
Organizational routines as a unit of analysis

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Organizational routines can be conceptualized as generative systems with internal structures and dynamics. In this paper, we propose three different ways that organizational routines can be approached as a unit of analysis. One option is to treat the entire routine as an undifferentiated 'black box'. A second option is to study particular parts of the routine in isolation (e.g. routines as patterns of action). A third option is to study the relationships between these parts and the processes by which the parts change. For some questions, routines can be taken as a unit of analysis without considering their internal structure, but there are many research questions for which it is useful to consider the parts of routines either separately or as they interact. We discuss the importance of understanding the internal structure and dynamics of organizational routines for exploring core organizational phenomena such as stability, change, flexibility, learning and transfer.

1. Introduction

Organizational science struggles with a variety of basic questions: How can we explain organizational stability, change and survival? What promotes (or inhibits) learning, flexibility and adaptation within organizations? What promotes (or inhibits) the transfer of learning between organizations? While organizational routines are not the only factor that may influence these phenomena, they are widely recognized as critical to all these issues, and more.

In this paper, we argue that for many of the basic questions of organization science we need to understand the internal structure of organizational routines. The idea of constructing explanations in terms of internal structure is a basic strategy of scientific research across a wide range of disciplines (Newell, 1990). For example, geologists explain phenomena such as earthquakes and volcanoes in terms of the internal structure and dynamics of the earth. Doctors explain disease in terms of the internal working of the body. Without overstating these analogies, it is fair to say that organizational scientists face a similar challenge. Our need to understand internal dynamics of routines is particularly strong if we want to influence, design or manage them. To craft good theory, we cannot rely on surface regularities and correlations; we need to understand the underlying processes (Sutton and Staw, 1995).

For a wide range of questions, such as those mentioned above, we need to look more closely at organizational routines. When we begin to do so, we see that they are not simple, monolithic objects. They consist of both abstract understandings and specific performances. A host of artifacts are attached to organizational routines. The abstract understandings, specific performances and artifacts are inter-related in complex ways. It is the inter-relationships between the aspects of a routine and between each aspect and artifacts that form the basis for explaining some perplexing questions. Some routines show a lot of variation; others do not. Some are flexible; others are not. Some are easy to transfer; others are not. These variations may seem like noise or bad measurement, but they are not. They are indications of underlying phenomena and dynamics. By unpacking routines, we can begin to apply ideas and theories from all branches of social and behavioral sciences to explain these kinds of differences.

In this paper, we argue that because of the nature and complexity of the underlying phenomena, we need to exercise caution when using routines as a unit of analysis. We begin by stating a theoretical model for routines that includes the abstract and specific aspects, as well as physical artifacts. We demonstrate that these aspects of routines are not always in alignment; using one aspect or another to characterize a routine provides a partial picture, at best. Because of this potential divergence, we need to be careful when we begin to unpack/study routines. We discuss three basic approaches to studying routines as a unit of analysis: (i) treating routines as black boxes; (ii) examining one aspect of a routine; and (iii) considering interactions between various aspects of a routine. These approaches entail progressively closer and more systematic treatment of the internal structure of a routine. We then discuss the implications of these approaches.

2. Conceptualizing organizational routines

Although the term has been in circulation for decades, we are just beginning to understand the nature of organizational routines. One problem is that organizational routines tend to look different depending on one's point of view. When viewed from a distance, any particular organizational routine can exhibit a great deal of continuity over time, which leads some theorists to emphasize their role in organizational inertia and stability (Nelson and Winter, 1982; Baum and Singh, 1994; Aldrich, 1999). Closer observation of routines reveals that they can change continuously and endogenously, which leads others to emphasize their role in flexibility and change (Pentland and Rueter, 1994; Adler *et al.*, 1999; Feldman, 2000).

In response to these apparently contradictory empirical findings, theorists have argued that organizational routines are generative, dynamic systems, not static objects (Pentland and Reuter, 1994; Cohen *et al.*, 1996; Lazaric, 2000; Lazaric and Denis, 2001; Hodgson, 2003; Feldman and Pentland, 2003). Routines are continuously emerging systems with internal structures and dynamics. The internal structure of a routine can

produce a wide range of different outcomes on the continuum between ‘very stable’ and ‘constantly changing’, depending on circumstances. Figure 1 shows a simple picture of the key elements of any organizational routine.

The distinction between the ostensive (abstract pattern) and performative (specific actions) is an important basis for understanding routines. On one hand, routines can be characterized as abstract patterns that participants use to guide, account for and refer to specific performances of a routine. We refer to this as the ‘ostensive’ aspect (Feldman and Pentland, 2003). On the other hand, routines can be characterized as actual performances by specific people, at specific times, in specific places. We refer to this as the ‘performative’ aspect (Feldman and Pentland, 2003). There are many related distinctions that can be applied to organizational routines, such as structure/agency (Giddens, 1984; Sewell, 1992), objective/subjective (Bourdieu, 1990; Searle, 1995); and disposition/behavior (Hodgson, 2003). While these distinctions are useful, we adopted the terminology used by Latour (1986) because it focuses attention on collective performances and on the ability of both participants and observers to create the ostensive aspect from these performances. Latour’s (1986) language best expresses the aspects of organizational routines that are needed to explain their generative properties, as observed in empirical field studies. Without these two aspects, a routine cannot produce ‘repetitive, recognizable patterns of interdependent actions, carried out by multiple actors’ (Feldman and Pentland, 2003: 95). Like structure and agency, these two aspects are mutually constitutive; the ostensive does not simply guide performances (as a script guides a play); it is also created from the performances.

