10 PROCESS AS THEORY IN INFORMATION SYSTEMS RESEARCH

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Abstract

Many researchers have searched for evidence of organizational improvements from the huge sums invested in ICT. Unfortunately, evidence for such a pay back is spotty at best (e.g., Brynjolfsson 1994; Brynjolfsson and Hitt 1998; Meyer and Gupta 1994). On the other hand, at the individual level, computing and communication technologies are increasingly merging into work in ways that make it impossible to separate the two (e.g., Bridges 1995; Gasser 1986; Zuboff 198). This problem—usually referred to as the productivity paradox—is an example of a more pervasive issue: linking phenomena and theories from different levels of analysis.

Organizational processes provide a bridge between individual, organizational, and even industrial level impacts of information and communication technologies (ICT). Viewing a process as the way organizations accomplish desired goals and transform inputs into outputs makes the link to organizational outcomes. Viewing processes as ordered collections of activities makes the link to individual work, since individual actors perform these activities. As well, process theories can be a useful milieu for theoretical interplay between interpretive and positivist research paradigms. A process-centered research framework is illustrated with an analysis of the process of seating and serving customers in two restaurants. The analysis illustrates how changes in individual work affect the process and thus the organizational outcomes and how processes provide a theoretical bridge between work at different levels of analysis.

1. Introduction

Many researchers have searched for evidence of organizational productivity improvements from investments in information and communication technologies (ICT). Unfortunately, evidence for such payback is spotty at best (e.g., Brynjolfsson and Hitt 1998; Meyer and Gupta 1994). On the other hand, at the individual level, ICT are increasingly merging into work in ways that make it impossible to separate the two (e.g., Bridges 1995; Gasser 1986; Zuboff 1988). The contrast between the apparently substantial impact of ICT use at the individual level and the apparently diffuse impact at the organizational level is but one example of the problem of linking phenomena and theories from different levels of analysis.

The goal of this paper is to show how individual-level research on ICT use might be linked to organization-level research by detailed consideration of the organizational process in which the use is situated. Process as used in this paper means an interrelated sequence of events that occur over time leading to an organizational outcome of interest (Boudreau and Robey 1999). Understanding this linkage is useful for those who study ICT, and especially useful for those who design them (Kaplan 1991).

In the remainder of this section, the problem of cross-level analysis is briefly discussed. The following section discusses the concept of a process to explain how processes link to individual work and ICT use, on the one hand, and to organizational and industrial structures and outcomes, on the other. As well, a brief discussion of the potential use of process theories as a milieu for interplay between research paradigms is presented. In later sections, the application of this framework in a study of the use of an information system in a restaurant is illustrated. The paper concludes by sketching implications of this process perspective for future research.

1.1 The Problem of Multi-level Research

Information systems research has in recent years shifted its attention to organizational issues (Benbasat, Goldstein, and Mead 1987). Organizational research in turn has historically been divided between micro- and macro-level perspectives. Unfortunately, many organizational issues are multi-level and thus incompletely captured by single-level theories. ICT impact is clearly multi-level, as the same ICT has discernable impacts on individuals, groups, and organizations. For such topics, multi-level theories are preferable because they provide a "deeper, richer portrait of organizational life—one that acknowledges the influence of the organizational context on individuals' actions and perceptions *and* the influence of individuals' actions and perceptions on the organizational context" (Klein, Tosi, and Cannella 1999, p. 243). However, multi-level research is difficult, so theorizing at different levels is often disconnected, leading to misleading theoretical conclusions.

Klein, Dansereau, and Hall (1994, p. 196) stress the primacy of theory in dealing with levels issues. However, multi-level work to date has been restricted to a few domains, such as climate or leadership (Klein, Dansereau, and Hall 1994, p. 197). The lack focus of focus on information issues suggests that there is an opportunity and a need for multi-level research and theorizing on ICT use.

2. Processes as Theory

Most theories in organizational and IS research are variance theories. Variance theories comprise constructs or variables and propositions or hypotheses linking them. Such theories predict the levels of dependent or outcome variables from the levels of independent or predictor variables, where the predictors are seen as necessary and sufficient for the outcomes. A multi-level variance theory is one that includes constructs and variables from different levels of analysis. The link between levels takes the form of a series of bridging or linking propositions involving constructs or variables defined at different levels of analysis.

