

RECONCEPTUALIZING USERS AS SOCIAL ACTORS IN INFORMATION SYSTEMS RESEARCH¹

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Abstract

A concept of the user is fundamental to much of the research and practice of information systems design, development, and evaluation. User-centered information studies have relied on individualistic cognitive models to carefully examine the criteria that influence the selection of information and communication technologies (ICTs) that

people make. In many ways, these studies have improved our understanding of how a good information resource fits the people who use it. However, research approaches based on an individualistic user concept are limited.

In this paper, we examine the theoretical constructs that shape this user concept and contrast these with alternative views that help to reconceptualize the user as a social actor. Despite pervasive ICT use, social actors are not primarily users of ICTs. Most people who use ICT applications utilize multiple applications, in various roles, and as part of their efforts to produce goods and services while interacting with a variety of other people, and often in multiple social contexts. Moreover, the socially thin user construct limits our understanding of information selection, manipulation, communication, and exchange within complex social contexts. Using analyses from a recent study of online information service use, we develop an institutionalist concept of a social actor whose everyday interactions are infused with ICT use. We then encourage a shift from the user concept to a concept of the social actor in IS research. We suggest that such a shift will sharpen perceptions of how organizational contexts shape ICT-related practices, and at the same time will help researchers more accurately portray the complex and multiple roles that people fulfill while adopting, adapting, and using information systems.

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Introduction

Advancing the research about information and communication technology (ICT) use within organizations requires some theoretical advances in understanding organizations (Orlikowski and Barley 2001) and technology (Orlikowski and Iacono 2001). This kind of research advance requires a complementary advance in our conceptualization of the *user*—the active agent in information system use. The most common conception of the user in IS research is of an atomic individual with well-articulated preferences and the ability to exercise discretion in ICT choice and use, within certain cognitive limits.

The theories that shape this understanding and influence the design and use of ICTs rely primarily on cognitive social psychology and cybernetic models that are contextually underdeveloped, leaving nearly all of the organizational and environmental context outside the model. The user concept these theories construct is not *wrong*, but by focusing on individualism, it provides relatively little detail about the contexts that shape ICT use, and so diminishes the importance of organizational structures and complex social environments. This focus tends to amplify technology specifics and to attenuate the social context, particularly people's relationships with those who have requested information or whom they are trying to persuade with information gathered and packaged through the use of ICTs. Moreover, within the complex social settings that commonly constitute organizations, individuals don't always have the opportunity to choose the systems they would prefer to use. Therefore, when aggregated to predict organization-wide activity, a thinly socialized concept of the user leads to frequent overestimates of ICT use

(Baldwin and Rice 1997; Dutton et al. 1993; Lamb et al. 2003; Libmann 1990; Wilson 1995).

Within several research disciplines related to information systems (IS) studies, there is a growing realization that ICTs, such as online information services, have achieved only limited success as useful information systems, in part because they are based on models that reflect this user concept (Beath and Orlikowski 1994; Grudin 1990; Salzman 1998; Westrup 1997). These thoughtful observations and impassioned critiques have motivated more social awareness and more human-centered design practices, but they do not provide an alternative to the user concept that can be coherently integrated into information systems design. We believe that a theoretically based reconceptualization of the user as a social actor is required to move IS research beyond this impasse.

Recent suggestions for advancing IS research have looked to structuration theory and institutional theory for concepts that can accommodate the complexity of designing ICTs and understanding their use in social settings. However, even researchers who have a richly contextualized conception of users as social actors often write ambiguously about agency and workers, so their conceptions can be readily interpreted as either individualistic *or* social (cf., Orlikowski and Barley 2001; Walsham 2001). To help our peers curb against this tendency, and also to respond to their call for better integration of institutional analysis in IS research, we have begun to model an unambiguously social view of the organization member as a *social actor* by building on the concepts of new institutionalists (DiMaggio and Powell 1991; Scott 1987, 1995) and social constructionists (Giddens 1984; Goffman 1974), as well as the rich descriptions of empirical studies that show how organizational contexts constrain and enable individuals using ICTs. In this paper, we will present our social actor view through a series of critiques and constructions that are based on a multidisciplinary literature review, and are grounded in our own empirical findings. In the following sections, we will examine the theoretical constructs that shape the ICT user concept, and then present some

empirical challenges and theoretical analyses that help to reconceptualize the user as a social actor. We will present key findings from a study of online information service use that characterize four ICT-related dimensions of a social actor. Building on these findings and the theoretical insights they support, we will present a model of the social actor that is fundamentally integrated with ICT use. We will conclude our discussion with an invitation to the IS community to try this reconceptualization—to move beyond user studies by examining the ICT use of social actors.

Challenging the User Concept

The user concept reflected in IS research is grounded in the cybernetic models of Herbert Simon, particularly his ideas of bounded rationality and learning through information feedback and adaptation (Simon 1955). These models describe an atomic individual with well-articulated preferences and the ability to exercise discretion in ICT choice and use, within certain cognitive limits. They also describe how information from objects, the environment, and interactions with other atomic individuals is cognitively processed as feedback to fine-tune the preferences that influence discretion. Within these models, however, information is highly decontextualized.

Over the past two decades, cybernetic models and concepts from cognitive social psychology (Fiske and Taylor 1991) have formed the basis for widely held understandings of individual mental models and communication behaviors involving the use of ICTs. User studies typically seek to inform ICT design by examining how task models, ergonomic factors, and cognitive psychodynamics define the limitations of human interaction with the computer system (Norman 1986; Shneiderman 1987). Theoretically, all humans have the same set of capabilities and limitations, albeit to differing degrees, ranging from novice users to expert users. Studies that seek to understand user satisfaction with information systems and IS services, for example, frequently draw on Simon's decision

theory models of consumer choice that explain the satisficing behaviors of consumers and their coordination through free-market interactions (cf., Malone and Crowston 1990). Studies that seek to understand the ways in which ICTs may affect user behaviors often rely on attribution theory to construct cognitive models that explain people's perceptions and rationales for their subsequent actions (Mishra et al. 1996). By adopting research models that reflect the user concept, researchers implicitly agree to model an artificially constrained set of contextual factors in controlled experimental settings, or to leave context outside the study entirely. Their studies most often take the form of laboratory experiments or surveys that evaluate the task/technology fit of computer systems at the individual use level. Theoretical insights drawn from user studies have been applied extensively in the design of ICTs. The design of online services, for example, has relied heavily on individualistic models to explain the use (and, frequently the *nonuse*) of online products by librarians, research intermediaries and end-users—i.e., people who gather information from online databases for use in their own decision-making and work-related tasks (Bellardo 1985; Borgman 1989; Newby et al. 1991; Nicholas et al. 1988).

Field studies frequently show, however, that ICT use projections based on user studies do not accurately predict use outside laboratory contexts—that user study findings simply don't scale up to the organizational or industry level (Baldwin and Rice 1997; Lamb 1997). Researchers acknowledge that, within the firm, individuals rarely have the opportunity to choose the ICTs they use (Karahanna and Straub 1999). Instead, they select from a set of resources chosen at the organizational level. Although user studies have improved our understanding of how a good information source fits the people who use it, IS field studies indicate that, from an instrumental perspective, the user concept is too narrowly defined.² In this respect, our key criticism of the

²At this point, we wish to emphasize that the discussion that follows does not invalidate user studies as a line of research nor the results of these studies, but calls into question the user *concept*, which these studies have

user concept—that it excludes context—reflects the more general criticism of cognitive social psychology made by Nye and Brower (1996).

STS and CSCW Critiques

A series of studies has strongly challenged the user concept and its exclusion of context from a theoretical perspective, even though it has not provided a concise alternative to the simpler user concept. Building on the early work of human relations theorists and socio-technical design researchers, these studies examine the ways in which ICT designs that are based on the user concept may be inadequate, dehumanizing, or disruptive to cohesive, productive working contexts (Ehn 1988; Nygaard 1986). Mumford's (1995, 2000) socio-technical ETHICS approach was particularly influential among Scandinavian ICT designers in the 1970s, and continues to shape their research methodologies and perspectives, although the popularity of socio-technical studies (STS) approaches has waxed and waned over the decades as economic conditions and labor relationships have evolved throughout the world. STS advocates generally believe that better working conditions will result from some sharing of power and an appreciation of the tacit knowledge and adaptive capabilities that workers contribute to organizational processes. They are keenly aware that structural constraints may prevent this, but they believe that *social actors* are capable of mobilizing change. STS-related initiatives, like the early participatory design movement, have sought to change the structures and technologies of production in ways that will benefit workers as well as managers. They believe that technologies can be constructed to support better quality-of-life work practices, and that these will, as a natural by-product, create more productive **environments**, based on the human relations concept that satisfied workers are productive workers. Participatory design researchers purport that when the workers who are expected to use the ICT under development also take part in its

constructed over time (and which many researchers have assimilated into their studies of organizational IS).

design and implementation, the use context will be more fully reflected in the final system, and workers' tacit knowledge about the task can be brought to bear (Greenbaum and Kyng 1991; Gutwin and Greenberg 1998; Guzdial et al. 2000; Nardi and Miller 1991). Their studies enrich conceptualizations of users by focusing on the cognitive complexity of their tasks and the adaptive nature of situated work. Some have even raised objections to the rational systems view of software development, which supports the user concept, preferring an informatics view that regards "information systems as networks of people" in which each participant interprets the process in his or her own way (Nygaard 1986). Their studies critically examine the fuzzy definition of a user, recognizing that user categories could be based on functional roles or interest groups, and that users can assume more than one role simultaneously. Furthermore, as users extend their knowledge of informatics, performing some of the day-to-day system modification themselves, their roles merge with those of developers.