Individual level factors, such as individual skills, habits, and ‘procedural knowledge’ naturally contribute to the phenomenon of organizational routines (Cohen and Bacdayan, 1994). But we distinguish between individual routines and organizational routines, which are characterized by multiple actors and interdependent actions. Organizational routines depend on the connections, the stitching together of multiple participants and their actions to form a pattern that people can recognize and talk about as a routine.

In any practical setting, these aspects of an organizational routine may be codified or prescribed, as well as enabled and constrained, by various artifacts. Artifacts take

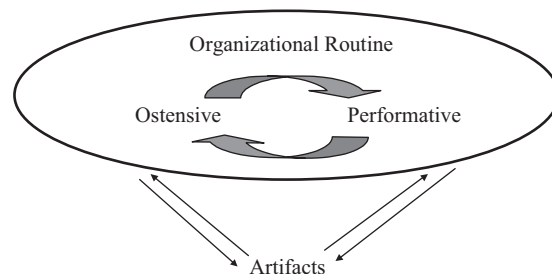


Figure 1 Organizational routines are generative systems

many different forms, from written rules, procedures and forms to the general physical setting (e.g. a cubicle farm). We call attention to artifacts here because they have been particularly prominent as a means of collecting data about routines. Artifacts such as rules and written procedures can serve as a proxy for the ostensive aspect of a routine. Artifacts such as work logs and databases can also provide a convenient archival trace of the performative aspect (Pentland and Reuter, 1994). Artifacts can be 'enrolled' in the performance of a routine to varying degrees, at the discretion of the participants (Feldman and Pentland, 2005a).

2.1 The performative aspect of organizational routines

Performances are the specific actions taken by specific people at specific times when they are engaged in what they think of as an organizational routine. Pentland and Reuter (1994) use the phrase 'effortful accomplishments' to describe the way in which participants construct routines from a repertoire of possibilities. Performances of a routine are practices in the sense that Bourdieu (1977, 1990), Lave (1988), Ortner (1984) and others have created for that term. Practices are carried out against a background of rules and expectations, but the particular courses of action we choose are always, to some extent, novel. In this sense, practice is inherently improvisatory.

The work of Feldman (2000), Hutchins (1991), Orlikowski (2000), Suchman (1983) and Weick and Roberts (1993) illustrates the improvisatory nature of performing organizational routines. As with musical improvisation, the degree of divergence from the score may vary considerably, from minor adjustments to cadence and dynamics to near total reinvention (Weick, 1998). And just as musical improvisation involves listening to what others are playing, improvisation in organizational routines involves attending to the actions taken by relevant others and the details of the situation.

2.2 The ostensive aspect of organizational routines

The ostensive aspect of a routine is the abstract or generalized pattern of the routine. Participants use it to guide, account for and refer to specific performances of the routine. The ostensive aspect may be thought of as a narrative, or a script. For example, consider the hiring routine (Feldman and Pentland, 2003). A common version of the ostensive aspect of the hiring routine involves attracting, screening and choosing applicants. If applicants are chosen, the routine also includes some form of extending an offer and joining up. These concepts are ordered as in 'first we attract, then we screen' with the end of the narrative being the successful or unsuccessful hiring of one or more employees.

A more detailed example would reveal additional subtleties to the ostensive aspect of organizational routines. First, the abstract pattern may be very fine grained and context dependent. Even within a single organization, there may be endless variations on the appropriate way to go about hiring people for different kinds of jobs, in different departments, or at different times of year. Second, the understanding of the

abstract pattern may not be the same from person to person, from event to event or over time. Indeed, multiple and divergent understandings are probably more the norm than the exception. For these reasons, the ostensive aspect should not be conceptualized as a single, unified entity.

2.3 *Artifacts and organizational routines*

Artifacts are physical manifestations of the organizational routine. The range of artifacts that enable and constrain organizational routines is practically endless. The most obvious examples are those that deliberately attempt to capture or prescribe the routine, such as formal rules or standard operating procedures. In turn, these may be embedded into machines or computers that support decision-making, workflow and so on. More subtle examples include the physical layout of office space or seating. For example, the fact that an office includes a 'reception area' facilitates the routine intake of visitors, but it does not directly prescribe who should be seen first.

