established, Productive Conversations coaching commences
2001		HOUP construction finished; heavy, sour crude processing begins
2002		IPO of SmallRefCo – hourly workers excluded
2002		25% reduction in salaried workforce for cost control
2003		Lubrication program begins – offshoot of NWT
2005	MidCo – Kyle Harris	MidCo purchases SmallRefCo for \$8 Billion. Nearly half of the company's capacity is in Redberg and more than half of total margin, placing its evaluation at close to \$4 Billion. Eli Larson retires and MidCo brings in Kyle Harris as plant manager.
2007		Research conducted

Table 3 - Summary of four metastructuring trajectories at Redberg Refinery

Trajectory	Early structuring & context	Metastructuring Moves	Subsequent structuring & outcomes
Proactive Manufacturing Program	Eli Larson's success with Proactive Manufacturing at his previous refinery Investment in new equipment creates need for improved reliability in old equipment	Manufacturing Game & action teams Slogans and icons CI Forum Vision Natural Work Teams	Cross-functional action teams become commonplace Proactive Manufacturing becomes key (if controversial) feature of plant history and culture
South Side culture	Deterioration of profitability in old business model leads to new strategy necessitating new equipment	Investment in new equipment Code of conduct Specialized training for operators Reinforcement of proactive norms by supervisors	Emergence of distinctive south side culture with less cross-level conflict and more allegiance to PM ideas
Lubrication Program	Ongoing RER team working on reliability Proactive Manufacturing slogans and imagery Availability of training money Turf boundary between machinists and operators	Labeling RER as Natural Work Team and expanding Sending Bob Ulrich to specialized conference and training Ulrich's creation of Lubrication program to train workers Machinists actively opposing operators' involvement in lubrication	New lubrication practices become norm in much of plant, receive industry award Some gaps in implementation due to inertia of old practices and machinists' active resistance
CI Forum and opposition	Worker-supervisor-manager conflict from Sam Taylor days Supervisors' wanting to reassert authority	Eli Larson's creation of CI Forum Union leader's vocal non-participation Executives' revision of gain sharing and IPO policies Hourly workers' dissemination of secret gain sharing memo	Evolution from Continuous Improvement Forum to Centralized Information Forum Systematic non-participation in CI Forum by hourly workers who question value and integrity of program

Trajectory 1: Proactive Manufacturing

The first trajectory is that of the Proactive Manufacturing program itself, which began in 1999, shortly after Eli Larson's arrival as plant manager. Interviews and archival transcripts of management meetings indicate that Larson implemented Proactive Manufacturing for three key reasons. First, SmallCo had announced a highly leveraged \$850 Million investment in the development of new equipment at Redberg to handle heavy, sour crude oil. Larson believed that in order to reap the benefit of that highly risky investment, the existing equipment needed to be running as reliably as possible. Second, as will be described at greater length below, Larson encountered some tensions among hourly workers, supervisors, and managers in the plant that had arisen during the previous manager's tenure. To cut through this tension he wanted to cultivate a culture of teamwork across functional boundaries and hierarchical levels of the refinery organization. Third, the plant management team wanted to create structures and practices for continuous improvement in plant performance. In the language of structuration theory, these three goals – reliability, teamwork, and continuous improvement – were *intended structures* for the program architects (Larson, his management team, and the external consultants he hired).

As emphasized above, however, an intended structure cannot be declared by fiat. It must be enacted by the participants in a distributed structuration process – in this case by the 800 employees of Redberg Refinery. To encourage the enactment of intended structures, the architects had to engage in metastructuring, offering facilities and potential norms and interpretive schemes to be taken up and enacted in the everyday life of the refinery. The activities of the Proactive Manufacturing change program are best understood in this light – as a series of metastructuring moves.

The Proactive Manufacturing moves are particularly vivid as an illustration of metastructuring because they involve rich, tangible artifacts and activities. The first of these was a board game called The Manufacturing Game® (TMG). The Game, developed by Winston Ledet at DuPont Corporation, is played in three teams representing maintenance, operations, and operations services, three of the key functional groups in a refinery. In one full day of game play, a year of plant operations is simulated. TMG was adapted from a system dynamics model of continuous manufacturing operations (Carroll, Sterman, & Marcus, 1998), and is designed to convey three lessons:

- The refinery is a complex system, with interactions among departmental activities that must be understood by everyone to optimize performance.
- Conducting preventative maintenance, although it requires foregoing production while equipment is taken down, can systematically remove existing equipment defects. This allows the plant to avoid a reactive maintenance trap in which equipment breakdowns sap organizational resources.
- The highest leverage policy for improving plant performance is investing in cross-functional improvement teams that eliminate defects at the source. This

“proactive” approach improves reliability, and as a result the financial, safety, and environmental performance of the plant.

The program architects believed that Proactive Manufacturing could only be achieved if they engaged the entire organization in its enactment. For this reason, they held a series of two-day workshops in which every one of the plant’s 800 employees played the Game over the course of two years. Building on ideas from the learning organizations tradition (Senge, 1990), the management team intended for these workshops to shift the “mental models” of participants. On the second day of the workshop, participants were asked to form cross-functional “action teams” of 6-8 people in order to practice and apply the ideas from the Game. These teams took on concrete improvement projects in an area of the plant where members had authority.

To supplement this wave of distributed improvement activity, four additional activities occurred in parallel.

First, a set of logos, slogans, banners, and posters were placed on walls throughout the refinery, and a patch was made to be stitched onto people’s uniforms. These symbols included a drawing of “Boris the Bug,” drawn by one employee and named by another, which symbolized defects to be eliminated from equipment and procedures. Boris is always accompanied by slogans such as “Fix it right, don’t let the bug bite,” and “Don’t just fix it, improve it” that reinforce the lessons of the Game.

Second, along with these symbols, Larson articulated a vision for the plant – “World class facility with pacesetter performance” – to be reiterated and emblazoned on banners and PowerPoint slides throughout CI Forum and other meetings.

Third, Larson established a monthly meeting open to all plant employees called the Continuous Improvement Forum, or CI Forum, during which people could present progress and challenges in their defect elimination efforts. The CI Forum is also used to deliver leadership and soft skills training to develop the capabilities of those involved.

Finally, two years into the program, the managers established “Natural Work Teams” to serve as analogues of the CI Forum at the level of functional groups and processing units within the refinery.

Table 4 describes each of these activities in terms of the intended structure behind their implementation, as well as the modalities for structuring that the program architects put in play.

Table 4 - Proactive Manufacturing as intended restructuring, with roles played by each of the program elements

Program element	Intended Structure	Actions	Facilities	Norms	Interpretive schemes
The Manufacturing Game	The “Winning” strategy in TMG <i>is</i> the intended structure – proactive manufacturing	Play the game to experience the new regime and the shift from reactive to proactive thinking and acting	Game board Bug imagery on poker chips Money, time Trained facilitators	Level playing field Cross functional interaction Friendly competition	Organization as system Maintenance as investment Proactive = good Teams = good
Action teams	Action teams as part of ongoing repertoire for problem solving	Practicing teamwork, defect elimination	Time, money for team work Tracking tools	Cross-functional and cross-level collaboration	Team effort – we’re all in this together
Slogans	Description of intended action to provide ongoing reinforcement	Hourly workers generate, everyone displays	Signage, imagery	“Fix it right, don’t let the bug bite” “Don’t just fix it improve it”	Images of good practice Maintenance as everyone’s job
Vision	Affirmation of intended outcome	Invoking regularly by plant management	Vision statement on Banners and PowerPoint	Management should reinforce vision	Redberg as world class
CI Forum	CI forum as ongoing support infrastructure for proactive manufacturing	Raising issues, working collectively	Space, lunch, paid time off normal job	Open discussion about successes and failures	Reinforcement of Proactive Manufacturing as key to success
Natural Work Teams	Unit-level analogue of CI Forum	Regular cross-functional work	Space, paid time	Open discussion of successes and failures	Reinforcement of cross-functionality

Running The Manufacturing Game®, for example, involved a set of tangible *facilities* that included the materials of the Game itself, the trained facilitators brought in to run the sessions, and paid time off the refinery units for participating workers. Both the experience of the Game and the facilitated debrief conversations shaped *interpretive schemes* about the refinery – the lessons described above. Playing the game also prefigured the collaborative *norms* it wished to encourage – people played the game in teams that mixed operators and maintenance, managers and hourly workers. These same interpretive schemes and norms were further reinforced through the investment in slogans and imagery – “fix it right, don’t let the bug bite” – emblazoned on banners, uniform patches, and PowerPoint slides throughout the refinery.

The intention behind these activities was to encourage people to enact “proactive manufacturing” in everyday life – to bring the “winning strategy” in the simulated world of the board game into the reality of the plant. The consultants and managers describe this intended structure as a “domain of performance” or a “way of doing business,” which they reinforced by forming action teams, CI Forum, and Natural Work Teams as contexts for ongoing work.

In the ensuing years, these modalities for structuring were taken up and enacted in a variety of ways by different people within the plant. This process yielded several enacted structures analogous to Orlikowski’s (2000) technologies-in-practice.

The most immediate and obvious of these outcomes was the emergence of action teams as a somewhat stable feature of the Redberg culture. Originally, the program architects mandated the creation of action teams during the second day of The Manufacturing Game® workshop. Each team, consisting of 6-8 participants from different levels and functions in the organization, was assigned a problem to solve from a list of documented defects or “bugs.” If an action team knew of a more pressing issue to tackle, then it was their prerogative to do so. The only rule offered for governance of these activities was as follows: action teams can make any change that its members have the authority to implement; if they encounter limits, their authority can be expanded by recruiting more senior people onto the team. This set of norms served as a way to both encourage and constrain distributed leadership in the organization.

In the early stage of mandated action teams, the majority seem to have taken on the problems assigned to them. A spreadsheet used to track action team status from 1999-2000 includes 88 action teams formed around pre-existing issues and 27 “proactive” teams who developed their own project. This is not to say that all teams followed through – some were created and defined, but never met after the workshop. Again, action teams are part of an intended structure, for which norms or action scripts can be offered, but these must be taken up and enacted by participants.

Nevertheless, success stories about many of these teams abound, and managers credit them with financial benefits that paid for the Proactive Manufacturing program several times over.

They were not big things – they were small things. Nothing wrong with that. Enough small improvements make a big change in the bottom line. One thing is that they fixed the blowers at 1241. The blowers, that’s something that brought in combustion air for the regeneration process. They were falling down all the time.

Every time one of them would fall down, they would cut throughput for the units [which cost \$80K/day]. They put together a team of operations, maintenance, everybody. One thing that's nice, you do have cross-functional teams. They looked at equipment and found it was an alignment problem between the driver and the blower... They went from 6 months or less on a run to 2 or 3 years without falling down... Savings were \$700K/year. See that is significant with the operators too because they don't have the blowers falling down at 2 in the morning when it's 30 degrees outside.