Many critiques of the user concept made by a group of researchers, loosely categorized as computer supported cooperative work (CSCW) researchers, draw upon this socio-technical foundation, objecting to the largely artificial separation between ICT developers and ICT users. Among those who directly experience the everyday negotiations of information systems development and maintenance, there is a strong sense that user concepts and characterizations are inadequate (Bannon 1991; Grudin 1990; Westrup 1997; Woolgar 1991). Along with other researchers, these authors have noted that users do not hold the same view of themselves that IS analysts do, and they do not like to be referred to as users (Beath and Orlikowski 1994; Grudin 1990; Markus and Benjamin 1996). In fact, users don't think of themselves as *primarily* having anything to do with the computer at all. They see themselves as professionals, working with others, and using computers in support of those **interactions**.³

³One might have expected that as end-users and developers began to share the same tasks, the term user would have disappeared. The very term *end-user* should indicate that the value of the user concept has

The more recent CSCW critiques, referenced above, have adopted an interpretive, constructionist perspective. These rely on theories that take a balanced view of agency and structure, regarding each as one side of the same coin, each constituting the other in critical ways (Giddens 1984). Advocates of this view see *social actors* as participants in the shaping of social structures through their iterative every-day practices, and as capable of initiating change through these very processes (Berger and Luckmann 1967). Social actors **interact** with variously constituted others to form the basis of social institutions and **identities** (Goffman 1959 1974). Technologies, particularly ICTs, are integral to these **interactions** and so shape **identity** and institutions. In use, ICTs are an extension of practice and also a part of structure—having dual effects and creating unintended outcomes.

CSCW researchers who study ICT use within groups and among organizational collaborators agree that the term user paints an inappropriate and somewhat pejorative picture of the people for whom information systems are created, but they are divided on how to remedy the situation. Scholars who recognize the end-user's capacity for innovative uses of ICTs have suggested that one way to tap that wellspring is to provide them with highly configurable systems (von Hippel 1998). However, this approach has been criticized for adhering to the "ICT as a tool" perspective, which also supports the user concept (Westrup 1997). Most CSCW researchers, therefore, have cast their lot with some kind of participatory design solution. When taken into organizations, however, the systems that these approaches produce have met with mixed reviews (Gasson 1999; Kling and Elliott 1994). As developers and users work together on system design, power imbalances frequently prevent users from making a real contribution (Blomberg et al. 1994).

broken down. But, as Westrup (1997) has noted, the ICT designer is also continually constructed in the process of ICT design and use, in large part because system development methodologies are firmly rooted in atomic user concepts, and they strongly reinforce the dichotomy between users and designers.

Challenges from the European Tradition of IS Research

In the North American IS literature, researchers have criticized the treatment of users during information systems development (e.g., Beath and Orlikowski 1994; Markus and Bjørn-Andersen 1987), but they have not challenged the user concept itself. Researchers in the European tradition of IS research have been more confrontational, basing their arguments on many of the theoretical concepts reviewed above, but also examining critical aspects of institutional power in information systems development and implementation. Several organizational IS studies have stressed the need for a larger **environmental** scope when dealing with ICT use, noting that individual ICT use is influenced not only by organizational contexts, but also by interorganizational, cultural, and global contexts (Czarniawska-Joerges 1992; Lamb 1997; Walsham and Sahay 1999). Some European-tradition IS studies echo the concerns of CSCW studies, indicating that a focus on **interactions** (between individuals in groups, among groups within an organization, among groups and individuals performing roles in different organizations, etc.) can better describe the ways in which people come to use ICTs to support their organizational and interorganizational activities. They also emphasize that organization members often fail to use ICTs in expected ways, and frequently reshape technologies to suit their needs (Hirschheim et al. 1996; Kling 1987, 1992; Kraemer et al. 1987; Kumar et al. 1998).

European sociologists have also theorized about technology use in ways that provide important new insights about social actors and their technologies (Castells 1996; Latour 1987; Touraine 1988), and these concepts have begun to guide IS research as well (Tuomi 2001; Woolgar 1991). Castells' ideas connect social actors to the global network society, describing a rich **environment** within which we can view social **interactions**. Actor-network theorists have also given ICTs a central focus in their theorizing about social systems, and have carefully pointed out the differences in stability within the networks they have studied (Callon 1991; Latour 1987; Woolgar 1991). Perhaps the

most important observation by actor-network theory researchers is that *people together with their technologies comprise social networks*. Modern **affiliations** among individuals, groups, and organizations entail the use of ICTs to varying degrees; therefore, all networks can be viewed as heterogeneous socio-technical *actor-networks*. The technical and the social are inseparable, and actor **identities** necessarily reflect this fusion.⁴

Walsham's (2001) recent overview of many of these works has made important connections between the studies. His analyses summarize their insights, highlight the global nature of ICT-related changes, and draw attention to the dramatic **identity** shifts that often accompany these changes. In our view, the most effective of these IS critiques place an emphasis on the intransigence of institutions and the processes of institutionally constrained action, while acknowledging the potential for agent-directed change via ICT design-in-use (e.g., Bikson 1996; Bowker and Star 1994; Ciborra et al. 2000; Kling and Iacono 1984). Their arguments often take root in new institutionalist explanations of organizational change that encompass a more systems-oriented, historically focused understanding of the possibilities for action within social institutions⁵ (cf., Friedland and Alford, 1991; Scott 1987; Tolbert 1985). Institutional IS researchers reject the rational-actor models that shape the user concept.

⁴For an in-depth discussion of network theory interpretations of our social actor concept, see Lamb (2003a).

⁵Scott (1995) defines institutions in this way:

Institutions consist of cognitive, normative, and regulative structures and activities that provide stability and meaning to social behavior. Institutions are transported by various carriers—cultures, structures, and routines—and they operate at multiple levels of jurisdiction (p. 33).

Institutionalization, then, is the process by which an organization develops a distinctive character structure—a set of norms and routines, a way of doing things. Practices can become routinized within one particular firm, or they may become standardized throughout an industry. See the section on theoretical development for further discussion of these concepts.

They focus, instead, on the characteristics of groups, organizations, industries, and societies that cannot be reduced to aggregations or direct consequences of individuals' attributes, preferences, or motives (cf., DiMaggio and Powell 1991). Their studies show that, with respect to the adoption, development and use of technologies, the actions of organizations are shaped by the institutional **environment**. From this perspective, we see that *social actors* are pressured to perform legitimate actions and **interactions** within institutionalized arrangements. ICT-related change happens, but it is not entirely agent-directed. Rather, agency is channeled through a complex, multilevel system of networks and organizational **affiliations** that constitute local and global **environments**.

Although these user-critical STS, CSCW, and European-tradition IS studies have not explicitly provided an alternative model to the user concept, collectively they indicate that a synthesis of theoretical constructs, supported by empirical evidence, may effectively do so. Their literatures vary in focus, but each contributes to a more robust conceptualization of how, why, when, and where people encounter and use ICTs, and to what effect. They differ in the degree of importance they give to agency and structure, but each demands a more concerted examination of *context* when seeking explanations and predictions of ICT use outcomes, and each provides some guidance for context-centered research design.

Research Design and Empirical Results

In order to develop a better understanding of ICT use, and to develop an alternative to the user concept, we designed a study to examine online information services from the perspective of the people who were actually using or not using them. Mindful of the main criticism of the user concept, and guided by the theoretical concepts that have informed its critiques, we focused our qualitative research on the organizational contexts of situated

use. Our methodology and findings are critical components of our overall theory development effort. Therefore, in this section and in the referenced appendices, we will present our research design and empirical results in detail to explicate the data-driven construction of the social actor model that is the main focus of this paper.

Study Design

If context matters, one way to characterize that influence would be to examine the differential use of a single ICT type. We chose to study online information services because, although prior studies concurred that firms varied widely in their online use, this variation was not well understood (Bellardo 1985; Borgman 1989; Newby et al. 1991; Nicholas et al. 1988). In addition, we share an interest and a familiarity with the contexts of online service use.

Between October, 1995, and March, 1997, we examined the use of online services by 26 California firms in three industries: biotechnology/pharmaceuticals, law, and real estate. (See Appendix A for site selection and sampling details.) The firms were all located within two areas of California (Orange County and the San Francisco Bay Area) that each support an active legal practice, a strong real estate market, and a viable biotechnology/pharmaceutical industry.

We had originally intended to select sites from only two industries that each reported high use of online resources: the biotechnology/pharmaceutical industry and the legal industry. According to Scott's (1987) environmental framework, however, this design would restrict our study to two highly institutionalized industries. We had expected the legal services industry to be highly institutionalized. In some respects, law can be considered an institution in itself. The biomedical field, although highly technical, is also highly institutionalized and heavily regulated—from physicians and hospitals to drug manufacturers and biotechnology groups. By including the real estate industry—an industry that is somewhat less institutional, also nontechnical, and not noted for

high use of online services—we ensured that our study organizations would be sampled from a wider variety of industry environments.

Methodology

We gathered data primarily through semi-structured, on-site interviews. As reflected above, our preliminary literature analysis indicated that at least three kinds of theorizing could help to shape a reconceptualization of the user: socio-technical approaches, social-constructionist approaches, and institutionalist approaches. These theories describe institutional relationships, social interactions, and organizational technologies in ways that suggest new possibilities for thinking about the user as a social actor, and we used these concepts to guide collection of data about industry environments and to design our interview instrument. Our questions to informants focused on their firm's use of online resources and print-based media, as well as their own personal contacts. We discussed the information resources they have and use, and we talked with them about how and why they gather information and when they go online. Often, they would demonstrate their use of a particular online service. During these interviews, people consistently mentioned their firms' interactions with outside organizations when they talked about using information, and they often linked changes in their data gathering practices with changes in key interorganizational relationships. Thus, while collecting data on information gathering practices at the individual level, we were able to direct attention toward the interfirm associations that influence the use of online services. (See Appendix B for a sample interview instrument.)

Throughout the study, we used a theoretical data sampling approach to guide our selection of study sites and to refine our inquiry instruments (Glaser and Strauss 1967). This method combines concurrent qualitative analysis with ongoing data collection. We followed that analysis with several rounds of coding and thematic analysis at four different levels to firmly ground our development of an alternative to the user concept in the empiri-

cal data. Where we had conducted interviews with more than one informant at a firm, we compared and contrasted transcribed interview data at the individual level. Where we had conducted more than one industry firm study in an area, we analyzed interview transcriptions and developed themes at the firm level. We also supplemented our code analysis with data reduction through site summaries (Miles and Huberman 1994). We then compared and contrasted the data categories that had emerged within each industry and refined our thematic analysis by performing a cross-industry comparison of the qualitative categories that characterize these sites, these informants, their activities, and their use of online information resources. (See Appendix C for further discussion of this approach, including thematic coding structure details.)