It is tempting to think that rules and standard operating procedure determine the patterns of action that make up the performative aspect of a routine. Managers create such artifacts in an effort to shape actual work practices, but the practical effect of any particular rule or procedure is often quite remote from its original design or intention. Even artifacts that attempt to codify behavior are inherently limited in their potential to specify particular performances. There are always contextual details that remain open – and that must remain open – for the routine to be carried out. Even in work settings with detailed descriptions of the expected sequence of steps in a procedure, participants introduce variations (Roy, 1959; Narduzzo *et al.*, 2000; Victor *et al.*, 2000). As Blau notes, the rules of what he calls a bureaucratic procedure 'must be abstract in order to guide the different courses of action necessary for the accomplishment of an objective in diverse situations' (Blau, 1955: 23). Rules can be important artifacts, in so far as they provide resources for actors (Giddens, 1984), just like forms, checklists, standard operating procedures and other artifacts. Rules are resources for action, but because contexts vary, they do not determine performances (Garfinkel, 1967; Zimmerman, 1970; Giddens, 1984; Heritage, 1984; Taylor, 1993).

It is also tempting to conflate some artifacts with the ostensive aspect of a routine. Because of the multiple and distributed nature of the ostensive aspect, however, this conflation would be a mistake. Standard operating procedures are artifacts that may be mistaken for the ostensive aspect of a routine. It would be more appropriate to describe standard operating procedures as indicators of the ostensive aspect or, from another perspective, as efforts to codify the ostensive aspect.

3. Aspects of routines can be divergent

Figure 1 suggests that the aspects of a routine and their relationships can be neatly defined and labeled as parts of a particular routine. But Figure 1 is deceptive, because

organizations are a sea of interdependent actions, interpretations and artifacts. Identifying a particular routine is a bit like trying to isolate the Gulf Stream from the Atlantic Ocean. Identification is part of the act of creation (Feldman and Pentland, 2005b). It is not always obvious where a particular routine begins or ends. For example, in Pentland and Reuter's (1994) study of software support, support interactions are defined as beginning when they are 'opened' in the vendor's call tracking database and ending when the call is 'closed'. But one could adopt a perspective that includes the actual problem event, and the events leading up to it, and so on. Similarly, in their analysis of a brake design process, Smith and Eppinger (1997) selected a set of 28 design tasks from a process that contained over 100 different tasks.

White (1992) argues that these kinds of boundaries are easily taken for granted, even though we essentially impose them as observers onto the underlying phenomenon. Latour goes one step further in suggesting that there is no *underlying* phenomenon (Latour, 1986: 276).¹ From this perspective, the phenomenon, such as it is, is something that we overlay. In this case we overlay the idea of routine on some combination of actions, people taking actions and physical objects. This is even true for participants, because the performance of a routine may entail a significant tacit component (Cohen and Bacdayan, 1994). The ostensive aspect of routines tends to reinforce the concreteness and identity of a routine, allowing us to create into a pattern a complex set of activities with a simple label ('hiring'). The taken-for-granted nature of the routine as an objective whole makes it easy to assume that because they are part of 'the same routine', the ostensive and performative aspects are also 'the same'. A similar assumption might be made about artifacts, as well.

When scholars take for granted the existence of routines (or any other social phenomenon), it is easy for us to overlook the potential for divergence among the constituent parts. In any given instance, participants may perform the routine in a way that diverges from the general pattern of performances as seen from either a prescriptive or descriptive perspective, which may diverge from artifacts such as the official rules. In the following we provide some brief illustrations of divergence between the ostensive and performative aspects of organizational routines. Had the researchers only examined one aspect, the divergence would not have been apparent and some important understandings about these routines would not have surfaced in this research.

A preliminary study by Pentland *et al.* (1994) compared the work of travel agents and reference librarians. Travel agents understand their work as consisting of three simple kinds of reservations: 'air, hotel and rental car'. In contrast, reference librarians at a major university research library understand their work as involving every possible topic from astrophysics to zoology. When asked about the variety of their work, the librarians report their work to be highly varied, while the travel agents report their work to be quite 'routine'. Observations of task performance by outsiders, however, indicated exactly the opposite. To accomplish 'air, hotel and rental car', travel agents

¹More correctly, Latour would identify the underlying phenomena at the performative level.

engage in extremely varied, elaborate sequences of action. Reference librarians, by comparison, have a simple repetitive interaction pattern with library patrons. Rather than discount either the ‘subjective’ answers to interview questions or the ‘objective’ observations, one can explain these differences by pointing out that the interview questions tap into the ostensive aspect of their work—the idea of the routine—while the observations tap into the performative part of the work.

In a later study, Pentland compared the variability of routines in four sub-units at CitiGroup’s United States Citibanking Center (USCC) from an objectivist perspective. As in the earlier study, data were collected on the ostensive and performative aspects of the routine. The variability of the ostensive aspect was measured using standard surveys, while the variability of the performative aspect was measured using observations. Again, Pentland (2003a) found that the two perspectives yielded opposite rankings of the routines in terms of their variability (see Table 1).