-Member of the training staff

While many of the “bugs” were physical like this one, some were matters of policy.

It's only mechanical about 20% of the time. That's where Eli Larson, why we have so much faith in this thing, even though you spend half a million dollars [for the program], that sounds like a lot of money. No matter what plant you go into, they are wasting money hand over fist... it's easy to find something that will pay for that investment. We found something within the first few months that paid for that three times over. It had to do with a flaring process we were doing here. We were importing gas from [supplier]. The procedure simply called for us to import it at a certain rate, which was more than we could handle. All we had to do was slow that down. Because we were bringing it in at such a high rate that we ended up flaring a lot of it. Simply by changing the procedure and getting with the supplier to say, hey, we need to take this at a little bit slower rate. They said, OK, and it was no big deal. All of a sudden we stopped flaring about a million dollars worth of gas a year... They worked all that out, and found out hey, this is a procedural thing. You know how much that costs? It costs ZERO.

-Member of plant management team

These early efforts helped demonstrate and tentatively establish the practice of convening cross-functional action teams to do defect elimination. As time progressed, additional metastructuring moves by the program architects helped solidify the practice. One example was the granting of a Presidential Award for a successful project to clean up waste water, providing compensation and recognition for participants. This is an example of deploying facilities in order to strengthen the norm of cross functional work. Another common move was the labeling of spontaneous efforts as action teams in order to reinforce the interpretation of cross-functional collaboration as part of a plant-wide program of change. Finally, the strategic telling and retelling of these success stories by program architects is a kind of metastructuring move designed to reinforce action teams in practice. The net result of these moves in the organization has been the establishment of cross-functional teams as routine.

The one thing that Proactive Manufacturing has done by developing the cross-functional team approach... when we got an issue to be resolved, there is engineering, there is operations, there's maintenance, there may be environmental health and safety... whoever the right folks are, they get together and talk about it, and they solve the problem. And many times it goes undocumented...

-Member of plant management team

In this trajectory of action team development, we see how metastructuring moves can influence behavior and plant performance. Participants took up the *facilities* offered in the form of time and space to collaborate, the *norms* of cross-functional teamwork, and the *interpretive schemes* labeling projects as “action teams” and “defect elimination.” While detailed impact analyses of these team activities were not always conducted, they were repeatedly cited by informants as having led to improvements in reliability and reductions in operating costs. This is an example of structuring that is both intentionally shaped through metastructuring and has outcomes consonant with the interveners’ intentions.

This success of action teams gives credence in turn to an overall narrative about the role of Proactive Manufacturing in the plant’s success. Beyond the specific stories and localized efforts, my conversations with informants elicited general accounts that are consonant with the intended outcomes of Proactive Manufacturing. These accounts both describe changes in the organizational culture and help others continue enacting it. They describe what Redberg is and should be, offering up interpretive schemes and norms consonant with the program’s intentions. They reinforce a structure of signification: the idea that the program has been successful and has contributed to the plant’s success. These accounts came from all three levels of the plant hierarchy.

One major thing I think Proactive Manufacturing did, and the idea of a cross-functional team did... prior to that, there was finger-pointing. There was the tendency to lay blame [among operations, maintenance, and engineering]. Lots of finger pointing and wanting to assign accountability to another organization...

When you make the transition out of the finger pointing mode, and people work together on some of these things, when something doesn’t go right, then if it’s an operations issue then operations is much more willing to put their hand up and say “this is our fault. We let that bearing run dry. Or we let that pump run dry.” Rather than try to cover it up and try to bring the maintenance guys or engineering guys to try to solve a problem that didn’t exist in the first place.

-Member of Management Team

We ran this refinery for years as reactive. Every time something broke, run out there and fix it. We try to be very very proactive... Let me put it this way – we have to be, to survive, to be proactive. I have 8 guys, and several thousand pieces of rotating equipment. You do the math. There is no way you can repair all this if it’s falling down all the time with 8 guys. We have to work smarter. The repairs we make have to last longer. The troubleshooting has to be better. The material we go to has to last longer. The conversations you have with operators – what actually is running in this? With the engineers – are we seeing H₂S in this? What is the limit on the amine here? We have to have better conversations, we have to talk better, we have to be more clear so that we can provide better equipment so we get longer runs on our equipment.

But the thing about Proactive Manufacturing, what that does is give you the big picture on how one piece of the puzzle affects everything else. That’s what

Proactive Manufacturing is about – it's seeing the big picture. You have to start there. You can't have people in their own little world, just working on this here. They have to understand this pump affects this unit, this unit affects this unit, this unit affects the other side of the refinery, which affects the whole refinery. Proactive Manufacturing is to put in the minds of the people an understanding of how what we do – what every individual person does – how important it is to the whole organization.

-South Side Maintenance Supervisor

It seems to me that things have taken time but things have changed. It has taken a long time but has had some effect. They stayed with the program so long that it's now part of the culture. But there are still those who don't buy in... They don't believe in it... Some of them, they are just old school, old paradigms, where it's "once again, here's another program." Apathetic look – like "that won't do nothing for us." But if you look at it in long run, I think it really has improved things... The improvement in the attention to the equipment, and the seriousness of keeping equipment in good shape.

-Hourly Operator

For the maintenance managers, Proactive Manufacturing has been a particularly powerful influence and they are keen to reinforce it. As Carroll, Sterman, and Markus (1998) point out, maintenance is not part of the “image” of a plant, usually being considered a service or cost center. The Manufacturing Game® attempts to shift that discourse and thereby legitimate the role that maintenance plays in plant performance. Proactive Manufacturing is, for these maintenance managers, an ideology and a way of life – in essence, the right way to do the job. Their narrative of success is woven with a narrative of the “good old days” and of a lost hero in the form of the plant manager Eli Larson. In a group interview with the second-line maintenance supervisors:

S – Eli Larson brought Proactive Manufacturing, Productive Conversations. People thought it was flavor of the month. But driven by plant manager who walked the talk. Operations and maintenance was us and them. We got more trust and respect - issues easy to solve. Eli set expectations, you knew where you stood.

W - Eli preached it every day - talked about it every day. Pounded in idea of reliability. Insisted that we fix things right - long term solutions. Eli knew everyone.

S - Knew weaknesses and strengths. Empowered you to do work. Best manager I've ever seen.

These quotes also illuminate the intensive metastructuring that Larson had conducted in reinforcing these interpretive schemes. One manager, in comparing Proactive Manufacturing to earlier TQM efforts at the plant, similarly reinforced the program's success and emphasized Larson's role:

I would have to say... I would have to give the edge slightly to the Proactive Manufacturing movement here. I think it was more effective. I think it won over more people than the quality movement. I think people attended a lot of the quality meetings and training classes because they were obligated to do it but in my recollection there wasn't that level of volunteerism and commitment to the movement that we had in Proactive Manufacturing. PM had the edge. I also have to say that Eli as a leader of it, and face and spokesman for it... he was much more effective than his counterparts in the quality movement... He was determined to win over the hearts and minds... he was really committed and really believed in it, and he was determined to persuade as many people as he could at Redberg that it was really the way to success and sustained success, through reliability. Reliability in our equipment, our procedures, and even our people. We had to eliminate breakdowns and failures, and wherever we did that, success would follow in all these other areas. It was a very compelling argument.

-EHS Manager

In these accounts, the metastructuring moves made by program architects, particularly Eli Larson, are highly visible and salient to plant employees. His constant reinforcement of Proactive Manufacturing interpretive schemes and norms is an example of metastructuring moves from a position of authority, and highlights the particular force of such moves. In the stories that follow, however, I will describe metastructuring moves by other players – from senior executives down to hourly operators. I show how these moves have generated other parallel outcomes, some consonant and some dissonant with the program's intentions.

Trajectory 2: South Side culture

The second metastructuring trajectory that I identified emerged from the findings that enactment of Proactive Manufacturing is uneven, and seems particularly strong on the south side of the plant, where capital expansions occurred as part of the Heavy Oil Upgrade Project (HOUP).

For most of its history, the Redberg Refinery processed West Texas Intermediate (WTI) crude oil, a common and relatively easily refined feedstock. As a result of this business model, Redberg was not highly profitable for a number of years, and rumors had circulated in the early 1990's that OldCo might close the refinery. When SmallCo purchased the refinery in 1995, they were therefore seen as saviors by plant employees, and SmallCo's senior executives immediately set to work on financing deals and purchasing contracts to migrate the refinery to heavy, sour crude. This new feedstock could be negotiated at a much lower price than WTI and is thus more profitable to refine. With new equipment, the refinery could also be more flexible in its product mix, ideally allowing it to adapt to market conditions more fluidly.

For ease of construction, development of this Heavy Oil Upgrade Project (HOUP) would take place in open areas of the plant's south side. To facilitate financial management of the loans needed to build the new equipment, the HOUP also started as a separate subsidiary company, and workers were employees of that subsidiary. This arrangement

of physical and financial facilities – a metastructuring move by SmallCo’s senior executives – created a stage on which further moves would play out.

When Eli Larson arrived as plant manager three years later, he explicitly framed these physical improvements and his organizational interventions as synergistic. In his vision statement, “world class facility” referred to the technical capabilities, while “pacesetter performance” described the reliable performance achievable through Proactive Manufacturing. This sensegiving – offering of interpretive schemes about the history and progress of the plant – was a key metastructuring move that helped further set apart the south side.

The next metastructuring move was Larson’s promotion of Norm Tipple, a supervisor who advocated for Proactive Manufacturing, to oversee the startup of the south side. This move did two things – it rewarded and reinforced the norms of Proactive Manufacturing among the other supervisors, and it put Tipple in a position where he could have an influential role among the new south side personnel.

Tipple’s new position allowed him to make several additional moves. First, he hand-picked the supervisors who would work on the new equipment, and selected people whom he thought would encourage proactive, collaborative work. Second, he worked with these supervisors to craft a set of operating standards for the new organization. The code included management principles such as honesty and integrity, but also explicitly included a commitment to reliability and keeping front-line operators involved in decision processes. This code brought the norms and language of Proactive Manufacturing into the south side from the early stages. These principles were then taken up and enacted when setting operating practices; for example, supervisors established a steady and more frequent rhythm of switching out pumps every 45 days for preventative maintenance.

Tipple’s next move was to transfer hourly workers, starting with head operators, from the old decoker to the new decoker for a series of special experiences. First, the operators contributed to the technical design process, a move which sought to assure their sense of ownership over the new equipment. Next, they participated in special training for south side work, using a realistic simulator that Tipple specially commissioned. Tipple’s language is telling about just how intensively he worked to cultivate specific norms and interpretive schemes among these workers:

We had to take them off decoker, deprogram them, completely purge all of the information and all of their habits, had to purge that out completely and start from scratch.