An alternative to a variance theory is a process theory (Markus and Robey 1988). Rather than relating levels of variables, process theories explain how outcomes of interest develop through a sequence of events (Mohr 1982). Typically, process theories are of some transient process leading to exceptional outcomes, e.g., events leading up to an organizational change or to acceptance of a system. However, this paper will focus instead on what might be called "everyday" processes: those performed regularly to create an organization's products or services.

A description of a process has a very different form from the boxes-and-arrows of a variance theory, but it is still a theory, in that it summarizes a set of observations and predictions about the world. In the case of a process theory, the observations and predictions are about the performance of events leading up to organizational outcomes of interest. Such a theory might be very specific, that is, descriptive of only a single performance in a specific organization. More desirably, the theory might describe a general class of performances or even performances in multiple organizations. As Orlikowski (1993) puts it, "Yin (1984) refers to this technique as 'analytic generalization' to distinguish it from the more typical statistical generalization that generalizes from a sample to a population. Here the generalization is of theoretical concepts and patterns."

Kaplan (1991, p. 593) states that process theories can be "valuable aids in understanding issues pertaining to designing and implementing information systems, assessing their impacts, and anticipating and managing the processes of change associated with them." The main advantage of process theories is that they can deal with more complex causal relationships than variance theories, and provide an explanation of how the inputs and outputs are related, rather than simply noting the relationship. As well, it is argued here that process theories provide a link between individual and organizational phenomena and a milieu for interplay between research paradigms. However, to make this point, first the components of a process theory, in contrast to the variables and hypotheses of a variance theory, will be described.

2.1 Components of a Process

This section develops a series of increasingly elaborate process conceptualizations. It begins by discussing processes as wholes and then as compositions of activities with constraints on assembly. The goal of this discussion is to understand the connection between processes and individual work, on the one hand, and processes and organizational outcomes on the other.

2.1.1 Processes as Wholes

A simple view is that processes are ways organizations accomplish desired goals. In fact, as Malone et al. (1999) point out, processes are often named by the goals they accomplish (for example, product development or order fulfillment). The goal identifies the desired result or output of the process, or the set of constraints the process satisfies (Cyert and March 1963; Simon 1964), which is necessary to link to organizational outcomes (i.e., how quickly or efficiently different process options meet the constraints and produce the output). By focusing at the level of a process, the paper tries to avoid the problems outlined by March and Sutton (1997), who noted the instability of organizational performance.

A related view is that a process is a transformation of an input to an output. This view focuses on the resources that flow through the process. The business process concept has strong roots in industrial engineering (IE) and its subfield of process engineering (Sakamoto 1989). Other process concepts borrow heavily from operations research (OR) and operations management (OM), in particular, the design and control of manufacturing and product-producing processes of the firm.

This view of a process is also similar to the root definition (RD) from Soft Systems Methodology (SSM) (Checkland and Scholes 1990). A key point in SSM, to which this paper also adheres, is that there is not a single correct RD for a process. Instead, there can be many RDs reflecting different view of the process. For example, one RD might focus on the official rationale for the process and the concrete items created. Another might focus on the way the organization allocates resources to different processes. Instead of arguing that whichever model chosen is a true representation of the work, the description is viewed as a discursive product, that is, as an artifact, with an author, intended to accomplish some goal. Checkland (1981, p. 81) similarly describes models as "opening up debate about change" rather than "what ought now to be done."

Describing a process as a way to accomplish a goal or as a transformation of an input to an output establishes the link between processes and organizational outcomes. For example, at this level of detail the efficiency of a process can be stated as the process outputs divided by the inputs. However, at this level of detail, the link to individual work or ICT use is not yet apparent.

2.1.2 Processes as Activities and Interdependencies

To progress further, we need a more detailed view of processes that will allow us to say more about differences in how individuals contribute to processes and especially how the use of ICT might make a difference to these contributions. To do so, we start with the definition of a process as a sequence of events, focusing specifically on events as activities performed by individual or groups. Such a description will be a theory of the process in the sense that it summarizes a set of observations about what activities happened when the process was performed in the past and a set of predictions about what will happen when the process is performed in the future.