The findings from these studies suggest that it is possible for one aspect of an organizational routine to be relatively stable (unchanging) while the other aspect is relatively variable. For example, participants may believe that a routine is ‘just the same old routine’ when, objectively, there has been a lot of change in the actual performances. Alternatively, participants may believe that the routine has been thoroughly revised when, from an outsider’s perspective, the performances are more or less the same.

These findings are consistent with the conclusions of Cohen and Bacdayan (1994), who found that routines tend to get stored in procedural memory. As a routine becomes more practiced and familiar, it becomes easier to do, but harder to verbalize or explain. Routine participants can still say what they are doing (hiring, budgeting, producing cars, etc.) but not how they do it. In terms of our model, the performative aspect of a routine becomes increasingly tacit. Thus, when asked about their work in surveys or interviews, participants can only recover the general idea of the routine (‘air, hotel, rental car’), which reflects the ostensive aspect. The actual sequences of

Table 1 Ostensive and performative aspects yield opposite results

	Ostensive	Performative
Pentland <i>et al.</i> (1994)		
Travel agents	Low variety	High variety
Reference librarians	High variety	Low variety
Pentland (2003)		
USCC A	Low variety	High variety
USCC B	Low variety	High variety
USCC C	High variety	Low variety
USCC D	High variety	Low variety

action required to perform the work, which we call the performative aspect, may be quite different.

These results provide support for the idea that ostensive and performative perspectives are empirically different. The units that look 'more variable' from an ostensive perspective are 'less variable' from a performative perspective, and vice versa. This could have important implications for any study that uses the variability of a routine as a dependent or independent variable. For example, consider the hypothesis that routines with lower variability lead to greater efficiency. Depending on which aspect of the routine you measure when testing this hypothesis, you would get the opposite result.

The existence of distinct aspects to a routine that can vary somewhat independently means that we must be rather careful when gathering data and making comparisons. Failure to make a distinction between the ostensive and performative aspects could lead to considerable confusion. Even gathering data through the same means could be tapping into different aspects. Interviews, for instance, could elicit responses about either the ostensive or performative aspect depending on how the questions are asked and how the respondent interprets the questions. This potential divergence between the aspects of a routine raises a number of challenging issues, which we begin to address in the following section.

4. Approaches to studying routines

This conceptualization of organizational routines as a multi-part dynamic system naturally suggests a range of approaches to studying routines. At one extreme, we can overlook the internal structure and treat a routine like a black box. At the other extreme, we can delve into the full complexity of interactions between the ostensive, the performative and related artifacts. In between these extremes, we can examine each aspect of a routine independently, one at a time. For each of these three broad approaches, we explore what we can learn through each of the approaches and discuss their effective use.

4.1 Routines as black boxes

The black box approach to studying routines is by far the most common. This approach has been particularly prevalent in texts that theorize about the nature of organizational routines. These texts often offer analogies to help us understand organization routines and their roles in organizations. Organizational routines have been likened to individual habits (Stene, 1940; Simon, 1945: 88–89; Nelson and Winter, 1982: 73), computer programs (March and Simon, 1958; Cyert and March, 1963; Allison, 1971; Gioia and Poole, 1984; Carley, 1996a, b; Carley and Lin, 1997; Levitt *et al.*, 1999) and DNA (Nelson and Winter, 1982; Baum and Singh, 1994). These analogies have helped us to understand the cognitive efficiency and inertial qualities of routines.

There are great advantages to treating routines as black boxes. We can study the inputs and outputs of the routine as a whole, without having to map or measure the internal structure of the routine. For example, manufacturing managers may use dimensional tolerances and defect rates as indicators of process variation (Montgomery, 1985; Ryan, 1989; Oakland, 1996). These indicators have enormous practical value for tracking and comparing the technical and economic performance of work processes.

Treating a routine as a functional whole is a sensible, safe approximation when the research question concerns a description, prediction or comparison concerning the routine as a whole. Consider, for example, a manufacturing routine such as an assembly line. Typical descriptive questions might be, 'What is the production rate?' and 'What is the defect rate?' Predictive questions are basically comparisons over time: 'Is the defect rate increasing or decreasing? Will it continue to increase or decrease?' Techniques such as statistical process control have been developed to answer these kinds of descriptive and predictive questions. These techniques rely on many performances of a routine, but they are focused primarily on outcomes (Oakland, 1996). They can generate extremely useful information without necessarily unpacking the internal structure of the process or routine. For example, Lillrank (2003) applies this approach to distinguish and classify routine versus non-routine organizational processes.

Of course, every useful approach has its disadvantages. In *The Social Psychology of Organizing*, Weick discussed Thorngate's (1976) observation that 'it is impossible for a theory of social behavior to be simultaneously general, accurate and simple' (Weick, 1979: 35). The 'black box' perspective is simple and general but not accurate. Specifically, the black box perspective can lead to a narrow understanding of organizational routines. In some respects, routines may operate as if they are like individual habits, computer programs or genetic material, and the analogy is, in those cases, useful. In other respects, organizational routines do not operate in these ways, and we must deal with them in their own right. The internal structure of organizational routines appears more variable and potentially contested than it does when viewed as a 'black box'. We can explore what people need to do to make a routine look as if it is stable and consensual. Exploring how we create routines that appear to be stable and consensual allows us to understand more about how routines relate to fundamental organizational questions such as: how do organizations learn, how do they change and how can we guide change?