-Norm Tipple

Finally, the physical design and configuration of south side operations further distinguished this subsection of the plant. A single control room filled with dozens of computer screens controls multiple processing units; this affords operational procedures different from those in the older sections of the plant where small, unit-specific control rooms are the norm.

The structure emergent from this series of events is a noticeably distinct south side culture. In our interviews with south side supervisors and hourly workers, we noticed a

level of both consensus and enthusiasm that differed from the other section of the plant. One head operator (an hourly worker and union member) put it as follows.

[On the south side] management and operations actually work together. They don't fight each other as much. It's not an us-against-them thing most of the time. I'm sure on the other side of the yard you hear that a lot... Philosophy is different from what I was used to on the other side of the yard. This was the first time I heard proactive. I didn't have a clue what it was. They actually try to be proactive here. Try to do routine preventative maintenance stuff. Actually do it, not just have it on paper. Try to head something off before there's a problem. Most of the time. It's totally different from the north side... First day I was over here, Tipple said this is how it's going to be, and it actually has been. Before people wouldn't talk to somebody that high. They never came around. Now you see them all the time. You can talk to these people just like you and I are sitting here talking. To me there's not that much animosity between the jobs... It was the purpose at the time, because if that project didn't go through, the whole plant would have been sunk.

-Head operator on the south side

This quote indicates both the increased capability of the south side and the way that capability derived from being a site of novelty and innovation. Another head operator and the maintenance and operations supervisors were all highly optimistic about the culture and performance of their units. Some of the common worker-supervisor conflict and discontent we documented (described below) did not seem as active among south side personnel.

I also received reports from an outsider in the engineering team that meetings and cross-functional coordination practices were particularly effective on the south side. This led me to observe two meetings – one planning meeting focused on maintenance activities, and one root cause analysis team inquiring into the repeated failure of a ventilation door on one of the units. Both meetings convened supervisors and hourly personnel from maintenance and operations as well as some engineering staff. Both were conducted with a high level of energy and precision as compared to the plant-wide morning handoff meetings I observed. And both meetings involved moments where the principles of The Manufacturing Game® were clearly and assertively brought into play.

At one point in the planning meeting, an operations supervisor named Max Neville paused the group to emphasize the importance of coordinating schedules among operators and maintenance to facilitate preventative maintenance activities. Then, a moment later, when a maintenance supervisor described a successful repair completion, Max again paused the conversation to emphasize the cost savings involved in that activity.

This use of “teachable moments” to encourage a proactive and collaborative approach characterized Max’s participation in the Root Cause Analysis meeting as well. When it seemed that the group was converging on a quick-fix solution to the failed ventilation door, Max emphasized the importance of enduring extra down-time and operational cost to “fix it right the first time,” using almost verbatim one of the slogans from Proactive Manufacturing that hangs on walls throughout the refinery.

These observations highlighted the embedding of Proactive Manufacturing norms and interpretive schemes into the culture and practice of the refinery, as well as the need to continually maintain them. Max's assertions of a proactive approach are pedagogical – an attempt to change or maintain proactive principles. Later in an interview he emphasized the importance of ongoing work to stay in a proactive mode. A strong advocate of the Natural Work Teams (NWT) approach and host to one of the longest running NWTs, Max recounted his recent need to re-emphasize principles of disciplined operation with his team because safety incidents had begun to occur under his watch.

More generally, my interaction with Max and observation of his metastructuring moves highlighted the importance of supervisors in enabling shifts in organizational culture. Although his recent NWT meeting got labeled as the “ass-eatin’ meetin’”, it was clear that Max maintains a style of empowering management compatible with a workforce engagement approach.

If you tell people what to do, and give them the tools, most of the time they will produce it for you... that's why I'm talking to you relaxed because I know they're on the job. I have time to look down the road a bit.

-Max Neville

He encourages Natural Work Teams to form action teams to work on specific improvement efforts, for example on tolerance alarms or maintenance procedures. But these projects don't occur until workers volunteer and educate themselves to become a “guru” in that area.

The difficulties that Max does face highlight the importance of the distinctive south-side culture and the specific way that Proactive Manufacturing is enacted there. When he has had workers transfer from the older section of the plant into his unit, they have had trouble adapting to an atmosphere where they are expected to take charge and engage in continuous improvement. Four of the six workers who transferred there from a utility plant ended up returning to their old unit after the “ass eatin’ meetin’”. Although the two that remained fit in better with the south side culture, one of Max's head operators expressed similar concerns.

It's slowly changing back the other way... That sense of being needed or whatever, don't know if that makes sense. It has gotten to the point where okay, you're established, we got what we wanted, now we're going to go back the other way. More friction, us against them. It's headed that way... Just a feeling. A sense... [When things were starting up] everyone was on the same page, we was all together, one big happy family. Now we're getting' new people over here, they didn't go through that. Sometimes the buy-in and stuff is not what it should be, in both directions. Both being management and labor or whatever.

Amid the natural buffeting and retrenchment into pre-existing ways of operating, the distinctiveness of the south side culture is clear. The intended structures of Proactive Manufacturing are largely being enacted consistently as a result of localized, consonant, and sustained metastructuring moves. The SmallCo executives, along with Eli Larson, Norm Tipple, and Max Neville have all worked to shape the facilities, norms, and interpretive schemes in play among south side supervisors and hourly workers.

Alternative modalities are excluded through processes of formal and informal selection of compatible personnel, and ongoing pedagogical actions by the actors I have described.

Nevertheless, the split between north and south side – to the point where personnel can be incompatible across the line – is an unintended consequence of these moves. In the first round of interviews, which focused on architects and advocates of Proactive Manufacturing, no one mentioned a distinct culture or any desire to create one. Informants represented the change as having occurred uniformly over the plant as a whole, as seen in the accounts of success in Trajectory 1. It was only through interviewing people outside the program’s “inner core” and direct observation that these alternative structures became visible.

Trajectory 3: Lubrication Program

Where the first two trajectories focus on metastructuring moves by people with positional authority, this third story – about the development of a Lubrication program at Redberg – highlights that this connection is not necessary.

The story begins in the Rotating Equipment Reliability (RER) team, a few years after Proactive Manufacturing began. Although RER had existed as a stable team since the OldCo days, it was relabeled as a Natural Work Team and expanded as part of the program. During this period, an hourly operator named Bob Ulrich became part of RER. Ulrich had always had an interest in machine maintenance and had unsuccessfully tried to bid into machinist jobs earlier in his career. RER offered him a welcome opportunity to meet with engineers, maintenance technicians, and other operators on a regular basis to discuss the reliability of the refinery’s myriad pumps, turbines, fans, and compressors.

At one point Ulrich’s supervisor invited him to attend a conference on lubrication technologies and he happily accepted. There Ulrich learned about the effects of proper lubrication on machine reliability, which caught his interest; his supervisor then helped him take advantage of training funds at Redberg to pass certification courses on lubrication science and technology.

Ulrich used this education to begin asking questions about lubrication use at Redberg, diagnosing the relationship between everyday practices by operators and equipment reliability. His inquiry, in partnership with a maintenance technician in a refinery laboratory, discovered “defects” in Redberg’s lubrication practices – mismatches between lubricants and equipment metallurgy, as well as problems with contaminated lubricants caused by improper handling. Beginning with experiments in his own area of the refinery, Ulrich discovered the decrease in failure rates and maintenance costs associated with proper lubrication. With the knowledge and confidence from this experience, he took action, pointing to Boris the Bug on the wall and prompting his fellow RER members to take lubrication seriously.

Along with the Natural Work Teams, came the bug thing – don’t just fix it. Something like this allowed me to stand up and say, “hey, guys you’re preaching this, but all we did was repair this machine again. We didn’t find out what’s happening to it. We’re just fixing it all the time.” After I had a little education, knew what I was talking about... Well, it kinda put the company on the spot. We’re going to preach this, then we gotta practice it. More than once [I pointed

to the bug]. No doubt, it gets people's attention. And it did. With everybody involved, and different ideas, between machinists, like I said, as a group making decisions, instead of just one person... Started using 1 micron oil everywhere in the plant... delivered straight from the truck – that's a standard. There's not many suppliers who can do it for you...

Bob Ulrich

Ulrich's local inquiry thus led to a systematic overhaul of lubrication procedures and an investment in higher quality lubricant oil, a critical facility for high reliability. Thus began Ulrich's shift from structuring to metastructuring – from taking up the ambient modalities like training money for his own development to more actively shaping the context for others' action.

As it turned out, the oil truck and other facilities alone were not sufficient to make a change – just as with Proactive Manufacturing more generally, Ulrich's intended structure required enactment by operators and maintenance people throughout the plant. He and his colleagues needed to advance new norms and interpretive schemes – that personnel should see improper lubrication as a defect to be eliminated, and that common practice for changing the oil on rotating equipment should change. To accomplish this, they created a training course for all operators and maintenance personnel, facilitated by Ulrich himself. The process has produced enough measurable results to win an industry award and gain recognition throughout the plant.

Still, the program is not without its difficulties, and Ulrich has encountered two key challenges.

We started our own training program out here in 2005... We trained, we brought all the operators and all the machinists to the training course... It took about a year to get everybody through it. And it's not easy – you got... you walk in and try to make a lot of changes to people my age in this kind of service and they're going, "Hell, we've been doing it this way for 30 years, what's the matter?" You still gotta get the operators to focus. I mean... keepin' things clean would be the biggest thing. Not checking a lot of things they could be checking.

-Bob Ulrich

In this quote, we first see Ulrich wrestling with the first essential dilemma of metastructuring – that people can choose whether or not to take up and enact the modalities for structuring they are offered. It highlights the social consciousness required in offering new ideas and norms amid deeply held beliefs and action scripts.

The second challenge is that in some situations, those modalities are even actively resisted by others with agendas of their own. The lubrication program requires cooperation among operations and maintenance, both of whom must utilize the right lubricants and monitor their effects. Among hourly workers, however, this cross-functional collaboration can be difficult because machinists and operators are organized by two different unions. Conflicts over turf can be serious.

This has been my struggle. Lubrication belongs to machinists. I have been allowed to practice this in my area... It's kind of like I was invading their territory. I had one of them almost choke me for it. The only reason I've been allowed to practice is that their work has gotten so busy in repairs that their preventive maintenance work is not getting done. Some of them are glad - I didn't want to mess with those filters anyway. Someone like them sees... I get my hand slapped. So it's really been a struggle with two different unions involved.

-Bob Ulrich

Here there is another structure desired by the machinist union – that their constituents have a monopoly over machine maintenance. The alternative norm being enforced is one of respecting turf lines.