Findings

Our thematic analysis of the interview data provided a rich set of findings to inform an alternative view of the ICT user as a *social actor* characterized by four main dimensions: affiliations, environments, interactions, and identities.⁶

Affiliations

We found that online service use practices are strongly shaped by the organization-level relationships of the firm. These *affiliations* may be engaged in by the firm or by members of the firm acting in their organizational roles; they may also be established by professional individuals on their own behalf and supported by their current organization. Affiliations comprise networks of relationships that link organizations and individuals within and across industries. Within this network of

relationships, the use of online databases by organization members is best explained from a perspective that understands these ICTs as *interaction technologies*. Organization members, like attorneys, commercial real estate brokers or members of biotechnology companies, use online services to exchange information and interact with affiliated organizations, such as clients or regulators, in ways that are considered legitimate within the industry. A commercial real estate brokerage, for example, may compile a three-inch thick report to support a pension fund client's property investment by combining online information with print-based reports and proprietary data analyses. Its pension and investment fund clients routinely demand more supporting data for real estate investments than individual investors require. Brokers understand that the data gathering and packaging processes they follow for fund and trust investments are intended to meet the fiduciary requirements of the investor and to minimize financial risk, as this broker explains:

[Pension fund clients] need to have demographics. They need to have lots of [comparative data.] They need to have projected earnings. A lot more homework is done, and rightfully so, especially if it's a pension fund or a life insurance company or a publicly traded REIT, in that those types of owners are using other people's money. Either as a public shareholder, or if you own life insurance, and you pay your monthly fee to the life insurance company, that's your money. If you're in a pension fund, obviously that's your money. It's the little man's money that they're investing. So they have to be very, very careful. [Affiliations: client demands]⁷

Real estate brokerages that service fund and trust clients reported using much more online information than other brokerages. They had also devel-

⁶These dimensions emerged from the data as described above and in the appendices, but they also resonate strongly with recurrent themes in the user-critical literatures we cited earlier. (See the bolded terms throughout the previous section.) We will bring these two sources together in the next section to develop an alternative to the user concept.

⁷The labels that follow each direct quotation will be used in the next section to link these empirical data points to theoretical concepts that support the social actor model, and to exemplify specific characteristics of a social actor.

oped sophisticated data gathering and management practices to support the information intensive activities of brokers and researchers throughout the firm. In the biotechnology industry, firms that interacted directly with regulators, such as the U.S. Food and Drug Administration (FDA), also reported using much more online data than firms that dealt with such agencies only indirectly. Much of the associated online activity involves submitting application packages for new drug approvals, but even after approval, the affiliation with the FDA continues to drive the use of online services, as this researcher describes:

There is a lot of information generated because of the regulatory agencies who need to be kept up to date that now that the product is marketed, it remains safe and effective. [We search online] regularly. With a new product, every quarter. And then every half year. And then after that every year. And every year thereafter. You have to do what we call periodic filings with the FDA. And we search the literature very thoroughly on set dates and forward that on through [our Regulatory Department] who sends it on to the FDA with reports. [Affiliations: load shifting arrangements]

Officially, the responsibility for oversight belongs to the regulator and the underwriter, but, as the examples show, these organizations effectively shift the oversight-related data gathering workload onto biotechnology companies and investors (who then shift it to brokers), by the nature of their affiliations with these firms. The nature of the affiliation with a regulator or a client is important. When a large pension fund client decides that it wants to work with only one broker at a firm, instead of three or four—no matter how many properties the client holds or in which geographic territories those properties are located—that can spur changes in other relationships that are fundamental to brokers. Providing “full service” requires making an exception to traditional territorial arrangements:

Commercial brokerage firms are very geographic and have territory. What we

have is Orange County. That’s our territory....Orange County primarily. I say that with a footnote because a lot of our brokers, especially investment brokers, have clients that have holdings all over. And of course they’re going to use the same person, so that’s a big exception. [Affiliations: full service]

Law firms have also had to provide full service in order to retain their biggest clients. For some, this has meant finding better ways to share information within the firm. For others, it has meant attracting attorneys who specialize in new practice areas, and then supporting their ICT needs. When a Bay Area law firm took in a group of lawyers who had been downsized out of their biotechnology firm jobs, the firm’s data gathering practices shifted accordingly, as this librarian reflects:

We [now] have a very healthy biotech segment of our clientele. I mean I can tell just from the kind of work that we have to do in the library that takes us over to the medical school library a lot more than it used to. Biomedical devices is a very large part of our practice, and we have an FDA practice now. [Affiliations: changing jobs]

This new FDA practice provides more services for biotechnology clients who choose not to interact directly with the FDA. The attorneys in this new specialization can fulfill the data gathering mandates of the FDA for law firm clients that do not have the infrastructure to manage this themselves or who do not have the capacity to manage another clinical trial in-house. Realtors and brokers change their brokerage affiliation, perhaps even more frequently than other professionals. Our informants mentioned that such changes are often the source of new client affiliations and new information practices within brokerages.

Environments

Data from this study emphasize that, when seeking to understand ICT use and ICT users, it is

critical to examine the network of relationships that call for the exchange of information and the use of ICTs. Those relationships take shape within particular industry environments that define standard and legitimate practices of communication and exchange for its member organizations. Therefore, our data-driven definition of an *environment*, in which we would find organization members using ICTs, is the stabilized, regulated, and/or institutionalized practices, associations, and locations that circumscribe organizational action. As we have shown, national and international financial and fiduciary standards strongly influence the information gathering and related ICT use practices of real estate brokers. Regulatory and fiduciary demands for extensive documentation and the increasing availability of information in electronic form seem to be pushing brokers to compile ever more sophisticated information packages for key clients, as this broker suggests:

I would say [our information packages are] somewhat more sophisticated. There'll be just a little bit more thoroughness to a package that's going to be presented to a client. But there again, a lot of it just really depends on who that client is. If it is a [pension fund] client, they are very much looking to have that big, thick package to go back to their boss and say, "Gee, I did a great job. Look at all this work that I've reviewed." And so, in that sense they're more thorough and they're better quality. And they're a little bit more timely. The information is more timely. I would say that's probably the biggest thing that the data revolution has brought, is that the information is that much more timely. [Environments: global financial/fiduciary practices]

The informational demands of banking and regulatory agencies shape the use of ICTs within an organizational field, as do industry competitors and the efficiency dynamics of globalization. Several commercial brokers reported feeling that they must have an impressive Web presence to

display their overall competence, mainly because their competitors are on the Web. However, ICTs like the Web can be a double-edged sword for this group. The Web can help brokers and realtors advertise their properties and reach more potential clients, but at the same time it threatens their livelihood by "giving away" property information that has belonged exclusively to the broker community (see the MLS discussion, below). One informant believes this is part of an overall trend in the commercial real estate industry toward greater efficiencies and fewer survivors:

I think that there are fewer commercial real estate brokers now than there were, I'm sure, 10 years ago. And there will probably be fewer in 10 years going forward. That's that efficiency thing, I guess. I mean there are fewer bankers, there are fewer of all of us, and we're working harder. Isn't it great? [Environments: industry or organizational field]

The need to manage bigger information packages and multiple property transactions across broker territories, combined with the need to compete more aggressively in local markets, has influenced one commercial brokerage in the study to develop a sophisticated set of proprietary software tools for its brokers. By investing in such ICTs, brokerage firms expect to expand their services in ways that will help their brokers attract and maintain large pension fund and investment trust clients.

Law firms that want to handle high-stakes class-action lawsuits must also make a concerted investment in informational infrastructure to coordinate expert testimony, corporate regulatory filings, and plaintiff profiles. The data gathered for a multi-plaintiff tort case, for example, produces a mountain of paperwork that could rival a biotech company's new drug application (NDA) filing in volume (see the NDA discussion below). All this data must be logged and classified. Data entry clerks must be hired and provided with adequately resourced facilities to do their work. A records manager must also coordinate with the trial attorneys to make sure they know about the deposition data and expert reports and have an

adequate knowledge of case-related issues, as this IS director explains:

You can see with large litigation cases... in order to manage the documents, you need to have some systems in place.... One of the things that we have for these large cases, is...another office in [central California] which is lower rent, and we handle the complaints there. So we have about 50 paralegals that are out in [central California], and they just handle all of those files, and all of the complaints, and track them and everything else...some of them then go to trial, and we have to get our trial team together. And so you have to manage a lot of people in these trial teams. And you have to have these attorneys educated, if its a medical issue, on the medical issues, so that they can go to court and handle that type of situation. [Environments: organizational ICT investment]

Some organizations have made ICT investments at the industry level, as well as the firm level. In our study, we found that the level of infrastructural richness within an industry greatly affected the use of ICTs by industry organizations. Generally speaking, if the industry information infrastructure was online, firms reported more online use. For example, in the U.S., both commercial and residential real estate brokerages have pooled their property information in multiple listings services (MLS), maintained by third-party providers for exclusive use by brokers and realtors within a geographic region. As one broker indicated, this kind of information cartel became an enormous asset to participants:

Its been my experience 5 years ago even 10 years ago or 20 years ago, this thing called the MLS, the multiple listing service, was one of the most highly and closely held secrets [of the industry.] Real estate agents had access. Nobody else. There was no such thing as you being able to find out anything about property. [Environments: infrastructural richness]

Originally the MLS was a printed booklet, but eventually it went online with broker listings and county recorded data. Brokers report that they use the online MLS at least daily, and often hourly. Lawyers can also rely upon a rich industry infrastructure. Legal data has been compiled and offered online through third-party vendors such as Westlaw and LEXIS since the 1970s, and public taxes have built a network of law libraries that provide free access to primarily print-based materials, but also offer fee-based access to online information.