4.2 Examining parts of routines

Treating routines as black boxes enables scholars to provide statistical explanations of why changes occur in populations of organizational routines. For explanations of the dynamics that occur in specific routines, we need to begin unpacking the routine. By unpacking, we simply mean to look inside a routine to examine its internal structure. There are three possibilities to consider: (i) the performances; (i) the ostensive aspect; or (ii) the related artifacts.

Focus on the performative

From the performative perspective, routines consist of many performances of patterns of actions. These actions are performed by specific people, for specific reasons, at specific times, in specific places. Examining and comparing performances is an important way of understanding the relationship between context and action. Studies that compare performative aspects, generally compare them with respect to a specific change in the context.

Field studies, experiments and simulations all provide opportunities for comparing performances. Field studies allow researchers to compare performances as they take place in real time. Some field studies that have compared performances of organizational routines over time or in different circumstances include Barley (1986), Hutchins (1991), Pentland and Reuter (1994), Narduzzo (1998), Adler *et al.* (1999), Feldman (2000, 2004) and Edmondson *et al.* (2001). These studies are strong on detail and descriptive accuracy but lacking in simplicity. Many things are happening at the same time and any result is likely to be over-determined. Experimental studies and simulations are designed to isolate explanatory factors and to provide more information about the likelihood of a particular cause creating a particular effect. Cohen's and Bacdayan's study (1994) is a good example of experimental work on organizational routines. Simulations include Cyert and March (1963), Cohen *et al.* (1972), Carley (1996a, b), Carley and Lin (1997) and Levitt *et al.* (1999). While experiments and simulations cannot study performances enacted by people in context and therefore miss many of the nuances of such performances, they do allow researchers to compare alternative conditions (e.g. varying skill levels, or turnover, or whatever) and to generate large amounts of data and in ways that would not be possible in real organizations.

Focus on the ostensive

Empirical research on the ostensive can be distinguished by its focus on the abstract idea of the routine. Many field researchers observe specific performances in order to write about the ostensive aspect of routines. In such studies, specific performances are often used as examples, but the core concern is the general idea of the routine. In field studies that focus on the ostensive, data collected about the routine summarize many specific performances. This is typical of firm-level or establishment level studies (Szulanski, 1996; Szulanski and Jensen, 2004). Other studies collect information about the general outline of a routine, without reference to particular performances. For example, in the MIT Process Handbook, Malone *et al.* (1999) provide abstract descriptions of thousands of organizational routines, but no information about actual performances.

Comparing the ostensive aspects of routines enables researchers to compare different world views. This can be accomplished through comparisons of groups of people. Adler *et al.*, for instance, compare the ostensive aspect of changeover routines in Big-3 automobile manufacturers and a Japanese automobile manufacturer (NUMI) (Adler *et al.*, 1999). Feldman compares the ostensive aspect of a budget routine from the supervisors' and the subordinates' perspectives (Feldman, 2003). In

both these cases, the comparison is made in order to understand more about how the difference in position influences the abstract pattern. Another approach is exemplified by the work of Leidner (1993). She compares two ideas: individuals as cogs in a machine and individuals as agents to show that routinization of service work is innately paradoxical with organizations trying to have both machine efficiency and individuality.

Focus on the artifacts

In practice, researchers use artifacts as indicators of the ostensive and performative aspects. Some artifacts tend to reflect the ostensive aspect, such as rules, standard operating procedures, checklists and forms. Artifacts that keep track of work processes may be viewed as indicators of performances. As we discussed above, it is somewhat risky to treat such artifacts as reliable indicators of either the performative or the ostensive aspect of a routine. Nevertheless, the availability of extensive archival records on such artifacts and their change over time makes them particularly valuable and attractive objects of study (e.g. Miner, 1991; March *et al.*, 2000).

Studying routines by studying artifacts may be particularly attractive because of the relative stability of and ease of identifying artifacts. The existence or non-existence of an artifact is straightforward compared to the multiple understandings and interpretations that may constitute the ostensive aspect of the routine. Similarly, though artifacts do change over time, they are likely to remain stable over at least several iterations of performances.

Artifacts can be studied in a variety of ways. Miner's work on jobs as routines uses the formalized job description as a primary indicator of the routine. She explores how these jobs come into existence (Miner, 1991) and evolve (Miner and Estler, 1985; Miner and Haunschild, 1995; Rura-Polly and Miner, 2000). Other scholars have studied artifacts as relatively fixed aspects of organizational performance. Research that studies how technologies determine performance, for instance, takes the technology as given (cf. Orlikowski, 1992). Other studies specifically study how artifacts change. Studying the dynamics of rules is a tradition that has provided a great deal of insight into the factors that are related to change in organizational routines (Cyert and March, 1963; Cohen *et al.*, 1972; Schulz, 1998a, b; March *et al.*, 2000).