Representing a process as a sequence of activities provides insight into the linkage between individual work and processes, since individuals perform the various activities

that comprise the process. As individuals change what they do, they change how they perform these activities and thus their participation in the process. Conversely, process changes demand different performances from individuals. ICT use might simply make individuals more efficient or effective at the activities they have always performed. However, an interesting class of impacts involves changing which individuals perform which activities. ICT might also be used to automate the performance of certain activities, thus changing the activities that comprise the process. Analysis of these possibilities requires an even more detailed view of the process, which is presented next.

To understand how changes in individual work might affect the process, it is necessary to examine the constraints on assembling activities that limit the possible arrangements and rearrangements of activities into processes. To identify these constraints, we focus in particular on the implications of dependencies for process assembly. In focusing on dependencies, we both follow and diverge from a long tradition in organization theory. Thompson (1967) viewed subunit interdependency as the basic building block of organizational structure and behavior. Following Thompson, two basic conceptualizations of organizational interdependency have evolved: resource interdependency, generated through exchanges between organizational members (e.g., people); and workflow interdependency, generated between organizational units located in the division of labor (Victor and Blackburn 1987).

In both cases, dependencies were seen as arising between individuals or groups. In contrast to these earlier views, the belief expressed here is that conceptualizing dependencies as arising between *activities* provides more insight into processes. This view makes it easier to consider the implications of reassigning work to different actors. In this view, the limits on the orders of activities arise from the flow of resources between them, that is, on resource interdependencies.

Malone and Crowston (1994) proposed two major classes of dependencies: *flow* or *producer/consumer* dependencies and *shared resource* dependencies. *Producer/consumer* dependencies arise when one activity creates a resource that is then used by another activity. *Shared resource* dependencies arise when two or more activities require the same resources (because of space limitations, this class of dependency will not be discussed further in this paper).

Both kinds of dependencies have implications for changes to processes. Since the activities can not be performed without the necessary resources, the existence of the dependencies constrains how the process can be assembled. In particular, *producer/consumer* dependencies restrict the order in which activities can be performed. On the other hand, activities that are not involved in a dependency can be freely rearranged. Therefore, we can limit possible arrangements of the activities in analyzing existing processes or in designing new ones.

As well as constraining the order of activities, interdependencies often require additional activities to manage them. According to Malone and Crowston, the *producer/consumer* interdependency described above not only constrains the order of the activities (a *precedence* dependency), but may also require additional activities to manage the *transfer* of the resource between or to ensure the *usability* of the resource. *Precedence* requires that the producer activity be performed before the consumer activity. This dependency can be managed in one of two ways: either the person performing the first activity can notify the person performing the second that a resource is ready, or the

second can monitor the performance of the first. ICT may have an affect by providing a mechanism for cheap monitoring. *Transfer* dependencies are managed by a range of mechanisms for physically moving resources to the actors performing the consuming activities (or vice versa). For example, inventory management systems can be classified here. *Usability* can be managed by having the consumer specify the nature of the resources required or by having the producer create standardized resources expected by the user (among other mechanisms).

In general, there may be numerous different coordination mechanisms that could be used to address a given dependency. Different organizations may use different mechanisms to address similar problems, thus resulting in a different organizational form. Because these coordination mechanisms are primarily information processing, they may be particularly affected by the use of ICT.

2.2 Processes as a Milieu for the Interplay of Research Paradigms

As should be clear from the preceding discussion, developing a model of a process raises numerous problems, such as how activities are identified and determined to be relevant to the process or choosing an appropriate level of decomposition for the process description. These choices can be problematic because processes involve numerous individuals with possibly different interpretations of the process. Resolution of these choices raises questions about the theoretical assumptions underlying the theory.

As a framework for discussing these underlying assumptions, Burrell and Morgan (1979) suggest a 2x2 categorization of social theories: order-conflict and subjective-objective (assumptions about ontology, epistemology, human nature, and methodology). The combination of these two dimensions results in four distinct paradigms for research. Burrell and Morgan present their four paradigms as incommensurable approaches to research. However, Schultz and Hatch (1996) suggest a research project can draw on and contrast multiple paradigms. They identify several ways research might cross paradigms, including sequential (e.g., Lee 1991), parallel, bridging, and interplay. Schultz and Hatch argue that interplay "allows the findings of one paradigm to be recontextualized and reinterpreted in such a way that they inform the research conducted within a different paradigm."