These two challenges illustrate how Ulrich's metastructuring moves can collide with entrenched structures and others' metastructuring moves. As a result of these collisions, a variety of enacted structures arise: Lubrication-in-practice within Ulrich's area is more successful than its enactment in other areas where the turf conflicts are harder to confront, and commitment is not as high. In the final metastructuring trajectory below about CI Forum, I will describe a larger scale example of similar processes.

Taken as a whole, Proactive Manufacturing and the lubrication program illustrate a normative aspect of metastructuring – that change goals can be achieved by encouraging improvisational but consonant metastructuring activity at multiple levels of the organization. Here a front line operator explicitly took up the facilities available for education and improvement, and then used the norms and language of Proactive Manufacturing to justify investing resources in “practicing what we preach.” He then engaged in metastructuring activities of his own, mobilizing resources for lubrication and training while offering new ways of thinking and acting as well. In other words, this is a successful case study of distributed leadership (Spillane, 2006).

At the same time, the turf conflict among unions hints at the other side of the coin: people can engage in metastructuring at any time, and sometimes these moves will clash. When they do, a kind of fragmentation can arise, with intentions for systemic change giving rise to diverse and conflicting enactments. The following trajectory will further illustrate this theme.

Trajectory 4: CI Forum and structures of opposition

The Continuous Improvement Forum is a monthly meeting at Redberg Refinery, designed to be cross-functional (operations, maintenance, engineering, services, etc) and cross-sectional (managers, supervisors, and hourly workers). Established during the early days of Proactive Manufacturing, “CI Forum” is the most regular, official practice associated with the program at the present day. In my interviews and review of archival data about CI Forum, however, I noticed an anomaly: attendance by hourly workers is consistently low. Furthermore, among supervisors who do attend, there was a sense that the meeting has evolved into something different from what it was intended to be.

This metastructuring trajectory seeks to explain the evolution of Continuous Improvement Forum into “Centralized Information Forum” and the development of a

parallel structure of opposition among unionized hourly workers. It highlights the unintended consequences of metastructuring activities, and the fragmentation that can arise amid dissonant and conflicting moves.

The first metastructuring moves relevant to this story date back several years before Proactive Manufacturing to Sam Taylor, the first plant manager under SmallCo, just before Eli Larson's arrival. Taylor's intended structure for the plant seemed to have been one in which front line hourly workers would have a sense of empowerment and voice in the operations of the refinery, and would thus engage in improvement activities to help a cash-strapped Redberg become more profitable. Taylor and his team started by establishing a relationship with the union leadership in the plant that had not existed under OldCo. A joint Union-Management team was formed, which was designed to address consistent grievances of the union membership and to engage hourly workers' help in improving the plant.

As part of these activities, union leaders were given an opportunity to *name supervisors that they wanted fired* because of conflict with hourly workers. One story about this process, told in hushed tones, was that the HR manager and union leader would sit in a room and invite one supervisor after another, at which time the HR manager would ask, "Should we keep him?" Along with the firings, the plant management instituted an "open door policy" allowing workers to come to managers with complaints about their supervisors. When managers responded by overturning some of the supervisors' decisions, this reaffirmed the interpretive scheme of worker empowerment and the norm of going directly to plant managers with complaints.

One story to emerge along these lines was about a supervisor who tried to follow a written refinery policy about when workers on overtime should be provided with lunch.

*It wasn't long before one of the hourly workers called the managers and said, "I think I deserve a lunch." The operator thought it was unfair. We administered the policy as it was written... But the plant manager overrode and completely redid, and I guess gave in to the guy. **We felt like he cut that supervisor off at the knees.** Eliminated any authority or credibility that supervision had in the plant.*

From that point forward it became common practice – word gets around – that any time an hourly worker didn't like something, they went around the supervisor and the area supervisor directly to the plant manager. In all the years I've been in the plant, the SmallCo senior management was the weakest we've ever had. Weak in leadership. I think we developed some bad habits. We developed some philosophies that we're having to change now and that we started to change when Eli Larson came on board.

-Member of plant management team

While Sam Taylor's management team intended to show seriousness in engaging the hourly workforce, the unintended consequence was to alienate and disempower supervisors. The phrase "cut off at the knees" emerged in several interviews with people who had been supervisors in this time period. In response, the supervisors banded together to organize a facilitated session in which the "97 Issues of the Supervisors" were

elicited. These 97 Issues served similar function to union grievances, most of which asked for clarification about compensation and policies for supervisors and their workers.

It was in this context that Eli Larson arrived and brought Proactive Manufacturing in 1999. Having heard these stories of conflicts among managers, supervisors, and hourly workers upon his arrival, Larson hoped that action teams and other collaborative activities might heal them.

Thus, when Larson established Continuous Improvement Forum in 2000, it was intended to be exactly that – an forum for discussion of improvement activities, open to any member of the plant who could attend and enjoy a free lunch. Its original purpose was to sustain an ongoing focus on Proactive Manufacturing, to share successes and progress with plant personnel, and to handle issues and challenges arising in the course of defect elimination efforts.

Shortly after CI Forum's establishment, however, two incidents occurred that alienated hourly workers and led to their discontinuing participation. One hourly operator, Carl, who had been heavily involved in CI Forum, was concerned about parking – an issue in his part of the plant that affected operators' quality of life in working there. Carl tried to bring up the issue repeatedly, which generated friction with his supervisor. The supervisor asked him to “shut up about it” and then Carl abruptly stopped receiving emails related to the Forum. It is difficult to uncover exactly what happened, but it appears that the supervisor told the organizer that Carl wanted to be removed from the list. Following this incident, Carl never returned to CI Forum or participated in any of the activities. The net effect of these events was to both exclude an hourly worker and exclude a voice willing to raise negative issues. The accumulation of such events would tend to make CI Forum both a “management meeting” and a meeting more focused on success than challenges.

One of the union leaders, David Ingram, whose opinions and actions are highly influential for other workers, told a more provocative story. During an extensive maintenance job on a hot day, shortly after CI Forum started, the workers requested a dedicated water cooler at their work site and were denied by their supervisor.

Ever since I've been here, [for special jobs] they moved, you know, john-on-the-spots in, wash stations in, and more water, all that kind of stuff. Well, after SmallRefCo got started with the CI Forum, I was working on a shutdown over on the next unit... and they didn't have water. So... I talked to the unit supervisor and said, “We need some drinkin water stations over there.” And they said, “They can come over here and drink water.” And I said, “Well that's counterproductive, because they're not working over here, they're working over there.” He said he wasn't gonna do it.

So I called HR department and said hey, we got some problems here. If we're going to be this... get into this... CI Forum, with all this change and all this innovation... we can't even do what we've maintained in the past! I need some Gatorade or something over here. I had to go pick up a case of Gatorade to bring over there. I tell you what, it was the biggest rigamarole you ever did see just to get water over to the people who were working.

After that is when I dropped out of the CI Forum. I said, if y'all can't make any more sense about providing for your working people than you are, then there is no sense in me going to the CI Forum because y'all aren't really concerned about what happens to the working people. So, that was the last time I went to the CI Forum.

-David Ingram, union leader

This story illustrates the flipside of Bob Ulrich's metastructuring moves in the lubrication program story. Here, Ingram attempted to take up and enact what he saw as the norms of Proactive Manufacturing – providing support and resources for people's work. When he was rejected, and had to pick up the Gatorade himself, it enacted a different structure – one in which the union provides for the hourly workers despite the managers. Here *in retelling this story to me* as an outsider and novice of the organizational culture,⁵ Ingram is doing further metastructuring – he promotes an interpretive scheme about managers focused on their apathy and domination. Such performances are obviously practiced and ongoing; one hourly worker commented on this story by saying, “I always say, Proactive Manufacturing is like communism – it works in theory!”

Around the edges of Proactive Manufacturing and the plant management team, other metastructuring moves continued in parallel that strengthened the structure of opposition to CI Forum and other “management meetings.” First, the senior executives of SmallCo and SmallRefCo implemented corporate-wide policies that allocated more resources to managers and fewer to hourly workers and supervisors. These included:

- Personnel cuts: Due to shrinking margins and cost pressures prior to the company's IPO, a 25% reduction in salaried workforce occurred in 2002, known internally as “Black Monday.” Hourly workers were protected by their unions but supervisors and staff were not.
- Changes in gain sharing plans were implemented, from a constant 8% up and down the organization to a stratified plan where hourly workers stayed at 8% maximum while supervisors could get 25%, superintendents 50%, and the plant manager 125% of their salary in gain sharing bonuses.
- The CEO retired with a \$93 Million pay out from his stock plan, at roughly the same time that this stratified gain sharing policy occurred.
- Exclusion of hourly workers and supervisors from participating in the company's IPO, after the expectation had been set that participation would be possible.
- Changes in benefits programs that went around standard union negotiation processes, an action perceived as using loopholes in union contracts to impose managers' agenda.

⁵ For this and other interviews out in the refinery processing units, I wore fire-retardant cover-alls, a hard hat, and safety glasses. I was also asked to shave my beard for proper fitting of ventilation masks in case of an emergency, a change that people described as making me look younger. Perhaps due to this appearance, the tone of many conversations was “let me tell you how it really is around here, kid.”

The changes in gain sharing plans were particularly controversial, and triggered a powerful metastructuring move by a small group of hourly workers. Having obtained a copy of a secret memo about the compensation changes, these workers made photocopies of the memo and distributed them around the plant so that every work group would see it. Doing so encouraged interpretive schemes about managerial hypocrisy and domination, and the norms of non-participation in “management meetings,” a term commonly used to describe CI Forum.

Through these processes, a structure of opposition to CI Forum has arisen among hourly workers, changing the composition of the meeting. While some hourly workers continue to attend CI Forum, the number appears to hover around 1-2 out of the 800 in the plant. Of the 40-50 regular attendees, the vast majority are supervisors and staff. These results parallel those by Vallas (2003), who found similarly narrow participation in continuous improvement activities at a paper mill.

Because hourly participants had brought many of the tough issues from front-line improvement efforts, CI Forum has gradually changed in their absence. Successes rather than challenges have become the emphasis. Elaborating on this idea of CI Forum as a pat-on-the-back management meeting, one of the hourly workers put it more colorfully:

I was asked to go maybe 5-6 years ago and I went and it was like a big giant suck ass session. Some people just couldn't control themselves because the plant manager was there. I'm like... you can't tell the man the truth when he's sitting there, then what's the point? ... You know what I mean when I say kissing up to the boss. These are supervisors or other salaried type people and their whole agenda was to get in with the plant manager and get higher up. Kind of destroyed whatever they were trying to do for maintenance.

-Hourly maintenance worker

Colorful language aside, there are several features of the CI Forum as practiced that may bias it towards an exercise in ingratiation. First, in part because of falling hourly participation, attendance is now recorded and monitored, and supervisors are rewarded for their own attendance and the attendance of their hourly people. These practices seek to reinforce a norm of participation but may select for those supervisors most interested in ingratiating themselves with the plant management.