5. Examining interactions within routines

For many research questions, and for many practical purposes, a partial view of a routine may be adequate. To understand the dynamics of a routine—the factors that produce stability or change—one needs to consider more of the internal structure. Taking the unpacking to the next step, we can begin to study the interactions between the three aspects of routines or some subset of them. There are three sets of relationships to consider: (i) the relationship between ostensive and performative aspects of

routine; (ii) the relationship between ostensive routines and artifacts; (iii) the relationship between performances and artifacts. Exploring the relations between these three aspects could provide us with a considerably better understanding of the sources of stability, rigidity, innovation, flexibility and change in organizational routines.

Several studies have alerted us to the existence of the multiple parts of organizational routines (Suchman, 1983; Miner, 1990; Adler *et al.*, 1999; Feldman, 2000; Narduzzo *et al.*, 2000; Pentland, 2003a). These studies have used the existence of multiple parts to account for observed flexibility or change. The internal structure of organizational routines has helped to explain the apparently paradoxical findings that organizational routines contribute to both stability and change. Understanding the relations between parts of routines, however, remains predominantly in the realm of future study. For this reason, we review less research in this section and focus more on posing questions that begin to constitute a research agenda for studying the interactions within organizational routines.

There are many avenues for research on the relations between the parts that make up organizational routines. In the following, we focus on issues of divergence between the parts. The potential for divergence between the ostensive and performative aspects of routines and between each of these aspects and the artifacts that are used in and codify the routine, opens up many researchable questions. Divergence between parts of a routine may, in different contexts, be beneficial or detrimental to the operation of an organization. For instance, an organization in search of new ways of operating may wish to create more divergence in key organizational routines. An organization wishing to increase its legitimacy may, by contrast, wish to try to decrease the divergence. In the following subsections, we suggest some of the conditions and effects of divergence.

5.1 Ostensive–performance interactions

While the ostensive and performative aspects of organizational routines are recursive and mutually constitutive, they are also multiple. Performances are necessarily multiple. Because exact replication is impossible, performances are varied. The ostensive aspect is also varied. There is no one pattern that all participants and observers agree is ‘the routine’. The routine will begin earlier for some than for others and will end later for some than for others. The hiring routine in the housing department that Feldman studied was markedly different for the student employees, the professionals who worked in the residence halls and the central administrators (Feldman, 2000). The help line routines that Pentland studied also had variable starting and ending points depending on the perspective of the participant (Pentland, 1992). The ostensive aspect of the routine may vary not only in when it begins but also in what actions are considered necessary and appropriate. While for some routines the ostensive aspect may be fairly coherent, for others the appropriate image may be a collage or a narrative told from many perspectives rather than representational art or a single

story. Thus, the interaction between ostensive and performative aspects is an interaction between two quite complex and diverse concepts.

One might hypothesize that given the mutually constitutive nature of the performative and ostensive aspects diversity within one aspect tends to increase diversity in the other. Highly contested and non-consensual ostensive aspects seem likely to produce more variation in performance. People may differ about what makes sense to do or there may not be any story about how one performs a particular task. Variation in performance may also produce multiple understandings and stories. Variety in the context may be one source of many different ways of accomplishing the same task and of contested or vague narratives. Novelty may also produce such outcomes (Narduzzo *et al.*, 2000). New organizations seem particularly likely to have vague or multiple stories about how one does things around here.

Another avenue for research is the effect of divergence. We can ask questions about how the relationship between these two aspects of routines encourages or discourages stability and inertia on one hand and flexibility and change on the other. A close match seems likely to indicate and predict stability and perhaps inertia. More disparate matches seem likely to indicate the existence of flexibility or change. For example, Feldman (2000) found that the people who ran residence halls in a large university in the United States changed their organizational routines because of the interaction between the ostensive and performative part of the routine. In some instances, the ostensive aspect of the routine served as a goal that they fell short of or an ideal that they were continuously *striving* toward. In these instances, the ostensive part of the routine remained relatively stable while the performances changed in order to match better the ostensive part. At other times, changes in performances generated changes in the ostensive part. In these instances, the changed performances showed participants new possibilities and, as a result, they *expanded* their expectations of the routine. When these two dynamics bundle together, they create a continuous cycle of endogenous change (Feldman, 2000).

Organizational learning was one outcome of the above example. Divergence also provided fuel for political struggles that existed within the organization. Different groups can align themselves with different aspects or even with different versions of the performative and ostensive aspects. Such dynamics can affect the efficiency and productivity of organizations in a range of positive and negative ways. Friction can cause vitality and enrichment (Czarniawska, 1997) and also chaos and confusion. New ideas and new ways of accomplishing tasks can revitalize or paralyze organizations. Managing, channeling and dealing with the effects of divergence are all issues that can be fruitfully studied.