In the Burrell and Morgan framework, theories of processes clearly focus on the ordering of society—stability, integration, functional coordination, and consensus—rather than on conflict. However, they could provide a milieu for interplay between subjective and objective perspectives. A process study might contrast realist and nominalist ontologies to achieve a richer description. Activities performed might be viewed as real (e.g., stamping metal) or nominal (e.g., many information processes). Flows of physical goods have a physical reality, although many interesting processes are largely information processing for which a nominalist position is more appropriate.

A study might contrast positivist and anti-positivist epistemologies. On the one hand, viewing a process as a way to accomplish organizational goals implies a positivist conception of the process. On the other, focusing on individuals and their conceptions of their work implies an anti-positivist view of activities. A possible result of this contrast is to explicitly problematize the question of how individuals come to contribute to the

higher-order goals. For example, even though individuals make sense of the world themselves, there must still be some degree of agreement among members of a group, e.g., about the meaning and nature of a shared process, meaning that individual perceptions are subjective but not completely arbitrary. Numerous researchers have investigated the nature of such shared cognitions and the social processes by which they are built (Walsh 1995). For example, Weick and Roberts (1993) show how aircraft carrier flight deck operations are made reliable by the "heedful interrelating" of flight deck personnel.

A study might contrast deterministic and voluntaristic assumptions about human nature. Individuals working in a group do not have total freedom in what they do if they are to contribute to the group, but are not totally constrained either. Again, consideration of interplay between these positions is possible. For example, Simon (1991) raises the question of why individuals adopt organizational goals in the first place.

To summarize, the objective-subjective debate is often presented as a dichotomy and a matter of prior assumption. However, as Schultz and Hatch say, "the assumption of impermeable paradigm boundaries reinforces and is reinforced by 'either-or' thinking. We believe that paradigm boundaries are permeable and claim that when paradigm contrasts are combined with paradigm connections, interplay becomes possible." Process theories provide a milieu for such interplay.

2.3 A Process-centered Research Framework

Crowston and Treacy (1986) noted that linking the use of ICT to any kind of organizational-level impact requires some theory about the inner workings of organizations. Processes provide a possible bridge between individual and organizational (and even industrial) level outcomes of the use of ICT. This framework is shown pictorially in Figure 1. The framework acknowledges that ICT, by themselves, do not change organizations, nor are they merely tools of managerial intent. Rather, ICT use opens up new possibilities for individual work, and these changes in work in turn have implications for the processes and thus the organizations in which these individuals participate.

These work and process changes, in turn, may involve changes in organizational structures and outcomes (and vice versa). In other words, as individual workers incorporate various forms of ICT in their work, they alter both how they conduct their work and how they participate in the organization's structure, and thus indirectly how their organizations participate in the industry-wide value-chain. Conversely, there are organizational and industry-wide forces shaping how work is done. These forces also affect how individuals do their work. The interaction of these forces is what shapes the uses of ICT, new forms of work and new ways of organizing.

In the next section, this framework is used in the study of the use of an information system in a restaurant. It shows how processes can provide a link between individual and organizational level phenomena.

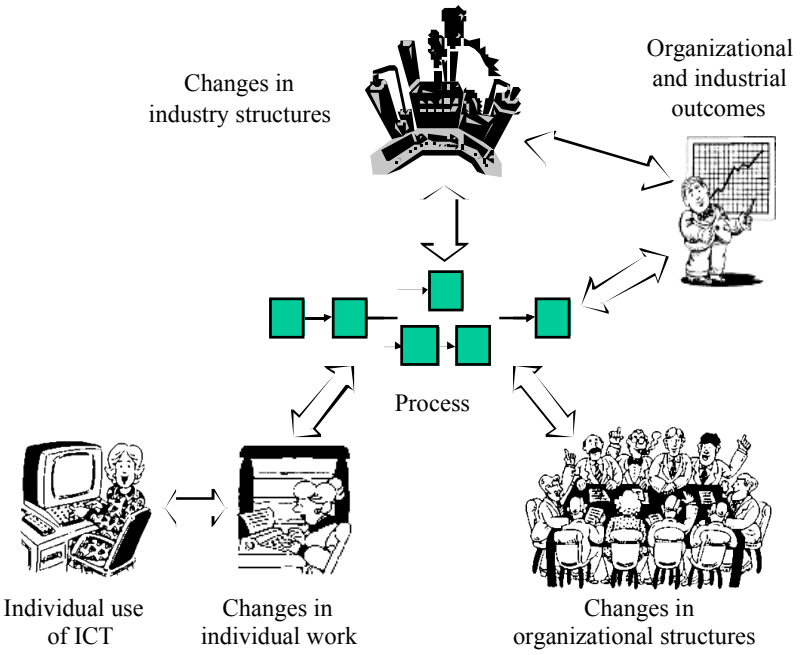


Figure 1. The Relationship between ICT-induced Changes in Individual Work and Changes in Organizational and Industrial Structures and Outcomes