Interactions

Within organizational environments, *interactions* consist of packages of information, resources, and media of exchange that organization members mobilize to engage with members of affiliated organizations. The interactions of attorneys, real estate brokers, and biotechnology firm members are shaped by industry environments and by the nature of their firms' affiliations. Client relationships, interorganizational networks, and information infrastructures both constrain and enable organization members. Clearly, client demands exert a major influence on data gathering practices and the ways that people use ICTs. Pension fund clients require more documentary forms of communication and investment decision justification. Regulators rely on documentation from the firms they regulate to provide evidence of compliance. Interactions between organization members and their counterparts in regulatory agencies or financial underwriting firms often involve the exchange of large documentary data sets. The sheer volume of data can make these interactions fundamentally different from other types of communication, as this biotechnology scientist pointed out when describing interactions with the FDA while developing a new drug:

Every single protocol is filed with the FDA....At the end you'd file what's called an NDA, which is a new drug application. That NDA contains everything that you've ever done on that particular drug. So it can be 300 volumes of stuff. It

goes by truck sometimes to Washington.
[Interactions: documentation]

In real estate, the information package is substantially smaller (perhaps *only* three-inches thick), but no less important. Package contents vary from property to property, and from investor to investor, but most brokers present potential buyers of commercial properties with a package that contains a standard set of data that can be used to profile a property in a way that allows for a comparison against competing properties and other competing investment opportunities.

If there's an individual buyer, he may have a different motive than a [pension fund] buyer, but from the standpoint of packaging the information, we're going to package it pretty much the same because you need to compare one real estate investment with another real estate investment and make sure that you're comparing apples with apples. And there's a lot of unwritten rules that are predominant in the industry to ensure that everybody is viewing an investment in somewhat the same manner. [Interactions: making information actionable]

These standardized packages make information actionable, and their construction often involves the use of an array of analysis and presentation software by brokers and their support staff. Getting all these software tools to work together and to produce an impressive information package is not an easy task. Firm members must frequently exercise a great deal of ingenuity to transport data from one format to another, so that it can be graphically displayed or econometrically modeled. So, although an organization member may not often have an opportunity to exercise much discretion in selecting the information resource, she plays an essential role in making the chosen resource work for her firm. This regulatory director explains that, contrary to sanitized stories about how ICTs are used, in biotechnology firms, users are continually challenged to redesign the organizationally chosen toolset in use:

Well, it would sound from listening to me like it was consistent and we did it in the same way every time. Don't believe it. There are always little wrinkles and of course, as technology advances, [there are] different ways to gather data. [There are] different ways to format it, to assemble it, to disassemble it, to review it. That is an additional part of the challenge. [Interactions: design in use]

Organization members, like those in this biotechnology company, continually develop, modify, and communicate effective data gathering and data management practices. In these cameo depictions, we see that they act primarily as firm members, performing specific and sometimes multiple roles while interacting with affiliates on behalf of the firm. Their actions are socially embedded and highly constrained by decisions made at the organizational level, including which clients the organization will serve. Their interactions take on only the limited number of forms that are deemed legitimate within the industry. As a firm member, there are prescribed ways in which one can interact with others. For example, when asked about the ways in which physicians might be recruited to perform clinical trials for her biotechnology firm, this researcher explained that those interactions must be face-to-face:

Researcher: So you do [online] literature searches first sometimes. And then you'll identify some physicians that you think might be able to answer a lot of the questions.... You meet with those people.

Interviewer: Now, will you go to see them? Will they come to see you?

Researcher: Usually we go to see them because if you're thinking about doing future clinical trials, what you also want to do is start evaluating these people as potential investigators.

Interviewer: Would you ever ask someone to be in a clinical trial that you didn't go and meet?

Researcher: No, you cannot do that. It's a regulation that you have to go see them and they have to meet this way
[Interactions: organization members]

move this one billion dollar portfolio for you." [Otherwise] they just won't even listen. I mean the competition becomes—it's a select few people that can do that.
[Identities: multilevel identities]

Identities

While using ICTs to obtain, package, and exchange information, organization members are simultaneously constructing *identities*—for their firm, for themselves, for their competitors, and for their clients. These identities constitute much of the content that ICT use entails. They take shape in avowed presentations of the “self” as an individual or as a collective entity, and also in profiles that others construct to ascribe particular qualities and propensities to a range of individual and collective entities, such as project directors or departments of the firm. When presenting property material to a client, for example, brokers frequently utilize sophisticated multimedia technologies. Both the package and its presentation signal brokerage firm competence. Brokers believe that these communicate a sense of technological mastery that is becoming more and more important to their clients:

The packages have to be fancier. They have to have more color graphics, aerial photographs, more bells and whistles. It takes a lot more to do the same project. In fact, we've really had to gear up and retrain so that we can do really dazzling packages. The guys can't compete with a package that would have been suitable last year or two years or three years ago.
[Identities: presentation]

As a firm member, the broker will share in this organizationally competent identity. Additionally, a broker will profile herself to the client, to show what she has personally done with other properties and for other clients. Before she can do that impressively, however, she needs to build a track record:

You have to have an awesome resume to go into an AllState and say, “I can

Profiling—the construction of informational vignettes that characterize particular aspects of a firm or an individual—was reported to be one of the most common uses of online services in all industries of the study. Members of biotechnology firms report that they frequently profile their potential partners or competitors by scouring online databases for information about patents, acquisitions, product sales, and corporate officer biographies. Real estate informants report that they profile properties, markets, themselves, their firms, and also their clients. Some profiles are constructed to get a quick snapshot of a firm or individual. When encountering a client for the first time, a broker might have his research group perform cursory credit checks and database searches to see if the potential client is a “real player” or just “wasting his time.” Attorneys also profile clients, judges, and expert witnesses. A lawyer will carefully research the experts she plans to call, but, before the trial, she can only make an educated guess about who the other side might call. When, during a trial, the names of the adversary's expert witnesses are eventually revealed, a law firm with a well-resourced information infrastructure can quickly profile those witnesses and provide that information to its attorneys on the case, just in time, as this librarian relates:

I actually did a really interesting case with one of those, where the case was ongoing in a different part of the state. And I went every end of the day—luckily court tends to wind up about 4:00 or 4:30 so they could still get a hold of me—and they'd tell me who the defense was going to call the next day. And I would work that evening to pull up information about them, and fax it to our attorney so that when they went into court the next morning, they were prepared to talk to this person....[This] was a securities

case, and we were looking that these people were still actively involved in the securities industry. [Identities: profiling]

Profiling is also a means of controlling identity perceptions about one's self. A firm may be concerned with its own organizational identity, especially if it is a national or international organization. It may profile itself, as one national real estate brokerage does, to evaluate its overall strengths and weaknesses:

[This company] has done a lot of research on this just by looking at our own [databases]...[The company] is constantly looking. At our corporate office, they know every single deal that's been done by every office in the country. They're constantly combing through that data to see what can they find, and to learn about who is our target. Know what markets you really excel in and know what markets you're wasting your time and your effort and your money in going after. Because there are a lot of different segments to the real estate markets. And some of them [this company] is set up to perform really well in, and some we aren't. We keep stubbing our toe. [Identities: self-monitoring]

When perceived technological competency enhances the identities of brokers and their brokerage, data gathering practices and presentation skills can migrate, and roles can change within the firm. At one commercial brokerage in our study, new brokers are purposefully exposed to information resources as part of their first year of professional training. During that time, they actually act as research assistants. This hybrid state is only temporary, but it helps new brokers in the firm acquire the data gathering and information presentation skills they will need to bring clients into the firm. In the legal industry, hybrid roles are more prevalent and more permanent. Intellectual property firms, for example, hire lawyers with technical training and bachelor of science degrees in addition to their juris doctor degrees, because this is a prerequisite for creden-

tials that those attorneys must hold to practice patent law. Law librarians may also acquire hybrid skills. At least one in our study has practiced law, and her experience can be very helpful to firm attorneys who know how to utilize it:

I think there are a number of law librarians who have law degrees. I think that my firm utilizes my law degree, and a lot of law firms don't. Or they don't recognize the value of it. And I did practice law for a couple of years before coming here. So particularly my litigation experience, working with clients, I think allows me to anticipate and understand and be able to participate with an attorney in that particular mode better than people that have not. [Identities: hybrid]

Hybrid training helps people transition up the career ladder, and it also aids those on the upper rungs. Interestingly, the same training system that upskills new commercial real estate brokers also helps older brokers, who have neither the time nor the inclination to acquire new data gathering or high-tech presentation skills, remain productive because the trainees provide research services to established brokers, as this research director explains:

[The training system is] a big asset to these guys also, because if I'm a 55-year-old broker, I probably don't know anything. I've heard of Windows, but that's all. And it gives these [trainees] a much greater asset in marketing themselves to a broker. If you don't ever want to touch a computer, then you'd better have a [trainee]. And that's a young guy who knows all the systems. So it works out pretty well that way. [Identities: expert/novice]

The older broker benefits from this relationship, and the novice broker acquires valuable professional knowledge by being apprenticed to the expert broker. Broker teams like these mix the novice/expert–expert/novice identities of younger and older brokers in a way that benefits the brokers and their firm.

Summary

The foregoing examples provide a socially rich view of the user of online services. They help us see how ICTs are used, when they are used, who uses them, and why. They make it less clear, however, where to draw a boundary around the user. The user is enmeshed by a network of relationships that mobilize the exchange of information and the use of ICTs. These interorganizational networks take shape within and extend beyond particular industry environments. The interactions that organization members engage in are shaped by these environments and by the nature of interfirm affiliations. When ICTs are used as part of those interactions—to package, present, and exchange information—they also construct identities for firms and their members.

Theoretical Development

Our analysis suggests that organizational ICT users are better understood as organization members whose ICT-related actions can be characterized along four interdependent dimensions that emerge from our findings: affiliations, environments, interactions, and identities. Although no existing models neatly depict organization members in terms of these broad themes, Scott's (1995) synthesis of institutional theory concepts provides a good basis for understanding organization members who use ICTs as *social actors*. His synthesis does not contain a social actor model to contrast against the ICT user, but it does relate actors situated at multiple levels to other actors, locations, social processes, and technologies. From this basis, we can reexamine each of our four analytical themes to construct a theoretically supported model of a social actor (see Table 1).