Second, when hourly workers are brought in deliberately, the emphasis has been on describing success stories like the Lubrication Program in which they have been involved. While this function of “celebrating” achievements may provide a kind of reward and reinforcement of Proactive Manufacturing norms, it also sets the tone of not raising issues perceived as negative, and even suppressing them.

Third, over the course of the CI Forum’s evolution, it seems to have become increasingly focused on information provided by the plant’s management team. One of the original purposes of the Continuous Improvement Forum was to make improvement visible to the supervisors and workforce by presenting data about plant performance. This tradition was set by plant manager Eli Larson, who was the first to make some of the financial numbers transparent, along with measures of equipment failure rates and reliability. PowerPoint presentations from those sessions go back and forth between Proactive

Manufacturing slogans and numerical results, a trace of Larson's efforts to use performance data in sensegiving and reinforcement of his vision.

As the CI Forum has evolved, and particularly since Larson retired, a practice has evolved in which each of the management team members present the data they know best. The financial manager presents revenues, costs, and margins; the HSE manager reports incident rates; the operations services manager presents rate and reliability; and so on. And, in fact, the people who do attend CI Forum, including occasional hourly workers, describe this as the most valuable part of attending, because it gives them an indication of what is going on in the rest of the plant.

The trouble is that, as a result, CI Forum has therefore become a predominately one-way communication device. Most of the time is taken up by these presentations. As one supervisor put it:

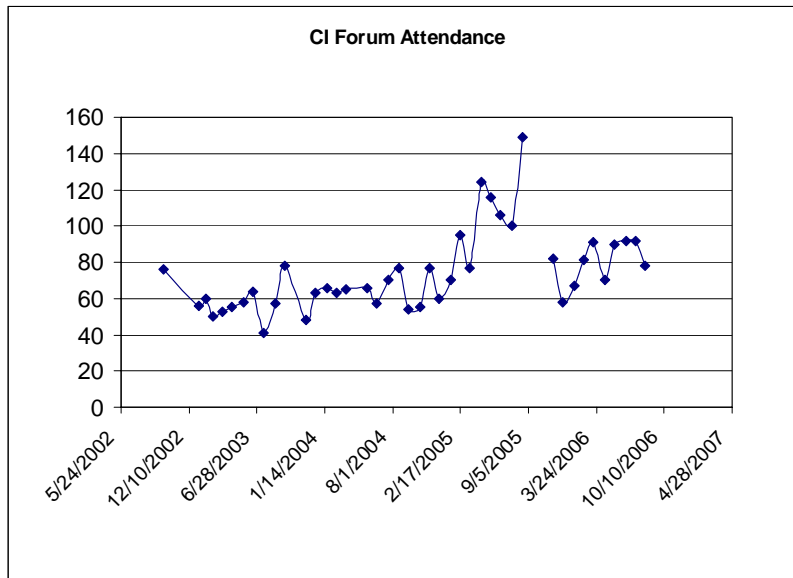
I'll be honest with you, I have mixed feelings [about CI Forum]. Sometimes it's like a show. It's entertainment...

Sometimes I just don't want to go. I don't want to go there because I don't think I'm getting a lot out of it. There are some things, like we might go over refinery metrics or refinery profitability, but we spend way the heck too much time talking about it. We need to show the data and get on with the show. We drag it out... and with all due respect to the directors [names some], a lot of them like to talk. They get up there and they ramble, and I'm thinking "get to the point." So something that in my book should take 5 minutes takes 30. But on the other hand, it's communication, and a lot of people out here will say they don't know what's going on because they don't get communicated to. The good thing is, you're going to get communicated to over there! And you'll have an opportunity to communicate some of your thoughts.

This aspect of CI Forum was brought into relief most powerfully in another conversation that I had with two operators in a control room – Frank, who is a relatively new hire, and George, who has been at the plant for thirty years. I brought up CI Forum. Surprisingly, George was only peripherally aware of its existence, and asked what “CI” stands for. Frank, who has eagerly gone to CI Forum several times because he is interested in hearing how the plant is performing, said – without irony – “I’m pretty sure it stands for ‘Centralized Information Forum.’” I was about to correct him and let him know that it stands for “Continuous Improvement Forum” until I realized that his *interpretation* of CI Forum was reasonably in line with how the forum had evolved within the culture and context of the plant.

When we examine the graph below of attendance records at CI Forum (Figure 3), we can see a fairly steady pattern of attendance, with a gradual increase in 2004 that peaks in 2005. This period coincides with the IPO of the parent company of the refinery, and the record peak coincides with the decision to sell the refinery and change plant managers. This behavior is consistent with the idea that CI Forum is a venue for “centralized information” about goings on in the company.

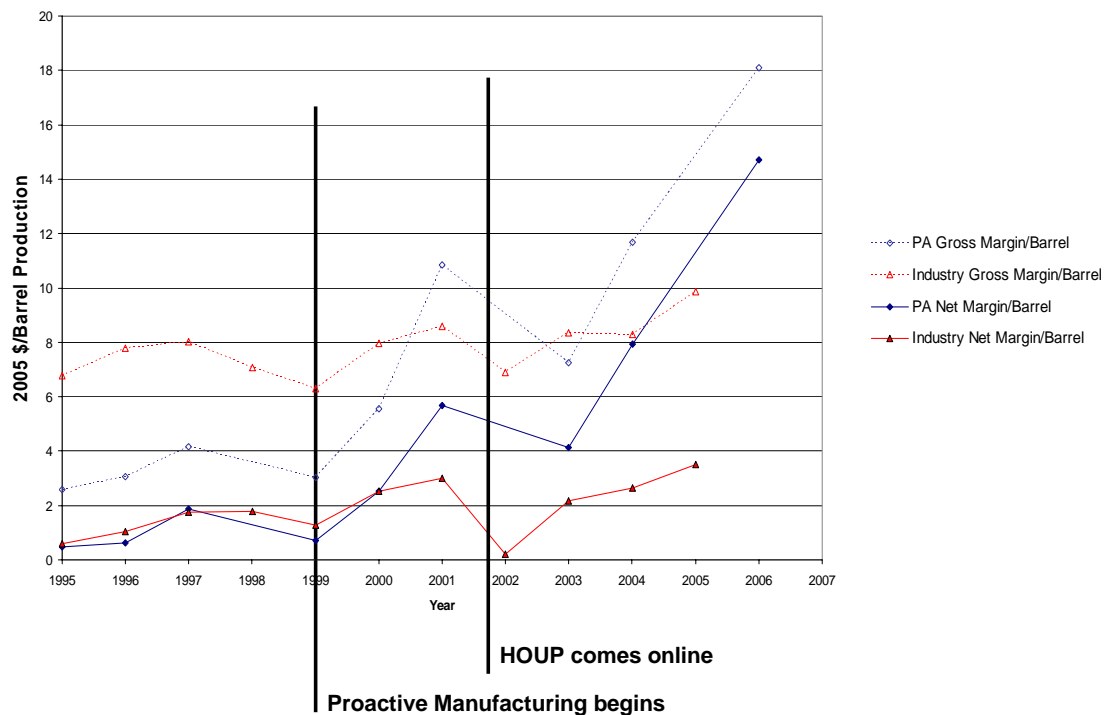
Figure 3 - CI Forum attendance, 12/2002 through 10/2006
Note: CI Forum not held in September-October, 2005



The reality, however, is more complex than that. Beliefs diverge about the *pragmatic* as well as the moral value of Proactive Manufacturing, as in the quote by an hourly worker that “Proactive Manufacturing is like communism – it works in theory!” Because multiple interventions occurred in parallel to improve Redberg Refinery’s performance – HOUP and Proactive Manufacturing as well as other initiatives – there is interpretive flexibility about which interventions make a difference. Those with concerns about the fairness of the program can also justify their opposition by claiming it is ineffective.

One could imagine that quantitative data about plant performance might arbitrate among these perspectives. In Redberg, at least, this was not the case. The following two graphs illustrate financial and safety performance in the plant, two key indicators of refinery performance.

Figure 4 - Redberg financial performance compared to industry average data from USDOE. Gross and Net Margin measured in 2005 US\$/Bbl of refinery production.



As mentioned earlier, Redberg has enjoyed astonishing financial performance gains. From refinery earnings in 1999 of \$50 million, there was an increase by a factor of 31.5 to \$1,580 million in 2006. By using measures of gross margin and net margin *per barrel of production* graphed above, we can compare these performance measures to those of the refining industry as a whole. Doing so allows us to account for the effects of fluctuations in crude oil and refinery product prices. Industrial comparisons for financial data are taken from the U.S. government’s Financial Reporting System Survey (USDOE-EIA, 2007). Here we can see that the refinery began to exceed industry performance in 2001, and has continued a trend of increasingly outperforming the industry.

Nevertheless, while performance gains started after Proactive Manufacturing began, the largest gains occurred after the HOUP came online. Is the plant successful because of

Proactive Manufacturing and a highly committed workforce, because of the technical capabilities enabled by capital expansions, or because of business environment changes and improved market prices? The answer is likely a combination of these three. Teasing apart these three effects, however, would require at minimum a prodigious accounting analysis that the plant’s financial team has not conducted; in fact the simple performance over time graphs presented here were not in circulation.

Safety performance is a similar picture. In the safety realm, data is readily available in the plant due to reporting requirements by the United States Occupational Safety and Health Administration (OSHA). Job-related injuries, whether by falling off a ladder, being burned by hydrofluoric acid, or getting a paper cut in an office, must be recorded and reported to OSHA. The refinery had records dating back to 1993. As a benchmark for these data I used the petroleum refining industry average (USDOL-BLS, 2007). Trends in the refinery and industry data are plotted in Figure 5.

Figure 5 - Safety performance: OSHA Recordable injuries per 100 full-time equivalent workers. Petroleum refining industry average included as benchmark



Here we can see a general downward trend in the injury rate, with the most significant improvements occurring between 1993 and 1998. These improvements moved Redberg’s injury rate from high above to somewhat below the industry average. Since then, the refinery has won more than thirty industry awards for safety performance, and achieved milestones such as 1 million man-hours without a serious injury (i.e. one resulting in lost work time). These performance gains were likely helped by targeted behavior change programs initiated by the HSE department, including significant rewards for safety performance. One such program included a pickup truck raffled to one of the workers, contingent on the plant’s meeting its safety goals.