3. Illustrative Example: Service Processes in Two Restaurants

To illustrate the use of this framework, we will analyze and compare the service processes in two restaurants, one with and one without a seating information system (Crowston 1994). This example demonstrates how consideration of the process helps to link phenomena observed at the individual and organizational levels. Restaurants have long been studied as important forums for coordination. The essential characteristics of restaurants—many customers, many orders, frequent deliveries, continuous monitoring of customers and of personnel in accomplishing work, and perishable products—makes them particularly illuminating for studies of logistical flows, information flows, and resultant needs for coordination.

3.1 The Research Setting

The two restaurants compared—one in Lake Buena Vista, Florida, and the other in Southfield, Michigan—both belonged to the same national chain. They differed significantly, however, in their use of information technology. The description and analysis

is based on observations of lunch and dinner service at the two restaurants, discussions with staff, and analysis of documentation describing the IT system provided by the software services company that developed and sold the system to the restaurant chain (Karp 1994; Rock Systems 1994).

The Southfield restaurant was a conventional sit-down restaurant, organized for high-volume operations. Seats were allocated by assigning entries in a conventional grease pencil-and-acetate record used by the hostess. Communications were face-to-face. By contrast, the Lake Buena Vista restaurant used an information system to track table status and to automate some communications between restaurant staff.

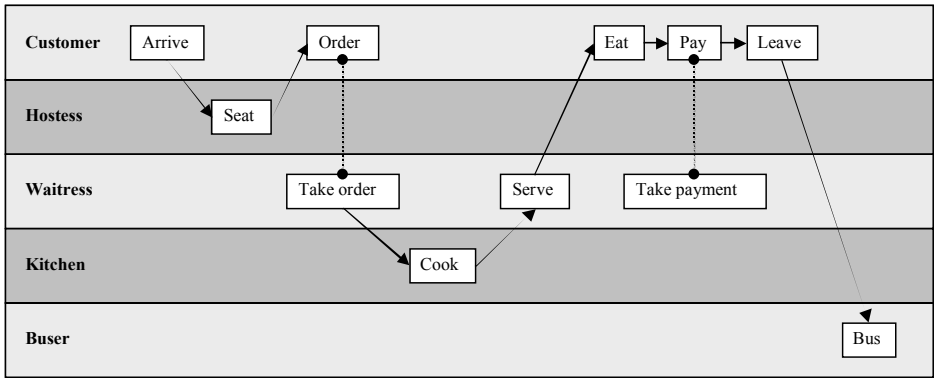
When I arrived at the Lake Buena Vista restaurant, the hostess consulted a computerized display of tables in the restaurant to select a table for us. The system can balance customers across wait staff or maintain a waiting list if the restaurant is full. As I was seated, my hostess pointed out a button under the table. Pressing the button updated the status of the table in the information system, e.g., from free, to occupied, to waiting-to-be-bused, and finally back to free. The system also included pagers carried by the wait staff. When the table button was pressed indicating I had been seated, the system paged the waitress responsible for the table, indicating there were new customers. When my meal was ready, the kitchen used the pagers to inform the waitress my order was ready to be picked up and served. When the waitress collected the bill after I had left, she could page a buser to clean that table. Similarly, when the buser had finished, he or she could inform the hostess (and the system) that the table is available and the next customer could be seated.

This system apparently had a significant practical impact: it is reported, for example, that "diners spend 15 to 30 minutes less time in the restaurant [after the installation of the system] because of swifter service" (Karp 1994). The question to be answered is, why does the system have such a profound impact on organizational performance? This question can not be answered by a single-level theory. On the one hand, focusing only on individual use of the system can not explain how the system has an effect on the overall performance of the organization, especially considering that the system does not seem to dramatically affect how any individual works. On the other hand, considering only the organization as a whole (e.g., by comparing a number of organizations with and without systems), quantifies but does not illuminate how the system provides benefit.