Affiliations

Our data exemplify how social actor relationships are shaped by networks of organizational and professional affiliations [Affiliations: client

demands].⁸ The set of affiliations that connects an organization member to industry, national, and international networks characterizes a critical dimension of a *contextualized* social actor. When a commercial real estate firm takes on a pension fund client, for example, that new affiliation brings with it particular expectations for service. Normative institutionalist concepts that highlight prescriptive practices and obligatory behaviors help to show how such networks of clients, professionals, and industry firms structure an organizational field at national and even global levels through interfirm relationships. Practices that become routinized within one particular firm may become standardized throughout an industry. The concept of isomorphism characterizes how organizations come to adopt similar market approaches, how they develop industry standards, and how they define legitimate forms of interaction. DiMaggio and Powell (1991) describe two types of isomorphism: competitive and institutional. Competitive isomorphic pressures are market-related and tend to push organizations toward improving efficiency or toward better marshalling of scarce resources. Institutional isomorphic pressures come from other organizations in the industry environment. These may be regulative (e.g., coercive, legally imposed restrictions that regulate the sale of drugs), cognitive (e.g., mimetic imitation of practices developed by leading industry organizations), or normative (e.g., codes of conduct associated with industry professionals) depending on the affiliation or relationship that is established. These relationships are dynamic and their related informational exchanges change with “flows” of capital, labor, and other resources [Affiliations: load shifting arrangements]. In many cases, obligatory practices like information gathering for government agencies such as the FDA may also be carried through networked social structures along with capital exchanges from one organization to another, exerting regulative isomorphic pressures.

⁸The labels in this section refer back to the empirical data points of the previous section. Each label links one or more theoretical concept to an exemplary data point and to a specific characteristic in the social actor model (see Table 1).

As relationships change, interaction practices migrate within and across organizations [Affiliations: changing jobs]. This can happen via load shifting arrangements, through the proliferation of a professional culture such as that of certified public accountants or people holding an MBA degree, or as people within an industry change their employment affiliations from one firm to another. Mimetic and normative isomorphic pressures can precipitate the adoption of practices, particularly if new organization members already have such skills. For example, when the competition gets tough, real estate brokers feel they must imitate the sophisticated, ICT-enabled presentation formats of the leading brokerage firms to signal a high level of competence. To support the intuition-based decisions of a savvy pension fund investor, brokers must compile a set of quantitative analyses that accounting professionals will consider adequate to justify a multimillion dollar loan package—and they need a skilled research staff on hand who can do this.

Affiliations are multilevel, multivalent, and multi-network [Affiliations: full service]. A firm's relationship with a transnational client to whom it sells investment properties may be simultaneously local, regional, national, and global. The interfirm relationships that support this complex relationship may cross departmental and organizational boundaries, and require legitimization within the norms and values of very different professional and regional cultures. Practices become institutionalized across organizations through isomorphic pressures. When industry practices become standardized, social actors may be severely constrained in the kinds of interactions they may initiate and the kinds of ICTs they might use. However, firms may be pressured through a number of different affiliations to use or not use ICTs in their interactions with other organizations. Organization members are simultaneously influenced in different ways to use ICTs because they belong to multiple, somewhat overlapping, networks, where professionals, regulators, and others may differ in their views of what is legitimate.

These affiliation-related findings emphasize that when we speak about an organizational ICT user,

we are really talking about a social actor who is an organization member, *representing* the interests of the organization or subunit (*and* her own interests) in the exchange of various forms of capital, and who uses ICTs to facilitate these exchanges and to service these affiliations. Her focal relationships are work-related affiliations, between realtor and client, for example, where the primary objective is to sell property to the pension fund. These affiliations are more important than how the social actor relates to the ICTs she is using: the use of an online resource like DIALOG or Nexis is instrumental to that primary relationship. As organization members, social actors seek to communicate with others in socially legitimated ways, and often through networked ICTs. Thus, we would expect that their selection of ICTs in this setting would be more strongly influenced by institutional norms than by personal preferences.

However, much of what we know about online use, and about the use of other ICTs, has been gleaned from studies that, guided by the user concept, focus on personal preferences rather than networked organizational affiliations. Even studies that examine organizationally mandated ICT use practices and contrast their results with studies of voluntary use practices (e.g., Karahanna and Straub 1999; Orlikowski 1996) constrain their examination of possible influences to inside-the-firm contexts. An institutionalist reading of our findings suggests that what needs further study are the ways in which different types of affiliations can affect the use of ICTs and ICT-enabled interactions more generally. While this may seem to be a daunting task, a focus on isomorphic influences, and attention to the flows of capital and other resources, can help to structure a systematic examination of social actor affiliations and related ICT use.

The foregoing analysis provides a theoretical basis for developing a model of the user as a social actor (see Table 1). As a first step, we have distinctly listed the four characteristics of social actor affiliations, noted above, that shape and are shaped through ICT use, and identified these as one dimension of a social actor. Clearly, these characteristics are *not* isolated attributions.

Table 1. Multidimensional View of a Social Actor

Social Actor Dimensions	Characteristics and Behaviors of Connected and Situated Individuals	Empirical Examples in the Study Data Presentation
Affiliations (Definition: organizational and professional relationships that connect an organization member to industry, national and international networks)	Social actor relationships are shaped by networks of organizational affiliations	Affiliations: client demands
	Relationships are dynamic, and related informational exchanges change with flows of capital, labor, and other resources	Affiliations: load shifting arrangements
	Relationships are multilevel, multivalent, multi-network (i.e., global/local, local/global, group, organization, intergroup, interorganization, culture)	Affiliations: full service
	As relationships change, interaction practices migrate within and across organizations	Affiliations: changing jobs
Environments (Definition: stabilized, regulated and/or institutionalized practices, associations, and locations that circumscribe organizational action)	Organizational environments exert technical and institutional pressures on firms and their members	Environments: global financial/fiduciary practices
	Environmental dynamics vary among industries	Environments: industry or organizational field
	ICTs are part of the organizational environment	Environments: organizational ICT investment
	ICTs are part of the industry, national, and/or global environment	Environments: infrastructural richness
Interactions (Definition: information, resources, and media of exchange that organization members mobilize as they engage with members of affiliated organizations)	Organization members seek to communicate in legitimate ways	Interactions: documentation
	Organization members build, design, and develop interactions that facilitate flow changes	Interactions: making information actionable
	ICTs become part of the interaction process, (interaction technologies) as people transform and embed available informational resources into connections and interactions	Interactions: design in use
	As organization members, people perform socially embedded (role-based), highly specified actions on behalf of the organization	Interactions: organization members
Identities (Definition: avowed presentations of the self and ascribed profiles of organization members as individual and collective entities)	Social actor identities have an ICT use component	Identities: presentation
	ICT-enhanced networks heighten ethnic and multiple other identities (global and/or local tension)	Identities: multilevel identities Identities: expert/novice
	ICT-enhanced connections among organization members transcend roles (project-based)	Identities: hybrid
	Social actors use ICTs to construct identities and control perceptions	Identities: profiling Identities: self-monitoring

Our data and theorizing show that these are deeply implicated in the characteristics of other dimensions of a social actor. Affiliations form the networks through which isomorphic pressures are carried. They constitute the social structures upon which organizational environments take shape, and they are a focus for organization member interactions. It can be helpful, however, to construct *affiliations* as a key dimension in ICT use. With this emphasis, social actor relationships become primary, and ICT use can be seen more clearly as supportive (i.e., a well-socialized actor does not have primary relationships with ICTs).

Environments

Multilevel systems of networks and organizational affiliations form the backbone of the organizational environments that exert technical and institutional pressures on firms and their members [Environments: global financial/fiduciary practices]. Where financial regulations can be enforced, more information will be gathered to assess the risk of a property investment, for example. Regulative concepts explain how institutions constrain and standardize behaviors through industry standards, government oversight, internationally sanctioned monetary practices, technical standards, and market regulations. As noted, all organizations face varying degrees of technical and institutional demands (e.g., isomorphic pressures) from their environments. Scott (1987) has categorized industries as being more strongly or weakly influenced by these demands. In prior analyses of our study data, we used Scott's classification to help explain why some firms find online technologies essential, while others use them very little, or not at all (Lamb et al. 2003). We found that in industries with high institutional pressures, firms produced more documentation, and so used online services more intensively. In industries with high technical pressures, firms performed more profiling activities, and used more online services for that purpose.

Despite such general influences, however, environmental dynamics vary greatly among industries [Environments: industry or organizational field].

For example, although real estate brokers are relatively unregulated, their pension fund clients can exert additional pressures on them to increase internal efficiencies, and to use ICTs in investor-community approved ways. In fact, there are as many differences among firms within an industry as there are between firms in different industries. Much of that variation has to do with the set of influences that come from the inter-organizational relationships of the firm. Industry organizations are more or less motivated to gather data and use information resources depending on the clients they serve or wish to attract. Thus, client relationships have a very strong impact on data gathering practices and the use of information resources. Firms that work very closely with institutions, such as federal regulators, report gathering more data overall than firms that do not interact with regulators as intensively. And, when firms partner with one another, they may shift the responsibilities for gathering data across organizational boundaries. These regulated or routine practices of communication and exchange with network associates constitute the informational environments within which organization members interact.

As the examples from our study show, the use of online information is embedded in communications among organizations. Those communications are shaped by industry institutions, they have a certain legitimacy, and they follow particular conventions, including the use of ICTs. Through routine use, ICTs become part of the organizational environment [Environments: organizational ICT investment]. Firms must invest in new ICTs, such as a sophisticated legal document management system, to maintain a viable environment, unless such resources are provided in another manner. In some cases, ICTs are part of the industry, national, or global environment [Environments: infrastructural richness], mitigating the investment costs of individual firms. In the U.S., for example, real estate firms have pooled their resources to support the development of critical information infrastructures: the regional MLS.

While discussing our environmentally related findings, we have shifted our attention to the

organization as a legal entity or the industry as an assemblage of collective actors. Scott's (1987) multilevel synthesis of institutional theory enables us to shift our view within this overarching framework to examine different aspects of social actor behaviors and characteristics—to transcend levels and to look at collective action as well as situated individual action—without departing from the basic theoretical constructs. Affiliations are not all of the same type. They are influenced by contexts we call environments and vice versa. Although these two social actor dimensions deeply interpenetrate one another, we are able to tease out different aspects by examining them from both normative and regulative institutional perspectives. Our use of this analytical perspective shows where the views complement each other, providing a richer understanding of the ways in which ICT use is constrained and enabled within informational environments.