Notably, however, these improvements occurred before the implementation of Proactive Manufacturing. If we examine the period after 1998, when Eli Larson arrived and initiated the program, we see a pattern of bumpy but flat performance in the OSHA recordable rate.⁶ A linear regression on the post-1998 data reveals no significant change over time ($t=.25$; $p=.814$). This pattern implies that either Proactive Manufacturing had no effect on this metric, or that its effect was eclipsed by simultaneous increases in recordable injuries, such as might occur in the HOUP construction activities. Redberg can rightfully claim high performance – unlike BP’s ill-fated Texas City refinery (USCSB, 2007), the plant seems to be enjoying both high financial performance and a good safety record. The effect of Proactive Manufacturing on safety is, however, ambiguous.

Thus, although the sensegiving efforts in CI Forum have emphasized the connection between Proactive Manufacturing and performance, the reality is by no means clear. Making sense of the plant’s history therefore falls to the individuals and political factions involved.

For the designers of Proactive Manufacturing, the intent was to create deliberate synergy.

The investments that had been made over the last four years or so was just a very bare maintenance but probably not even called a sustaining maintenance level. So some of the facilities had regressed and degraded, and reliability, you know, wasn’t good. A lot of room for improvement. And of course then when I got there, it was very obvious to me anyway that we had a huge project that could be very very economically viable and yet it was all dependent upon good safe and highly reliable operation of the old plant. It was all fully integrated together – you could not run one without the other. So then that’s when we decided to take the same approach – pretty much the same – as was done at Heartland, in terms of using the Manufacturing Game, bringing in all the people, putting them through the two day workshops, making them become familiar with the theory behind it. Forming action teams to go off and make improvements. And starting a CI Forum... with pretty much the same representation as at Heartland.
-Eli Larson, former plant manager

One operations services engineer put the importance of reliable equipment to financial performance more colorfully: “You have to be out in the street playing if you want to get hit by the good luck wagon.”

In fact, the physical investments make the story all the more compelling for advocates of Proactive Manufacturing. The HOUP capital investments created a temporary situation of limited cash and extensive debt when they were undertaken. In this context, Proactive Manufacturing came with substantial cost and risk – the architects repeatedly emphasized that the program was initiated by Redberg itself, without the backing of SmallCo’s senior executives. It also required an investment of more than \$1 Million in consulting fees,

⁶ A slight increase is evident from 2005-2006. This may be a harbinger of eroding safety performance, but it is too early to extrapolate a trend.

licensing, and personnel time away from regular work. The successes achieved are therefore highly significant to initiators and advocates of the program and are seen as integral to Redberg's history.

The south side personnel and the Lubrication Program architects represent more localized, immediate versions of this same view. There, the synergy between technical investments and organizational capability must be worked out every day through Max Neville's supervision of his team and Bob Ulrich's teaching of his lubrication class.

Among the detractors of these efforts, however, their sensemaking has led them to a more binary conclusion. The following quote comes from David Ingram, the aforementioned union head, and presents a contrary view.

I can tell you right now, Sam Taylor [the plant manager before Eli Larson] was probably the biggest factor in getting the [heavy sour crude] deal and making Redberg what it is today... Between Taylor and the deal and the plans for the decoker and then [the SmallCo CEO] going on through with it and everything else, by the time Eli Larson came in here, he was just basically a figure head. Everything had been set up as far as moving forward. He came in as a plant manager, nothing else. His deal was the Proactive Manufacturing and the CI Forum – that was his big push for anything, so... And really what put us in the place of where we are now is Taylor, the CEO, and, you know, the money... it was a good group that went out there and did the financing. Like I said, Larson came in... his part in it was a whole lot less than the rest of them, almost non-existent... He stayed for, you know, quite a while and ended up smelling like a rose. He is one of those guys who landed in the right spot at the right time.

-David Ingram, union leader

Ingram suggests here that success has derived from strategic changes and capital expansions, and Proactive Manufacturing was irrelevant. This interpretive scheme reinforces the more general interpretation of the program as part of management hypocrisy, and helps sustain the structure of opposition.

These findings indicate that interpretive flexibility about the causes of organizational performance might be a critical contextual factor in both deliberate and emergent change. For diverse actors engaged in metastructuring, the same performance data can be used to advance different and sometimes conflicting interpretive schemes. Those interpretive schemes then inform people's prospective and retrospective justifications for action, for example whether or not to participate in CI Forum, action teams, or new lubrication practices. Awareness of such ambiguities – which exist in any complex organization – may be a part of the social consciousness necessary for successful metastructuring moves. It is to this and other implications that we now turn.

Discussion

This paper has sought to articulate a concept of metastructuring that provides for a synthesis between two types of organizational change theory – one focused on deliberate interventions and the other on situated, emergent change processes. This synthesis focuses on the idea of interveners' shaping the context for others' action by offering

modalities for structuring – facilities, norms, and interpretive schemes. These modalities are then taken up in practice to produce emergent outcomes. As such it builds upon past work on structuring and organizational change (Barley, 1986; Feldman, 2004; Feldman et al., 2003; Orlikowski, 1996, 2000), but foregrounds metastructuring moves as attempts to shape those very processes.

The data from my empirical case of Proactive Manufacturing at Redberg Refinery illuminate key aspects of this metastructuring perspective. First, they emphasize the need for a refined conception of human agency that includes social consciousness and the ability to deliberately shape the context for others' action. Such capabilities are not limited to institutional entrepreneurs (Fligstein, 1997). A manager mandating The Manufacturing Game®, a supervisor emphasizing its lessons, a manager selecting and retraining people for new refining units, an operator teaching lubrication technique to his peers, and a union leader mounting resistance to CI Forum are all examples of metastructuring activities.

Second, while any one of these actors may have an intended structure they wish to bring about – a vision for their world – the shaping of action is by no means a deterministic process. New tools, ideas, and scripts for action arrive in the context of existing structures that are the legacy of ongoing structuring and metastructuring – from turf lines among unions to antipathy between hourly workers and their supervisors. Multiple conflicting norms and interpretive schemes exist, amidst which people must make their own way. They must choose, for example, whether to attend CI Forum or not, whether to raise their voice in a meeting and call for “fixing it right the first time,” and whether to tell stories of collaboration or conflict to organizational newcomers. These choices lead to emergent or situated change processes.

One implication is that when metastructuring moves by diverse actors are consonant and synergistic, the array of available modalities fits together, and the results tend toward wholeness and internal consistency. Intended structures come into reality. In the South Side of the Redberg refinery, a code of conduct, personnel selection and training, and supervisors' ongoing reinforcement of Proactive Manufacturing norms all aligned to produce a relatively harmonious and proactive subculture. The Lubrication Program is similar, where an operator took up the idea of defect elimination as intended by management, then elaborated a training program to encourage cleaner lubrication practices in the plant.

Conversely, dissonant metastructuring moves produce fragmented structures. While Proactive Manufacturing activities sought to encourage cross-level collaboration, management simultaneously implemented a highly stratified gain sharing plan. This contradiction undermined the espoused egalitarian ideal, to which hourly workers responded with organized resistance, cementing their non-participation in CI Forum. A rhetorical Continuous Improvement Forum, an enacted Centralized Information Forum, and workers' narrative that “Proactive Manufacturing is like communism – it works in theory” are the diverse structures that arose. Similarly, while an operator sought to conduct a Lubrication Program, maintenance workers opposed this work as a turf violation. These conflicting metastructuring moves helped create variation in lubrication-in-practice across different parts of the plant.

One enabling condition for such fragmentation is the interpretive flexibility of quantitative performance data. Management approaches building on the TQM tradition make data and Key Performance Indicators a mainstay of organizational improvement efforts in an effort to rationalize action. In complex organizations like Redberg Refinery, however, there are multiple causes of organizational performance – technological and infrastructure investments, incentive systems, interventions to shift organizational culture, and market dynamics to name a few. Thus, while managers might gather and disseminate performance data to help arbitrate among conflicting perspectives, such data is polysemous like any resource (Sewell, 1992). People can use it to validate different interpretive schemes about the causes of performance and mobilize support for multiple routes of strategic action. Activities like CI Forum that involve a degree of choice and voluntarism in participation become particularly vulnerable. In applying structuration theory to organizational change, this particular source of interpretive flexibility should be recognized as creating space for multiple structuring and metastructuring processes.

Limitations

The findings and concepts developed in this paper have three key limitations that necessitate further work. First, metastructuring at this stage is best described as a perspective, sensitizing concept, or framework. It aims to clarify and explain the relationship between deliberate interventions for social change and the emergent processes that engage them. As such, it is an offering primarily to interpretive or qualitative researchers for whom heuristics and sensitizing concepts are useful. I have not specified its propositions at the level of precision necessary for predictions or falsifiable theory. For positivistic audiences, more data would be necessary both to generate testable predictions through analytic induction and/or test them on a population of change interventions. For example, the data might suggest that organizational change interventions employing more extensive diagnosis, monitoring, and adaptation to ongoing structuring processes might lead to less fragmented emergent outcomes. A more precise specification and testing of this relationship, however, would require comparison among change processes.

This leads to the second limitation, which is that my data derive from a single business unit in a single organization. The metastructuring perspective developed here is likely to be generally applicable, but it reflects the specific data emerging from Redberg Refinery. Although the plant provided enough internal diversity of attitudes and structuring processes to develop the metastructuring perspective, the ideas here would be greatly enriched through their use and refinement in other contexts.

Finally, the data in this study are primarily retrospective, emerging from people's accounts in interviews about the sequence and meaning of past events. This methodology has some advantages – it allowed me to capture a fifteen year time span and connect change interventions with events occurring before, during, and after them. Through repeated interviews with a range of informants, ethnographic observation, and archival analysis I was also able to triangulate data and work around some retrospective biases. Nonetheless, relative to ethnographic or action research methods that follow change processes synchronously, I have no doubt captured structuring processes with less fidelity. This could limit the precision and utility of the concepts I have developed.

Implications for theory

While these findings build upon structuration theory, they also offer some additions to the theory, particularly as it is used in agency-rich accounts of social change. First, Giddens' (1984) conception of agency does not easily incorporate the phenomenon of actors' deliberate intervention to bring about structural change. His concept of agency needs to be augmented to include social consciousness or social skill (Fligstein, 1997, 2001). At minimum this means empathy for the states of others, at maximum a kind of reflexive sociology (Bourdieu et al., 1992). These capabilities allow for actors with a vision for the world to deliberately shape the context for others' action in order to try and bring that world into reality. Drawing on a concept developed to study IT change (Orlikowski et al., 1995), I have labeled that process metastructuring. I have suggested and illustrated how metastructuring can be accomplished through moves that shape the modalities for structuring – facilities, norms, and interpretive schemes – that Giddens posed as a layer between action and structure (see Figure 2).

This process is not, however, deterministic, and therefore does not violate any of the core assumptions of structuration theory. Metastructuring projects – like any action – still have unintended outcomes; the modalities offered must be taken up by actors with agency of their own. To the extent that interveners can anticipate others' response (which means being aware of other parallel metastructuring activities), they will be more or less successful. This idea aligns well with Giddens' assertion that the extent of actors' knowledgeability constrains the degree to which their intentions can be realized (Giddens, 1984, p.11). My specification of social consciousness just further elaborates the idea of knowledgeability.