3.2 Analysis

This section provides an analysis of the process of seating and serving customers in the two restaurants that illustrates how changes in individual work affect the process and thus the organizational outcomes. The changes in individual work have been described above: use of an information system to track table status and to communicate between individual employees. The organizational outcomes have also been described: reduced waiting time and increased table turns and profitability. The question addressed here is how consideration of the process can clarify the link between these phenomena.

The first step in this analysis is to develop a description of the activities involved in the process. A simple description of these steps is shown in Figure 2. This figure shows actors on the left and activities performed by each across the page in time-order. Activities performed jointly are connected by dotted lines. While there may be some dis-



Actors are shown down the left side, activities performed by each are shown in order across the page. Activities performed jointly are connected with dotted lines.

Figure 2. The Restaurant Service Process

agreements about details, the belief is that most people will recognize the sequence of activities as representative of a restaurant. It was argued above that process descriptions should be viewed as resources for action rather than as necessarily valid descriptions of reality. In that spirit and in deference to a limited page count, the paper will bracket discussion of the validity of this model and instead focus on the insights possible from the analysis.

In the case of these restaurants, a particularly important type of dependency is the producer/consumer dependency between activities. These dependencies can be easily identified by noting where one activity produces something that is required by another. These resource flows and the dependencies between activities are shown in Figure 3. For example, the activity of cooking creates food that can then be served and eaten; the customer's departure produces a table ready for busing; and busing and resetting a table produces a table ready for another customer.

This distinction clarifies the role of the information system used. Recall that in Malone and Crowston's (1994) analysis, such a dependency can be managed in one of two ways: either the person performing the first activity can notify the person performing the second that a resource is ready, or the second can monitor the performance of the first. Employees in Southfield can not be easily notified that they can now perform an activity. They must instead spend time monitoring the status of the previous activity. For example, a bused table, ready for a customer, waits until the host or hostess notices it. In Lake Buena Vista, by contrast, the buser can use the system to notify the host or hostess that a table has been bused and is ready. Similarly, the wait staff can monitor the kitchen to notice when an order is ready or, using the system, the kitchen can page the wait staff to notify them that it is. Similar changes can be made throughout the process. The appropriate waiters or waitresses can be paged when customers arrive at their tables; a buser can be paged when the table has been vacated and is waiting to be bused.

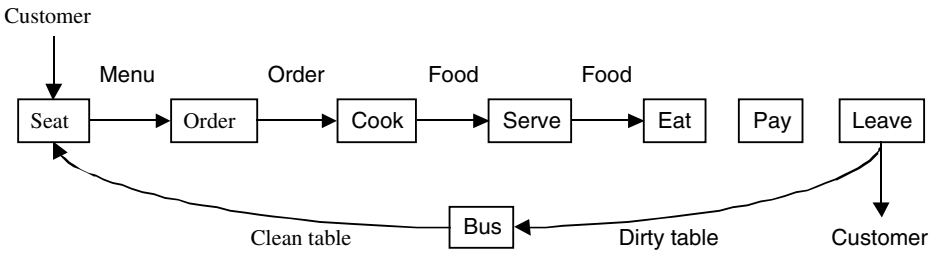


Figure 3. Flow of Resources between Activities and Resulting Dependencies in the Restaurant Service Process

The effect of this change in coordination mechanism is to slightly reduce the interval between successive activities. The change likely comes from increasing the pace at which the restaurant employees work. Since there are many such intervals, the result of the system can be a noticeable decrease in the interval between successive customers or, alternately, a higher number of table turns and increased utilization of the restaurant's tables. (Of course, this analysis assumes that there are a large number of customers waiting to be seated and that these customers are not seeking a leisurely dining experience, both factors that were true of the restaurants studied.)

3.3 Summary

This example demonstrates how examination of the process helps to link phenomena observed at the individual and organizational levels. The changes in individual work include use of an information system to track table status and to communicate between individual employees. The organizational outcomes include reduced waiting time and increased table turns and profitability. The analysis of the process suggests that the system allows individuals to change how they manage precedence dependencies, from noticing to notifying, thus decreasing the interval between activities, and, overall, increasing table turns and profitability for a certain class of restaurant.