In our characterizations of informational environments (Lamb et al. 2003), we have focused on the choices that *organizations* make about using information and information resources. Our examples show that information does not flow freely within and among organizations; it is pushed, pulled, created, packaged, and presented by people in one organization to members of other organizations. People respond to technical and institutional pressures in their local environments, make constrained choices about gathering data and using information resources, and coordinate with individuals in their own firm and other firms to accomplish their assigned tasks. In retrospect, we can see that this view would have provided more realistic estimates of online resource use throughout the pre-Web era. We believe that this environmental understanding, when integrated into a social actor model, can more accurately predict the use of current and new ICTs.⁹

As a second step in developing our model (see Table 1), we have identified the four ICT-related characteristics of informational environments,

highlighted above, as another dimension of a social actor. Again, these characteristics are *not* isolated contextual attributions, but are multiply associated with the characteristics of other dimensions of a social actor. Informational environments both constrain and enable organization members' ICT use through institutionalized norms and routines, as well as organizationally acceptable processes for change and strategies for fair competitive growth. Environments shape ICT use by aggregate social actors (i.e., the organization as a legal entity or the industry as a collective set of actors). This dimension can help IS researchers focus on the regulative influences of industry standards, monetary practices, and government oversight on ICT shaping and organizational ICT adoption practices (aggregate level) and illustrates how these are carried through social structures and cultures (e.g., regulatory mandates, industry associations, and infrastructures) to constrain the ICT choices of organization members (individual level) in their daily interactions with affiliates.

Interactions

When people engage in interactions with clients, regulators, partners, and others, they are enacting their firm's affiliations within constrained environments, and their ICTs as interaction technologies are a fundamental part of these communications and exchanges. Whether as a connected and situated individual or a larger group, the social actor may be simultaneously representing that self, additional local groups, the larger organization, or even the entire industry, depending on which affiliations pertain. As organization members, people routinely perform socially embedded (role-based), highly specified actions on behalf of the firm [Interactions: organization members], and they seek to communicate in legitimate ways [Interactions: documentation]. Regulative institutional concepts, which give primary emphasis to the role of oversight, mandates, coercion, and sanctions to establish and maintain formal and informal systems of behavior, can improve our understanding of ICT use in certain interactions. Consider the ways legal regulations shape the use

⁹This speculation is currently being tested (Lamb 1999). See the next section for more details.

of ICTs in the compilation of FDA submissions, and the ways they restrict the interactions in which biotechnology researchers can engage, such as the face-to-face recruiting of physicians for clinical trials.

However, normative and cognitive institutionalist concepts explain many other interesting phenomena associated with ICT-enabled interaction, particularly with respect to organizational and industry interactions.

At the intermediate levels, individuals operate within particular social arenas, such as educational, work and family settings which carry with them many codified cultural rules and social routines. And in everyday interaction, at the microlevel, individuals appropriate and employ these broader cultural frameworks but also improvise and invent new understandings and interpretations that guide their daily activities. Individuals are not simply constrained but informed and empowered by these preexisting knowledge and rule systems (Scott 1995, p. 51).

In other words, although they seek to communicate in institutionally proscribed ways, organization members often find the need to reshape available resources to accomplish that goal—to build, design, develop, and modify interactions to facilitate flow changes [Interactions: making information actionable]. When brokers create an information package that profiles a property so that it can be compared to other investments, such as a stock purchase or a commodity trade, they are reshaping an informational resource in ways that facilitate the flow of investment capital.

Organization members are also commonly called on to improvise—to draw upon their tacit and explicit knowledge to effectively deploy new ICTs on behalf of their firm or to cobble together effective assemblages of existing technologies that will support new interactions. They rely upon organizational norms, professional codes of conduct, and ways of working in particular com-

munities of practice to construct ICT-enabled interactions (Giddens 1984; Goffman 1974). ICTs are shaped by and also shape interactions within organizational contexts, as well as the kinds of practices that may proliferate through interactions with affiliates. In this way, ICTs become part of the interaction process (i.e., interaction technologies) as people transform and embed available informational resources into connections and interactions [Interactions: design in use].

We know that ICTs are increasingly part of organizational interactions, enabling in some ways, constraining in other ways. However, some researchers go further, suggesting that ICT-enabled interactions engender fundamental changes in affiliations, encouraging a shift from traditional, socially complex relationships to simple, functional exchanges or encounters (e.g., Gutek 1995). A model of social interactions that integrates ICT use could provide a framework for further examining such claims about shifting relationships within complex contexts of organizational, professional, and personal affiliations.

Therefore, as a third step in developing our model (see Table 1), we have included the four ICT-related characteristics of social actor interactions, noted above, as another dimension. ICTs are intrinsic to the exchanges of organizational entities: they both shape and are shaped by the interaction practices that may proliferate within and among organizations. Depending on the relevant affiliations, a social actor, as an individual or as a group, may be representing herself, a local group, the larger organization (or even an industry) *simultaneously*; each relevant affiliate may have different expectations about legitimate interaction practices. A focus on the richly contextualized interactions of social actors will help IS researchers consider the normative and cognitive aspects of isomorphic influences that shape the ICT use of organization members (e.g., cultural values, imitation, and symbolic action), as well as the cultures and routines that shape ICT adoption by organizations and divisional units (e.g., communities of practice, professional codes, and industry norms). In addition, this approach sets the stage for examining how ICT-enhanced

interactions (and reciprocal interactions) can fundamentally influence the role-based identities of organization members and the collective identities they construct and present to affiliates, regulators, and the general public.

Identities

As many examples of our study data show, when interactions embed the use of ICTs, social actor identities have an ICT use component [Identities: presentation]. For example, when brokers pitch a property using multimedia graphics and “fly-over” video clips, they mean to convey a sense of their own (and also their firm’s) technological competency, believing that to be a quality that the potential investor will value. Cognitive institutional theorists such as Coleman (1990) have drawn on social constructionist concepts to explain that “the social construction of actors is not limited to persons: Collective actors are similarly constituted and come in a wide variety of forms” (Scott 1995, p. 43). This ability to theorize about both collective actors and individual actors is an important advantage because, as our data exemplify, ICT-enhanced networks heighten professional, ethnic, and multiple other identities [Identities: multilevel identities; expert/novice], and ICT-enhanced interactions among firm members often transcend roles [Identities: hybrid]. In work settings, people may be called upon to use their personal identities, or project-based identities to serve the larger organization, when, for example, a broker presents his “track record” as evidence of his own and his firm’s capabilities; or when an attorney must demonstrate to a client that her expertise covers biotechnology as well as the law in order to maintain client confidence and future business for the firm.

Much of what institutional theorists rely upon to understand identity construction, at all levels, is drawn from Goffman’s (1959, 1974) descriptions of the ways in which interactions are shaped or framed by social institutions and enacted by the presenter and her audience. He observed that over time, people have used many resources, including technologies, to present multiple aspects

of themselves to different audiences. The things we own, use, and display to others make statements about who we are. Our technological possessions and competencies are very much a part of identity, and so it is not surprising that social actors use ICTs to construct identities and control perceptions [Identities: profiling; self-monitoring]. Firm members commonly use online information to profile experts, clients, and competitors, and they often use proprietary data to monitor themselves—to see themselves as others would see them. For Goffman, the self and presentation of the self can only be understood through a person’s interaction with others. That is, identity is co-constructed by interactors and reciprocity is a necessary ingredient in identity construction.

ICTs are fundamental to the social construction and representation of reality and the self within organizational contexts. People’s identities influence how they work with ICTs; organization members consciously project identities that reflect their ICT competencies. They appropriate their own identity characteristics from collective units, such as the projects and communities of practice in which they participate, and they contribute their own embodied competencies, such as ICT use expertise, to collective social actor representations, such as their department. But, even though they may present themselves as a coherent collective actor, people within an organizational unit aren’t all alike because of the mix of affiliations, environments, and reciprocal interactions in which they engage over time.

Confirming concern about the connection between ICTs and shifting workplace identities, Walsham (2001) devotes an entire chapter of his book to a review of related studies. This line of research provides broad support for information society concepts, but he concludes that the relationship between ICTs and shifting professional identity has been underexplored. Although the researchers he cites concur that workplace identity shifts linked to the introduction of new ICTs can be dramatic, there is little research that goes beyond this initial phase. We believe that this is true, in part, because there are no well-contextualized models of ICT use that can help IS researchers extend their work in this direction.

To remedy this deficit, we have added a fourth dimension to our social actor model, based on the four-part characterization of social actor identities that emerged from our empirical data (see Table 1). Informed by institutionalist concepts, this dimension can help researchers focus on the everyday interactions that sustain and transform organizational identities—encompassing collective as well as individualistic identities—and on the complicity of ICTs in those processes. When incorporated into the overall social actor model, it provides a way to examine how ICTs participate in the social construction and representation of reality and the self within organizational contexts. By addressing the multiply connected and situated representation of the self, whether as an organizational individual or as a collective actor, this dimension can help IS researchers better contextualize their understandings of cognitive institutional concepts (e.g., imitation, symbolic action, and cognitive frames), and link them more explicitly to the cultures and routines that carry them (e.g., communities of practice or project teams—together with their interaction technologies).

In this section, we have synthesized the four themes that emerged from our empirical data, informed them with an overarching theoretical approach based on institutionalist concepts, and constructed a model of a social actor that is consistent with our continuing research observations. In Table 1, we defined each of the model's four dimensions and summarized their characteristics; and we have provided a link (column 3) back to the original data examples in the previous section. We believe that this multi-dimensional social actor model of interpenetrating layers can help IS researchers better examine the interplay between agency, ICTs, and structure in organizational settings, but in order for it to do so, they must find it useful.