The idea of metastructuring also augments Sewell's (Sewell, 1992) synthesis of Giddens' and Bourdieu's theories of structuration. Sewell offers a set of axioms of structural change – seen as necessary conditions for change – but does not theorize the process through which those conditions come to be. I would argue that in some cases Sewell's "axioms" are the results of people's deliberate metastructuring activity. For example, interventions to produce change offer new interpretive schemes – such as seeing a refinery as a system of defects to be eliminated through cross-functional teams – that create alternative justifications for action that did not exist before. Sewell labels this the "multiplicity of structures" and it is one prerequisite for structural change because it offers a source of choice and disruption. Further work on metastructuring could elaborate how successful interventions to produce change might work by making Sewell's axioms true.

Finally, this approach to metastructuring reinforces the link between structuration theory and Swidler's (1986) idea of culture as a toolkit or repertoire (e.g. DiMaggio, 1997). Swidler describes culture as a "tool-kit of symbols, stories, rituals, and world-views, which people may use in varying configurations to solve different kinds of problems" (1986, p. 273). She sees "culture's causal significance not in defining ends of action, but in providing cultural components that are used to construct strategies of action" (p. 273). This conception closely parallels the description of action amid diverse modalities for structuring that I have developed here. While Swidler's focus on culture emphasizes the symbolic and ideological aspects of structuration, the idea of a toolkit can be extended to include facilities as well as norms and interpretive schemes. In this sense,

metastructuring moves can be seen as attempts to add to or shape the elements of a cultural toolkit. Doing so creates the context for new strategies of action that metastructuring moves are intended to encourage.

These contributions to structural approaches require, in turn, another look at agency-rich theories of social change that have touched or built upon structuration. Of these, organizational change theory is the most obviously connected to the data in this study. Here the contribution is to bring together intervention-focused theories of planned change with situated and emergent change approaches: metastructuring moves (deliberate interventions) shape the context for structuring (emergent change). Interventions might include information technology introduction, TQM implementation, or a Proactive Manufacturing program; these can set off waves of situated change as people take up the modalities for structuring that have been offered. Actors engaged in metastructuring must then respond to the outcomes of such suffering. Although this sequence has been described in situated change studies that build upon structuration theory (Barley, 1986; Orlikowski, 1996, 2000; Orlikowski & Hofman, 1997), the absence of social consciousness and deliberate intervention in the theory have biased these scholars towards omitting, back-grounding, or making exogenous the metastructuring moves. Future studies of organizational change should understand both metastructuring and structuring as ongoing and distributed processes that produce the outcomes observed.

With respect to theories of planned change and intervention that have built on Lewin's idea of unfreeze-move-refreeze, the metastructuring perspective forces recognition of more complexity in organizational change processes. Assuming a monolithic "refreezing" at the end of a change intervention ignores both the continuous nature of change and the multiplicity of structuring processes and outcomes. The empirical case above, for example, illuminates the various "technologies-in-practice" that arose through the enactment of Proactive Manufacturing.⁷ It is also critical to recognize that few efforts at shaping an organization are solitary – what is perceived as "resistance to change" or "frozen-ness" in the Lewinian model may actually be the result of deliberate metastructuring by actors with an alternative vision for the organization.

Weick and Quinn (1999) have proposed an alternative to Lewinian change theory by reframing deliberate intervention as freeze-rebalance-unfreeze. In Weick and Quinn's formulation, freezing happens through documentation of schemas and mental models; rebalancing involves reframing issues as opportunities or Appreciative Inquiry into new generative ideas; and then unfreezing would mean monitoring how new thinking influences continuous change. This concept exhibits two key problems – it still succumbs to reifying the organization, and it requires a cognitivist view of organizations that excludes the roles of facilities and power essential to structuration. Nonetheless, Weick and Quinn do foreground the ongoing nature of change, and their ideas complement metastructuring ideas. In particular, if we take "rebalancing" as a kind of

⁷ In fact, the consultant who implements the Manufacturing Game explicitly uses the unfreeze-change-refreeze theory to describe his approach; the data in this study show how this conception can mask some of the underlying complexity. Is Redberg "refrozen" as a "proactive manufacturing" organization? In fact the answer is continually being negotiated, differently in different parts of the plant.

metastructuring move – offering new interpretive schemes – then their theory usefully calls attention to the need for diagnosis before and monitoring afterwards. These implications for practice are explored further below.

Because the concept of metastructuring does not require reifying organizations, it also applies to more general processes of social change. In so doing, it provides a useful common language that can substitute for incomplete or inappropriate analogies. For example, analogies between social movements and organizational change are common (e.g. Davis & Thompson, 1994; Strang & Jung, 2005; Zald & Berger, 1978). In my study several informants similarly described Proactive Manufacturing as an internal “movement.” These analogies are useful in part because they tap into metastructuring concepts. Social movements are public examples of people’s crafting new interpretive frames, mobilizing resources, and communicating or prefiguring new norms. Analogies have been useful because they illuminate similar phenomena in the organizational realm.

The problem with using social movement metaphors and analogies too liberally, however, is that doing so waters down the idea of a “social movement.” As some scholars have advocated (Schwartz & Paul, 1992), the term should perhaps be restricted to “conflict movements” and domains such as civil rights where less powerful actors must overcome a dominant regime. Manager-led change programs directed at improving shareholder returns should not be called social movements in this view. Metastructuring, because it underlies all these processes as a more general concept, allows the language of social movements to be used in specific, appropriate domains.

Beyond clarifying the relationship between social movements and organizational change, the metastructuring perspective can inform social movement analyses per se. As elaborated in the Introduction above, there is a nice mapping between the organizing processes described in social movement theory and the idea of activists’ offering facilities, norms, and interpretive schemes. Scholars could therefore use metastructuring to explain the ongoing adaptation between activist moves and the structural or systemic change processes they help generate.

Institutional entrepreneurship scholars could similarly use metastructuring to understand entrepreneurs’ moves and impacts: their intended institutional structures; their diagnosis and interpretation of existing institutional arrangements; and the facilities, norms, and interpretive schemes they craft and offer to encourage change. Metastructuring, with its link back to situated change theory, would particularly help illuminate the processes of translation and localization that occur as people in diverse contexts take up and enact what entrepreneurs have to offer.

Implications for practice

Given that the metastructuring perspective informs theories of organizational change, social movements, and institutional entrepreneurship, it can also be useful to practitioners engaged in these processes. In particular, it offers two heuristics for consideration in attempts to bring vision into reality.

The first heuristic is that leadership is a fundamentally distributed phenomenon. Recognizing and cultivating it as such might be helpful in encouraging the success of change efforts. Recognizing distributed leadership means knowing that metastructuring moves are not the limited province of “change agents” – they can occur at every level of

an organization, sometimes in conflicting ways. Cultivating distributed leadership means doing good metastructuring – offering ideas, ways of working, and facilities for others to take up in enacting the world you want to see. It also means working to align people’s interests and visions so that their metastructuring moves are consonant and thus contribute to outcomes that are whole and internally consistent.

The story of Redberg is both an inspiring and a cautionary tale in this regard. Architects of the Proactive Manufacturing program were successful at cultivating distributed leadership by conveying new ideas (the plant as a system of defects), ways of working (action teams), and facilities for new action (time and space for work, equipment, money for training, etc.). This activity was ambitious, empowering dozens of action teams around the plant. And it was creative, employing a board game and cartoon “bug” imagery on uniform patches. The south side culture and the Lubrication Program are examples of supervisors’ and hourly workers’ taking up these modalities and running with them. In these aspects of plant operations, where metastructuring moves were consonant, the change architects’ desired world went from a simulation in the Manufacturing Game® into reality.

The cautionary side of the Redberg story comes in part from people’s not recognizing and/or confronting others’ metastructuring moves that were dissonant with the goals of Proactive Manufacturing. While the plant manager sought to cultivate cross-level and cross-functional collaboration, senior executives made gain sharing plans less equitable and union leaders used that fact to organize workers’ opposition to CI Forum. Avoiding the fragmentation that ensued would have meant ongoing diagnosis, monitoring, and response to these players’ intentions and actions.

The second heuristic is that history matters. Through the history of the organization and the processes of ongoing structuring, a set of facilities, norms, and interpretive schemes will have already accumulated. The new modalities for structuring that a change program offers will arrive into that context, adding to a toolkit that people draw upon in action. Again, in some cases the toolkit “fits” together, producing synergistic outcomes. At Redberg, the longstanding Rotating Equipment Reliability team was easily relabeled as a Natural Work Team; it then became the context out of which Bob Ulrich started the Lubrication Program. On the other hand, the history of conflict between levels of the organization, with supervisors looking to re-establish their authority, may have helped push hourly workers out of CI Forum. This outcome undermined the intentions of creating an open space for organizational learning.

Such findings suggest the value in understanding the existing structures – people’s ambient ways of working, the facilities they employ, how they see the world, and how they justify their actions. This understanding is part of the “social consciousness” mentioned in this paper, and might enable practitioners to anticipate and respond to the way change efforts are interpreted, enacted, and responded to with others’ metastructuring moves.

References

- Andersson, L. M. & Bateman, T. S. 2000. Individual Environmental Initiative: Championing Natural Environmental Issues in U.S. Business Organizations. The Academy of Management Journal, 43(4): 548-570.
- Barley, S. R. 1986. Technology as an Occasion for Structuring: Evidence from Observations of CT Scanners and the Social Order of Radiology Departments. Administrative Science Quarterly, 31(1): 78-108.
- Barley, S. R. & Tolbert, P. S. 1997. Institutionalization and Structuration: Studying the Links between Action and Institution. Organization Studies, 18(1): 93-117.
- Becker, H. S. 1998. Tricks of the Trade: How to think about your research while you're doing it. Chicago, IL: University of Chicago Press.
- Bourdieu, P. & Wacquant, L. J. D. 1992. An invitation to reflexive sociology. Chicago: University of Chicago Press.
- Carroll, J., Sterman, J. S., & Marcus, A. 1998. Playing the maintenance game: How mental models drive organizational decisions. In J. Halpern & R. Stern (Eds.), Debating rationality: Nonrational elements of organizational decision making: 99-121. Ithaca, NY: Cornell University Press.
- Chakrabarti, A. K. 1974. The role of champion in product innovation. California Management Review, 17(2): 58-62.
- Clemens, E. S. & Cook, J. M. 1999. Politics and institutionalism: Explaining Durability and Change. Annual Review of Sociology, 25(1): 441-466.
- Creed, W. E. D., Scully, M. A., & Austin, J. R. 2002. Clothes Make the Person? The Tailoring of Legitimizing Accounts and the Social Construction of Identity. Organization Science, 13(5): 475-496.
- Czarniawska-Joerges, B. 1997. Narrating the organization : dramas of institutional identity. Chicago: University of Chicago Press.
- Davis, G. F. & Thompson, T. A. 1994. A Social Movement Perspective on Corporate Control. Administrative Science Quarterly, 39(1): 141-173.
- Davis, G. F., McAdam, D., Scott, W. R., & Zald, M. N. 2005. Social movements and organization theory. New York: Cambridge University Press.
- Deming, W. E. 1986. Out of the Crisis: Quality, Productivity and Competitive Position: Cambridge University Press.
- DiMaggio, P. 1997. Culture and Cognition. Annual Review of Sociology, 23(1): 263-287.
- DiMaggio, P. J. & Powell, W. W. 1983. The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. American Sociological Review, 48(2): 147-160.
- Dutton, J. E. & Ashford, S. J. 1993. Selling Issues to Top Management. The Academy of Management Review, 18(3): 397-428.
- Dutton, J. E., Ashford, S. J., O'Neill, R. M., & Lawrence, K. A. 2001. Moves That Matter: Issue Selling and Organizational Change. The Academy of Management Journal, 44(4): 716-736.
- Dutton, J. E., Ashford, S. J., Lawrence, K. A., & Miner-Rubino, K. 2002. Red Light, Green Light: Making Sense of the Organizational Context for Issue Selling. ORGANIZATION SCIENCE, 13(4): 355-369.