4. Recommendations for Process Research and Practice

It was argued above that a focus on processes makes contributions to the study of ICT use and organizations. Overall, it seems reasonable to urge adoption of a process perspective when investigating the many organizational problems that have an ICT component. Five specific recommendations are outlined below for incorporating processes in ICT research and practice.

4.1 Develop Richer Process Analysis and Design Techniques

First, researchers need to develop richer process analysis and design techniques. Analyses of processes must consider the flow of resources, the dependencies created by these flows, and how these dependencies are managed (Crowston and Osborn 1998), not just the sequence of activities. Researchers in these areas might consider how their instruments can be adapted for broader usage.

A more difficult challenge is developing a meta-theory for processes comparable to the well-defined and well-understood set of terms and concepts for variance theories (e.g., construct, variable, proposition, hypothesis, variance, and error) and statistical tools for expressing and testing hypotheses. The framework developed in this paper is but a small first step toward such a meta-theory.

4.2 Use Processes as a Unit of Analysis

Organizational theorists have found it problematic to develop generalizations that hold for entire organizations, reflecting the diversity of activities and micro-climates found in most modern organizations. Mohr (1982) describes organizational structure as "multi-dimensional—too inclusive to have constant meaning and therefore to serve as a good theoretical construct." Processes provide a useful level of analyses to narrow the study of organizational form (Abbott 1992; Mohr 1982). As Crowston (1997, p. 158) states, "to understand how General Motors and Ford are alike or different, researchers might compare their automobile design processes or even more specific subprocesses." Within this finer focus, it may be possible to reach more meaningful conclusions about a range of theoretical concerns (Price and Mueller 1986).

For example, March and Sutton (1997) note the difficulties in studying antecedents of organizational performance due to the instability of this construct. However, it may be meaningful to consider performance at the level of a process. Similarly, it is probably not meaningful to measure the level of centralization or decentralization of an entire organization (Price and Mueller 1986), but such measures may be quite appropriate and meaningful within the context of a single process.

4.3 Develop the Theory of Organizational Processes

More research is necessary to properly establish processes and the various constraints on process assembly as valid theoretical constructs. For example, research methods need to be developed or adapted to operationalize activities, resource flows, and dependencies and to validate models built around these constructs. As well, additional research is needed to characterize the range of possible dependencies and the variety of coordination mechanisms possible and, in general, to document the assembly rules used in organizations. Work already done on work design and agency needs to be adapted to the general process perspective. Most importantly, research is needed to characterize the tradeoffs between different mechanisms. Ultimately, such work may allow some degree of prediction of the performance of a selected configuration of activities.

4.4 Expand to Richer Contexts

Consideration of organizational processes has been used primarily in an applied fashion and, as a result, its use has mostly been restricted to processes in companies, often with the intent of designing a more efficient process, employing fewer workers. Certainly, the belief expressed here is not that this is the only or even most interesting application of these ideas. Therefore, it is recommended that the use of organizational process analysis be expanded to a richer and more complex range of contexts.

4.5 Use Multiple Theories

Cannella and Paetzold (1994) argued that use of multiple theories is a strength of organizational science. Following their argument, the use of a process perspective with complementary theories, resulting in a multi-level and multi-paradigm understanding of the organization, is recommended. One example of this approach is an ongoing study of the use of ICT in the real estate industry (Crowston, Sawyer, and Wigand 1999; Crowston and Wigand 1999; Sawyer, Crowston, and Wigand 1999). To accomplish the objectives of this research, the researchers synthesize several theoretic perspectives to integrate findings from multiple levels of data collection. Specifically, at the individual level, they draw on theories of work redesign and social capital. At the organizational and industrial levels, they apply transaction cost and coordination theory.

6. Conclusion

This paper presented the argument that individual-level research on ICT use can be linked to organization-level research by detailed consideration of the organizational process in which the use is situated. Viewing a process as the way organizations accomplish desired goals and transform inputs into outputs makes the link to organizational outcomes. Viewing processes as ordered collections of activities makes the link to individual work, since individual actors perform these activities. As well, process theories can be a useful milieu for theoretical interplay between interpretive and positivist research paradigms (Schultz and Hatch 1996). An analysis of the process of seating and serving customers in the two restaurants illustrates how changes in individual work affect the process and thus the organizational outcomes.

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