Conceptualizing the Social Actor

As Schultze and Leidner (2002) have observed through their careful analysis of IS knowledge management research, few IS studies examine

conflict in organizations, even though conflicts arising from ICT implementations and globalizing practices are frequently identified as critical issues for further research (Kling 1987, 1992; Kling and Iacono 1984; Markus 1983; Walsham 2001). Individualistic models do not encourage researchers to examine these issues. To address them, some IS researchers have called for a better integration of institutional theory into ICT-related studies (Orlikowski and Barley 2001; Orlikowski and Iacono 2001). This paper responds to that challenge: the social actor model provides a bridging mechanism that IS researchers can use to pursue the agenda repeatedly called for by leaders of the field. It is a “next step” for researchers who are looking to broaden their theoretical research design space and, for their purposes, it is eminently useable. A new model is useable and useful to IS researchers if (1) its underlying concept is clearly explained, (2) that concept can be used to guide research and analysis, and (3) the new model offers clear benefits over existing models. We now examine how our social actor model might meet these criteria.

The Social Actor Concept

A social actor is an organizational entity whose interactions are simultaneously enabled and constrained by the socio-technical affiliations and environments of the firm, its members, and its industry. In short, social actors are *not* primarily users of ICTs. They often have conflicting and ambiguous requirements about the activities they perform, and the socially legitimate ways in which to perform their work as attorneys, biotechnology research teams, inspectors, plant representatives, real estate brokers, pension fund investors, students, or teachers. Social actors exercise limited discretion in ICT choice and use, since in their multiple and aggregate roles, organization members articulate the preferences of a collection of actors, not just individual biases. Social actors interact with one another at various levels within organizational environments, where coordination centers around the exchange of resources and information between members of firms and insti-

tutions. Social actors routinely use computers, information products, and other ICTs in their interorganizational and interpersonal interactions. These technologies shape who they are as organizational representatives, what they can do in terms of exchange, important aspects of their interactions with other actors (i.e., speed, complexity), and influence the perceptions of other actors (i.e., ascribed identities) and the nature of reciprocal engagements, as well as social actors' perceptions about themselves (as variously represented).

Separately, these ideas about social actors are recurrent in other research analyses, but, until now, they have not been systematically selected and integrated into a guiding research design model. Our conceptual integration provides two benefits. First, by using institutional theory to interrelate an empirically derived set of four dimensions and 16 characteristics, our model provides a framework for *systematic* research of complex, highly contextualized ICT use in organizations, rather than encouraging the study of isolated aspects of ICT use in decontextualized settings. Second, the model's multidimensional view can help researchers examine both macro- and micro-level phenomena of the organizational contexts of ICT use, in a theoretically coherent way by identifying the research unit of analysis as a social actor, which can vary with self-representation, yet still be explained through the underlying social actor concept.

Using the Social Actor Concept to Guide Research and Analysis

The social actor concept, in its various formative stages, has been used to guide research and analysis. While developing the dimensions of the model, Lamb took the opportunity to test them with findings from her ongoing research and to compare the resultant analyses to those from related research guided by other models. In 1998, she began a study of the development and use of intranets within midwestern U.S. firms. The study was designed to examine the influence of infor-

mational environments on the social construction of this new technology (Lamb 1999). To date, over 250 firms in five industries have been surveyed about their intranet use, over 60 firms have been visited to view and discuss existing intranets, and six case studies have been conducted to examine the organizational contexts of intranet development and use in greater depth. Insights from the environments dimension of the social actor model provided the basis for industry and site selection, and in combination with key aspects of social actor affiliations, such as the influence of regulatory regimes, customer demands, and load shifting arrangements on information gathering and packaging, have provided a better basis for making predictions about the organization-level adoption and adaptation of new ICTs (for a brief review, see Lamb et al. 2003).

Specifically, this study confirms that the development and use of intranets, like that of online services, is influenced in predictable ways by the technical and institutional pressures of industry environments. It also confirms the importance of clients and other affiliates in shifting or intensifying those pressures, and suggests new ways for understanding the changing roles of IS professionals and for understanding opportunities for systems integration in light of these relationships. In the analysis of changing end-user and IS professional roles related to intranet introduction and evolving use, the social actor characteristics of two dimensions (affiliations and environments) were focused on to guide a historical retrospective on intranets as extensions of end-user computing. This view helped move the analysis beyond deterministic stage models of organizational ICT implementation and toward more context-aware institutional explanations that can help practitioners make better decisions about how to deploy intranets and future ICTs (Lamb and Davidson 2003). This view also pushed the analysis past role theory discussions for explanations of work-related changes that extend beyond the organizational boundary and across industries as well (e.g., the technization of work [Barley 1996]). In the same intranet study, a focus on social actor interactions, and the basic types of exchanges

that organization members engage in with affiliates when developing and using intranets, has led to a new conceptualization of systems integration: providing a new approach to project-based integration that differs from structural and transaction-based integration approaches in important practical ways (Lamb 2003b).

These analyses have linked the original focus of the study (environments) to the other three social actor dimensions (affiliations, interactions, and identities) through a synthesis of institutional concepts (Scott 1995) that have helped to confirm the value of our original empirically derived social actor view and have provided more examples of the value of a cohesive institutionalist perspective of organizational ICT use. In its fully formed, four-dimensional state, the social actor concept has provided a basis for understanding organization member identities as multiple and contextually constructed, through intranet structures like “smart” directories and ISO 9000 documentation systems, in ways that augment the perception of organizational control (Lamb and Poster 2003). In that analysis, the social actor model has helped to explain how ICTs enable shifts of attributed qualities and competencies from individuals to aggregate identities and vice versa—not just when ICTs are newly introduced, but on an everyday basis. By using the explanatory power of this approach, findings from our online services study and the intranet study have been linked to the paradoxical projections of information society forecasters. Bell (1976), in particular, has made predictions about key conflicts in an information society that these studies confirm. For example, he described two broad trends in modern society that would lead to cultural contradictions in organizational settings: the increasing control of production variations through the application of new ICTs (i.e., more control) and the expansion of creative self-expression through the adaptation of cultural resources (such as religious concepts, ethnic practices, national symbols) through new media (i.e., more freedom). Interestingly, the intranet study shows that some very successful ICTs reconcile this contradiction by accommodating both trends: through profiling practices,

intranet deployments hold promise for emancipatory self-expression as well as greater organizational control. By linking this finding to findings from our online services study, it is clear that over time organizational interactions and social actor identities have evolved in tandem with profiling practices, which have been greatly facilitated by the increasing availability of online information.

In a different study (Kling and McKim 1998, 2000), an institutional perspective was used to predict the likelihood that scholars in different fields would rapidly adopt the practice of publishing unrefereed versions of their future journal articles, in a way that has become common in several subfields of physics, astronomy, mathematics, computer science, and economics. They treated scientists as social actors who would have different kinds of interactions in different fields, based on such features as the size and visibility of research projects and the patentability of research products. They boldly predicted that biologists and chemists would not soon adopt this “open access” prepublication style. In contrast, Hars (1999a) developed an information processing analysis of corpuses of scientific preprints and later commented:

my argument is generic and should apply to any scientific discipline. Thus I expect [the fields of] Information Systems and Chemistry to embrace online publishing in a similar way as physics, etc. (Hars 1999b).

In May 1999, the director of the National Institutes of Health, Harold Varmus, proposed an electronic repository for biomedical research literature called E-biomed. E-biomed reflected the visions of scholarly electronic publishing advocates: it would be fully searchable, be free to readers, and contain full-text versions of both preprint and post-publication biomedical research articles. It would have given bio-medical researchers an online pre-publication resource similar to that used by physicists, astronomers, and mathematicians. However, in less than a year, the E-biomed

proposal was radically transformed: the preprint section was eliminated, delays were instituted between article publication and posting to the archive, and the name was changed to PubMed Central. The E-biomed proposal was a kind of natural experiment that tested Kling and McKim's bold institutional prediction and casts doubt on Hars' information processing analysis.

These studies show how a social actor concept can push researchers to consider ICT use within complex organizational settings in a systematic, dimension-by-dimension approach, enabling insights that may not have been possible with other organization-level models, such as variations on Nolan's (2000) stage model, or with more individualistic models that do not account well for organizational environments or multiple, collective, and professional identities, such as Davis' (1989) technology acceptance model (TAM).

We have found that the social actor concept can guide data collection as well as analysis. Encouraged by the insights gained from focusing the intranet analyses on each social actor dimension, Lamb is conducting a study of academic and industry scientists that is designed explicitly to collect data along the dimensions and characteristics of a social actor as outlined in Table 1. This is a qualitative study, that relies primarily on interview data. Therefore, the research team has used the social actor characteristics to develop their interview instruments. The four-dimensional framework is used first to pose questions that the researchers should seek to answer. For example, to examine whether ICTs are part of the industry, national, or global environment when interviewing academic oceanographers or marine biologists who do much of their research at sea, the team wants to know which ICTs are part of the larger organizational or institutional domain (for example, what are the technological infrastructure configurations of ships owned by oceanography labs or ships owned by the Navy). The sample characteristic focuses attention, in this instance, on the kinds of flexibility that ships with different owners may allow by guiding the construction of the actual interview question set(s) for the social

actors (as aggregates and individuals) that the team expects to encounter. That set of interview questions is designed to elicit a description of ICT logistics and potential ICT use that encompasses an understanding of (1) the relationships that must be developed to negotiate use of the ships and their technologies, (2) the constraints on technology and resulting data use that may be imposed by the U.S. Navy, (3) the need to enlist personnel who know how to operate highly specialized, one-of-a-kind technologies, and (4) the different kinds of communications and exchanges that are considered appropriate when working in such settings. Preliminary results from this relatively straightforward approach have already provided some new understandings of the roles that ICTs play in identity construction and self-presentation among oceanographers that have been glossed over in research guided by less contextually rich models (cf., Lamb and Davidson 2002).

In a related study, Kling is using the social actor model to provide guidance for better study design. A study of U.S. high school teachers was set to examine their ICT use only in the school setting, ignoring the home, where teachers do much of their work. The home environment is clearly an important setting for the study, and the social actor model was used to guide a more systematic examination of the interplay between the home milieu and the institutional setting. A second study project was originally designed to develop better Web-based measures of Internet site use, but was not designed to examine what those sites were intended to do, nor to learn about the intended audience. That study is now being revised to engage key dimensions of the social actors who provide, use, and are expected to use the sites.