5.2 *Artifact–performance interactions*

As described above, artifacts are the physical trace of an organizational routine. Documents are common physical traces, but other objects such as machines may also play

this role. For the sake of simplicity we focus principally on the Standard Operating Procedure (SOP) or the codification of the organizational routine in this discussion. Our concern here is thinking about the match between this artifact and performance.

One condition that seems likely to influence divergence between artifact and performance is the ability to observe or monitor performances. One might speculate, for example, that in situations where performances are difficult to observe or monitor, novel performances (improvisations, short-cuts, etc.) may have little impact on artifacts such as rules, and vice versa. Under this circumstance, the artifact may be very stable (the rules stay the same), when in fact the actual practice is changing quite significantly.

Another condition is the degree of specificity in the artifacts. This is most easily seen where the artifacts are written rules. In some contexts it is difficult to write rules that specify particular behaviors. If the rules are vague, one might expect the performances to vary more widely than when the rules are more specific. Such specificity may be particularly important in cases where the routine is being exported to new environments. Compare, for instance, the transportability of routines in the research of Darr *et al.* (1995) and of Szulanski (2000). Darr *et al.* studied routines concerning the placement of pepperoni for pan pizzas and the layout of workflow to improve the handling of boxes and labels. They indicate that these routines could be readily transferred between pizza restaurants operated by the same franchisee. By contrast, Szulanski found that transferring the bank conversion routine took a great deal of effort. It is entirely possible that the differences in difficulty found by these researchers is due to the relative difficulty in specifying particular behaviours in the different contexts.

Map-making or codification of any sort is an intrinsically political and highly contestable activity (Suchman, 1995). In part for this reason, it is also something that is generally hierarchically controlled. Therefore, the relationship between artifact and performances seems particularly likely to uncover aspects of power relations within an organization. In a command and control environment, the SOP is the command. The match between performances and SOP, then, is the measure of control. In environments in which the employees have more control over how they accomplish their tasks, the SOP may be either the employees' agreement about what they are doing or the managers' understanding of what the employees do.

In each of these cases, the implications for divergence between artifact and performance are worth exploring. Little divergence in the command and control context means firm hierarchical control that may include surveillance techniques to insure that prescribed actions are taken. Little divergence in the more empowered context may indicate that managers understand and legitimate the work their subordinates are doing. A great deal of divergence in the command and control environment may indicate resistance or serious misunderstandings about what it takes to do the work. In the more empowered context, divergence may indicate a template that is outdated or a lack of attention to the creation of the artifact.

Similar questions arise where the artifacts are objects such as machines rather than documents. People who study workplace technologies and how they influence the process of work have undertaken some of the research on this relationship (Barley, 1986; Orlikowski, 1992, 1996, 2000; DeSanctis and Poole 1994; Garud and Rappa, 1994). In a sense, their findings mirror the discussion of rules and other written artifacts: the same technology can be appropriated in many different ways by different sets of actors. They are a resource for action, but do not necessarily determine action. Moreover, this research has shown that the different ways that technologies are appropriated provides important information about the organizational context in which the appropriation takes place.

5.3 Artifact–ostensive interactions

The relationship between artifacts and the ostensive aspect of an organizational routine is the most often ignored because the potential for divergence is likely to be overlooked. The most obvious artifact, the written rules or SOP, is often assumed to be the routine in principal, the understanding, the narrative. In other words, SOPs are often taken to be the ostensive aspect. There may, indeed, be times when the relationship between artifact and ostensive aspect are close. The employment ad or the SOP may express a consensual understanding about the process and intent of the hiring routine. But it is not uncommon for there to be no consensual understanding or for the consensual understanding to be different from the artifact. One of the authors vividly remembers pointing out the sign on the wall in an automobile dealership that announced that the customer is always right only to have the repairman laughingly explain that the sign was just something management put on the wall. It was not something that made any sense to the people who repair the cars. Similarly, both authors have sat in meetings in which employment ads are designed and simultaneously disparaged as not how we will ‘really’ attract candidates to the job. Legally mandated commitments to affirmative action may be particularly at odds with understandings about how the hiring routine takes place.

While the relationship between artifact and performance is about the control of behavior, the relationship between artifact and ostensive aspect is about an alignment of documents and other objects with what we understand about what we are doing. Written rules or SOPs may be efforts on the part of management to prescribe or encourage a particular way of understanding an organizational routine. Divergence between artifact and ostensive aspect may indicate disagreement between labor and management and may be an expression of the divergence in goals between different groups. From the management perspective, routines that conform to relevant regulations (e.g. OSHA, ISO) may be a good way to organize the work; from the workers’ perspective these may be unnecessary and make it harder for them to do the work in the way they think appropriate. Divergence may also be about the relationship between the organization and some relevant public. Workers may understand that

management needs to put a sign on the wall but that they are not really supposed to act according to the sign. Organizations may need to write employment ads that assert a commitment to affirmative action even when they do not intend to alter their hiring practices or outcomes.