- Eisenhardt, K. M. 1989. Building Theories from Case Study Research. The Academy of Management Review, 14(4): 532-550.
- Ewick, P. & Silbey, S. 1995. Subversive Stories and Hegemonic Tales: Toward a Sociology of Narrative. Law and Society Review, 29(2): 197-226.
- Feldman, M. S. 2000. Organizational Routines as a Source of Continuous Change. Organization Science, 11(6): 611-629.
- Feldman, M. S. & Pentland, B. T. 2003. Reconceptualizing Organizational Routines as a Source of Flexibility and Change. Administrative Science Quarterly, 48(1): 94-118.
- Feldman, M. S. 2004. Resources in Emerging Structures and Processes of Change. Organization Science, 15(3): 295-309.
- Fligstein, N. 1997. Social skill and institutional theory. The American Behavioral Scientist, 40(4): 397.
- Fligstein, N. 2001. Social Skill and the Theory of Fields. Sociological Theory, 19(2): 105-125.
- Ford, J. D. & Ford, L. W. 1994. Logics of Identity, Contradiction, and Attraction in Change. The Academy of Management Review, 19(4): 756-785.
- Ford, J. D. & Ford, L. W. 1995. The Role of Conversations in Producing Intentional Change in Organizations. The Academy of Management Review, 20(3): 541-570.
- Gamson, W. A. 1992. The social psychology of collective action. In A. D. Morris & C. M. Mueller (Eds.), Frontiers in social movement theory: 53-76. New Haven, Conn.: Yale University Press.
- Garfinkel, H. 1967. Studies in ethnomethodology. Englewood Cliffs, N.J.: Prentice-Hall.
- Gersick, C. J. G. 1991. Revolutionary Change Theories: A Multilevel Exploration of the Punctuated Equilibrium Paradigm. The Academy of Management Review, 16(1): 10-36.
- Giddens, A. 1984. The constitution of society: outline of the theory of structuration. Berkeley, CA: University of California Press.
- Gioia, D. A. & Chittipeddi, K. 1991. Sensemaking and Sensegiving in Strategic Change Initiation. Strategic Management Journal, 12(6): 433-448.
- Greenwood, R. & Suddaby, R. 2006. Institutional entrepreneurship in mature fields: The big five accounting firms. Academy of Management Journal, 49(1): 27-48.
- Hackman, J. R. & Wageman, R. 1995. Total Quality Management: Empirical, Conceptual, and Practical Issues. Administrative Science Quarterly, 40(2): 309-342.
- Howell, J. M. & Higgins, C. A. 1990. Champions of Technological Innovation. Administrative Science Quarterly, 35(2): 317-341.
- Kleiner, A. & Roth, G. 2000. Oil change : perspectives on corporate transformation. New York: Oxford University Press.
- Kotter, J. P. 1996. Leading Change. Cambridge, MA: Harvard Business School Press.
- Lawless, M. W. & Price, L. L. 1992. An Agency Perspective on New Technology Champions. Organization Science, 3(3): 342-355.
- Levy, D. & Scully, M. 2007. The Institutional Entrepreneur as Modern Prince: The Strategic Face of Power in Contested Fields. Organization Studies, 28(7): 971-991.

- Lewin, K. 1951. Field theory in social science: selected theoretical papers. New York: Harper.
- McAdam, D., McCarthy, J. D., & Zald, M. N. 1996a. Comparative perspectives on social movements : political opportunities, mobilizing structures, and cultural framings. New York: Cambridge University Press.
- McAdam, D., McCarthy, J. D., & Zald, M. N. 1996b. Introduction: Opportunities, mobilizing structures, and framing processes - toward a synthetic, comparative perspective on social movements. In D. McAdam & J. D. McCarthy & M. N. Zald (Eds.), Comparative perspectives on social movements : political opportunities, mobilizing structures, and cultural framings: 1-20. New York: Cambridge University Press.
- Meyer, D. S. & Staggenborg, S. 1996. Movements, Countermovements, and the Structure of Political Opportunity. The American Journal of Sociology, 101(6): 1628-1660.
- Meyerson, D. E. & Scully, M. A. 1995. Tempered Radicalism and the Politics of Ambivalence and Change. Organization Science, 6(5): 585-600.
- Miles, M. B. & Huberman, A. M. 1994. Qualitative data analysis : an expanded sourcebook (2nd ed.). Thousand Oaks: Sage Publications.
- Orlikowski, W. J. 1992. The Duality of Technology: Rethinking the Concept of Technology in Organizations. Organization Science, 3(3): 398-427.
- Orlikowski, W. J. 1993. Learning from Notes: organizational issues in groupware implementation. The Information society, 9(3): 237-250.
- Orlikowski, W. J., Yates, J., Okamura, K., & Fujimoto, M. 1995. Shaping Electronic Communication: The Metastructuring of Technology in the Context of Use. Organization Science, 6(4): 423-444.
- Orlikowski, W. J. 1996. Improvising Organizational Transformation over Time: A Situated Change Perspective. Information Systems Research, 7(1): 63-92.
- Orlikowski, W. J. & Hofman, J. D. 1997. An Improvisational Model for Change Management: The Case of Groupware Technologies. Sloan Management Review, 38(2): 11-21.
- Orlikowski, W. J. 2000. Using Technology and Constituting Structures: A Practice Lens for Studying Technology in Organizations. Organization Science, 11(4): 404-428.
- Polletta, F. & Jasper, J. M. 2001. Collective identity and social movements. Annual Review of Sociology, 27(1): 283-305.
- Porras, J. I. & Silvers, R. C. 1991. Organization development and transformation. Annual Review of Psychology, 42(1): 51-51.
- Rogers, E. M. 1995. Diffusion of innovations (4th ed.). New York: Free Press.
- Romanelli, E. & Tushman, M. L. 1994. Organizational Transformation as Punctuated Equilibrium: An Empirical Test. The Academy of Management Journal, 37(5): 1141-1166.
- Roth, G. & Kleiner, A. 2000. Car launch : the human side of managing change. New York: Oxford University Press.
- Roth, G. L. & Kleiner, A. 1995. Learning about organizational learning : creating a learning history. Cambridge, MA: [MIT Center for Organizational Learning, Sloan School of Management].
- Schein, E. H. 1985/2004. Organizational culture and leadership. San Francisco, CA: Jossey-Bass.

- Schön, D. A. 1963. Champions for radical new inventions. Harvard Business Review, 41(2): 77-86.
- Schwartz, M. & Paul, S. 1992. Resource mobilization versus the mobilization of people: Why consensus movements can not be instruments of social change. In A. D. Morris & C. M. Mueller (Eds.), Frontiers in social movement theory: 53-76. New Haven, Conn.: Yale University Press.
- Senge, P. M. 1990. The fifth discipline: The art and practice of the learning organization (1st ed.). New York: Doubleday/Currency.
- Sewell, W. H. 1992. A Theory of Structure: Duality, Agency, and Transformation. The American Journal of Sociology, 98(1): 1-29.
- Snow, D. A., Rochford, E. B., Jr., Worden, S. K., & Benford, R. D. 1986. Frame Alignment Processes, Micromobilization, and Movement Participation. American Sociological Review, 51(4): 464-481.
- Spillane, J. P. 2006. Distributed Leadership. San Francisco: Jossey-Bass.
- Strang, D. & Jung, D.-I. 2005. Organizational change as an orchestrated social movement: Recruitment to a corporate quality initiative. In G. F. Davis & D. McAdam & W. R. Scott & M. N. Zald (Eds.), Social movements and organization theory: 280-309. New York: Cambridge University Press.
- Swidler, A. 1986. Culture in Action: Symbols and Strategies. American Sociological Review, 51(2): 273-286.
- Tushman, M. L. & Romanelli, E. 1985. Organizational evolution: A metamorphosis model of convergence and reorientation. Research in Organizational Behavior, 7(S 171): 222.
- USCSB. 2007. Investigation report: Refinery explosion and fire, BP Texas City. Report #2005-04-I-TX: U.S. Chemical Safety and Hazard Investigation Board. http://www.csb.gov/completed_investigations/docs/CSBFinalReportBP.pdf.
- USDOE-EIA; Financial Reporting System Survey; <http://www.eia.doe.gov/emeu/finance/>.
- USDOL-BLS. 2007. Industry Injury and Illness Data, 1994-2005: US Department of Labor, Bureau of Labor Statistics
- Vallas, S. P. 2003. Why Teamwork Fails: Obstacles to Workplace Change in Four Manufacturing Plants. American Sociological Review, 68(2): 223-250.
- Weick, K. E. 1984. Small wins: Redefining the scale of social problems. American Psychologist, 39(1): 40-49.
- Weick, K. E. 1995. Sensemaking in organizations. Thousand Oaks, CA: Sage Publications.
- Weick, K. E. & Quinn, R. E. 1999. Organizational change and development. Annual Review of Psychology, 50: 361.
- Zald, M. N. & Berger, M. A. 1978. Social Movements in Organizations: Coup d'Etat, Insurgency, and Mass Movements. The American Journal of Sociology, 83(4): 823-861.
- Zbaracki, M. J. 1998. The Rhetoric and Reality of Total Quality Management. Administrative Science Quarterly, 43(3): 602-636.
- Zucker, L. G. 1987. Institutional Theories of Organization. Annual Review of Sociology, 13(1): 443-464.