As with the relationship between artifact and performance, many other questions and possible relationships may arise when we think about artifacts as all of the objects that participate in the routine. For instance, when we take into consideration not only the wording on employment ads but also the telephones used and telephone calls made and the networks of professional friends that are contacts, the picture would be very different. Different definitions of the artifact will reveal different visions of the relationship between artifacts and the ostensive aspect of the routine.

6. Discussion

Our focus in this paper is on the routine as a unit of analysis. Although for some questions routines can be taken as a unit of analysis without considering their internal structure, we have shown that there are many research questions for which it is useful to consider the parts of routines either separately or as they interact. In particular, opening up the internal structure allows us to reveal the importance of power, subjectivity and agency in the operation of organizational routines (Feldman and Pentland, 2003). In this section we focus primarily on issues of power and conflict though subjectivity and agency are inevitably implicated.

Power is one of the more important issues that the internal structure of organizational routines exposes. By power we are referring here to the ability to influence what actions people take (Dahl, 1968). This power can be exercised through a variety of means, including dictating specific actions, controlling agendas and resources, and ideological influence (Weber, 1956/1978; Lukes, 1974). We do not here discuss another important perspective on power, the power created through coordinated action (cf. Foucault, 1976; Arendt, 1977; Latour, 1986). Although also important in relation to organizational routines, we focus here on the ways in which organizational routines are the location for playing out contested issues in organizations.

Nelson and Winter (1982) alluded to the importance of power relations in routines when they articulated the idea of 'routines as truce'. Recent work on the political and motivational aspects of routines has highlighted this feature as well (Burns, 2000; Mangolte 2000; Lazaric and Denis, 2001). The routine as truce idea suggests the routine as a resolution to the conflict. Our framework points to the kinds of divergence within a routine that can form the locus for on-going dynamics of domination and resistance. The existence of a routine does not necessarily indicate that a truce has been achieved. Political conflict can be and probably often is a part of many routines. Indeed, any organizational routine could be the locus for acting out many different conflicts. Each performance provides an opportunity for members to act out their

differences and an opportunity to understand the routine differently. The ostensive aspect is always up in the air to some extent, and it can potentially be revisited every time the routine is performed. This perspective suggests that truce is a relative rather than an absolute term. The extent and stability of truces in relation to particular routines would be a fruitful subject of research.

Understanding the political and contested nature of organizational routines is useful for understanding phenomena such as organizational learning and organizational change. Scholars have shown that organizational routines are a source of organizational learning (Levitt and March, 1988; Miner, 1990). Feldman has theorized that this is, in part, related to the potential in organizational routines for reflective, agentic behavior (Feldman, 2000). If people who enact routines reflect on what they are doing, they may decide to alter what they do in future iterations of the routine. Opportunities to reflect with other participants in the routine can have similar effects. What the organization learns from such reflection seems likely to have much to do with the dynamics of domination and resistance as Crozier showed in his classic study (Crozier, 1964).

Organizational routines provide opportunities not only for the people who enact the routine but also for managers and designers of routines to exercise power. Routines are usually thought of as helping to solidify or stabilize an existing arrangement, but they can be used as a mechanism to promote change (Adler *et al.*, 1999). Motivating people to change their performances in a routine or to change their understandings of what the routine is supposed to do or how it is supposed to be enacted is one way of exercising power. An understanding of the internal dynamics of organizational routines provides different ideas about how to motivate such change. Training, visioning and other forms of altering the understandings people have about the organization and the role of their actions in it can be used to change the ostensive aspect of a routine. Surveillance, positive or negative sanctions, and other forms of controlling behavior can be used to change the performative aspect of a routine. Aligning artifacts with the desired change can be an important part of influencing either the ostensive or performative aspects.

Viewing routines as generative systems can be helpful in understanding the strengths and weaknesses of organizations. Because routines are a locus for playing out issues of power and conflict, studying the internal dynamics of an organization's routines is a way to learn more about the organization. Exploring the internal dynamics of routines makes it possible to observe how power dynamics operate and where conflicts exist and potential conflicts are likely to emerge. Divergence between ostensive and performative aspects and between these aspects and artifacts focus attention on what otherwise might be overlooked or misunderstood.

7. Conclusion

In this paper we have explored many ways in which organizational routines constitute a unit of analysis. We have shown that taking the entire routine as an undifferentiated

unit of analysis is just one option. Other options include taking the ostensive and performative parts or even the artifacts as indicators of organizational routines. Studying the interactions between these parts provides another possible avenue for studying organizational routines. By considering these interactions we return to the organizational routine as a unit of analysis, but it is the analysis of an interaction or a process now rather than of a thing. Moving to a focus on process enables us to bring to bear many different conceptual tools and to ask many different questions.

Routines are an important aspect of many core organizational phenomena such as stability, change, flexibility, learning, and transfer. Explaining these phenomena requires explicit consideration of the role of organizational routines. Once we begin to unpack routines, however, we are confronted with a range of issues and choices. Because routines are generative systems, with complex internal structures, we need to exercise caution. But once we begin to unpack routines, there is an enormous amount we can learn.

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