Implications for IS Research

We believe that our new social actor model offers three clear benefits over existing models (1) it is predictive without being deterministic, (2) it is scalable, based on the multilevel explanatory

power of institutional theory, and (3) it is extensible in multiple ways.

Predictability

The institutional concepts that underlie our model are predictive without being deterministic; they retain a sense of patterned complexity. For example, the concept of informational environments applied to intranet adoption and use would suggest that hospitals and health care facilities (an industry with high technical and high institutional pressure) would adopt intranets much earlier and use them more extensively than restaurants (a industry with low technical and low institutional pressure). The intranet survey confirms this general prediction (Lamb et al. 2003), but the concept also indicates that industry pressures are further influenced at the firm level by relationships. This allows for as much variation within an industry as across industries (which the intranet study also confirms, particularly in mixed environments such as manufacturing and law). At the firm level, however, this introduces more precision in forecasting ICT adoption. Knowing that a manufacturer has a supplier relationship with Boeing, for example, would indicate that the company is probably ISO 9000 compliant and is, therefore, highly likely to have intranet-based quality management documentation, even if the firm is rather small in terms of production output or number of employees. An understanding of informational environments can account for cyclic behaviors through institutionalized practices and similar pressures, while accounting for change through the same mechanisms. At the organization and industry levels, it provides a more robust understanding of technology adoption and use over time than even the most recently revised stages models (Lamb and Davidson 2003; Nolan 2000). More importantly, it guides IS researchers toward richly probabilistic forecasting, that should result in better advice to managers and designers, as well as better stories (e.g., adoption scenarios and use trajectories) that include some sense of how to “get there,” rather than simple stochastic outcomes or states.

The social actor model is an alternative to the user concept that can be coherently integrated into information systems design. Stage models suggest that for successful technologies, nearly every firm will eventually adopt—it is a matter of maturity—whereas the social actor model suggests that adoption and use very much depend on industry pressures and interorganizational relationships. Some firms may never adopt a particular ICT, no matter how potentially useful it is, not because they are laggards, but because they continually shift their informational load onto other firms. How can this understanding inform ICT design? In reporting our study results to our supporting online services vendor, we advised them to tailor their offerings to their existing customers, rather than try to provide features and services intended to encourage *everyone* to use information services. This advice was coupled to the understanding that many nonuser firms already use online services indirectly; they often purchase information services *packaged with* legal services, for example.

Scalability

Unlike some commonly used IS models, the social actor model is not tied to individualistic concepts that do not scale up. IS researchers have tried to augment individualistic approaches like the technology acceptance model (TAM) with contextual elements to increase predictability (Karahanna and Straub 1999; Venkatesh and Davis 2000). Clearly, they recognize that more richly contextualized models can provide better understandings of ICT use and adoption. However, their theoretical bases (the theory of reasoned action and the theory of planned behavior) don't easily allow for augmentation of this sort. In contrast, institutional theory easily enables a socially rich analysis. When building a context-rich alternative to an atomic individualistic user, we contend that the thinking should come from theory that understands cognition as inextricably contextualized phenomena. Cognitions matter, but, as Scott's (1995) synthesis emphasizes, within organizations these are intrinsically shaped from sources outside the organizational boundary. Cognitive

science views rarely go beyond individual, internal sources for generating constructs to guide IS research to a better understanding of the ICT user. However, Scott's synthesis provides an important conceptual gadget that allows institutional analyses of the social actor to vary in scope according to self-representation, as Touraine (2000) has recommended. We believe that it is important for IS researchers to have a theoretical basis for their studies that allows for that kind of transition, and that facilitates the multiple perspectives needed to see all sides of a multidimensional social actor. Other analysts have helpfully focused on particular aspects of the social actor. Geser (1992), for example, has treated the organization itself as a social actor to examine collective action and to explain the dynamics of multiple, simultaneous, often conflicting interactions among organizational actors and between their internal subunits. Munck (1995) has also theorized about collective action by considering social movements to be social actors that interact with existing institutions through the efforts of movement organizers to develop strategies and build movement identity. Our own approach retains this focus on interconnection and action, but more closely follows Touraine's (2000) general method for studying social actors by allowing the social actor unit to vary in accordance with self-representation (i.e., as an individual, a group, an organization, or a social movement) and relationships to other actors.

Extensibility

We have tried to describe the social actor model as an association of deeply interpenetrating layers that generously allow for much modeling work to be done by others. This modeling can be done in multiple ways. One way would be to expand the existing dimensions by adding more characteristics. With respect to *affiliations*, for example, we would expect that a more discriminating, institutionally informed and empirically grounded study of social actor affiliations could provide more refined explanations of these characteristics, as well as additional affiliation-related characteristics.

A second way would be to typify each dimension with respect to an IS issue under analysis. In her analysis of intranets and systems integration, for example, Lamb (2003b) further described integration types as *interactions*, using the existing social actor interaction characteristics to compare and contrast transactional, structural and project-based integrations,

When studying ICTs used to support certain kinds of communication and action where time and distance are of central concern (e.g., virtual team support, knowledge management, distance education, computer conferencing), it may be necessary to extend the underlying theory to include these aspects of social interaction. From this basis, the model might be extended to include a dimension that characterizes physical and/or temporal aspects of a social actor. Lamb is currently designing a study that could provide empirical support for this new dimension, and may provide a grounded theoretical extension of institutional concepts along these lines. A more accessible way to extend the model, however, is to link it to relevant lines of research and theorizing that have not been explicitly tied to institutional concepts in Scott's (1995) synthesis, but that strongly complement this basis. One example would be Barley's (1996) research and theorizing on the "technization" of work. Because our model of the social actor is fundamentally integrated with ICT use, it should be possible to further extend or refine its characteristics to encompass Barley's findings.

Overall, the social actor framework provides a way to tie in related studies—to gain their insights and apply them to a specific focus of interest in a systematic way—without being overwhelmed by the complexity of trying to understand the whole thing and without resorting to reductionist approaches (however cognitively accessible) that over-simplify and may eliminate the real points of interest for understanding ICT trends and use trajectories.

In the process, by relying on institutional concepts (e.g., professional and cultural values) and illustrating how these are carried at various levels

through social structures and industry cultures (e.g., professional hierarchies and interorganizational networks), IS researchers can address the social actor as an organization member who is representing the interests of the firm or department (as well as her own interests) rather than as a user.

Moving Beyond the Concept of Users

We believe that the social actor model provides a better way to conceptualize ICT research and design: it can move IS research beyond the concept of users. The actor metaphor energizes the IS researcher's imagination to ask with whom an actor is interacting, about what issues, under what conditions, for what ends, with what resources, etc. It is a metaphor that readily expands the scope and scale of the social space of people's interactions with ICTs and with other people, groups, and organizations.

As a framework for data collection and analysis, it provides a theoretically sound mechanism, via institutional theory synthesis, for transcending levels, and for examining characteristics and behaviors from regulative, normative, and cognitive perspectives *as they become relevant*. Throughout this paper, our goal has been to provide the IS community with a workable alternative to the socially thin concept of user. We realize, however, that *in use*, a social actor approach may reshape the kinds of questions researchers can investigate and reconfigure the methodologies they find effective. To construct a socially rich view of ICT use, we have drawn out the more reliable (and researchable) aspects of institutional theory and set out a direction for new theoretical work in IS. More can be done, and so we invite IS researchers and designers to augment and refine our view of a multidimensional social actor. It will take a concerted effort by IS researchers to shape a comprehensive understanding of interaction technologies in the network society. Such an effort could make an important contribution, not only to IS-related disciplines, but to social theory as well.

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Appendix A

Online Services Study Sampling Details

With data from online databases, such as Dun and Bradstreet, we analyzed the firms within each area and industry using revenue and employee statistics to form a rough impression of how large and how successful each firm might be. We then correlated this information with online usage data provided by a cooperating online vendor¹⁰ to identify sample sites that did not use their online services, as well as those that did. From these augmented selection lists, we chose sites for our cross-sectional study to include firms that were non-users as well as regular users of online resources, late as well as early adopters, large firms, small firms, and poorly financed as well as richly capitalized organizations (see Table A1).

In law firms, we interviewed librarians, paralegals, associate attorneys, and firm partners. In biotechnology companies, we included information center directors, information specialists, scientists, marketing managers, and directors of strategic partnering units. At real estate brokerages, we included brokers and realtors. We used a nested interviewing approach, relying on inside referrals to collect responses from

¹⁰ Our cooperating vendor was Knight-Ridder Information, Inc. (KRI), who at the time of this study was the provider of the DIALOG and DataStar online services.

Industry	Orange County		San Francisco Bay Area	
	Informants	Sites	Informants	Sites
Biotechnology/Pharmaceutical	12	6	11	5
Law	9	5	6	4
Real Estate	8	4	2	2
Totals	29	15	19	11

Informant Role	Number Interviewed		
	Biotechnology	Law	Real Estate
Librarian/Law Librarian	1	3	0
Library/Information Center Director	6	1	2
Information Specialist	2	2	1
Information Systems/Research Director	2	1	0
Paralegal/Legal Secretary	0	3	0
Basic Research Director/Vice President	2	0	0
Scientist	3	0	0
Marketing Analyst	2	0	1
Marketing Director/Vice President	2	0	1
Investigator	1	0	0
Regulatory Liaison/Director	2	0	0
Attorney/Partner	0	5	0
Broker/Realtor	0	0	4
Information Systems/Software Developer/Manager	0	0	1
Totals	23	15	10

between one and four informants at each site. Wherever possible, we also observed the use of online resources and services in the day-to-day activities of the people we interviewed (see Table A2). A low number of interviews was typical in firms that did not use online resources at all. Also, in a few small firms, the nested interviewing approach did not lead to any other inside referrals because online resources were used by only one person at the firm. While this may seem to be a limitation, in fact it allowed us to better analyze organizational use, because our set of individual informants fully represented online service use within the firm.

Appendix B

Online Services Study Interview Instrument

IRIS: Interorganizational Relationships and Information Services		
Semi-Structured Interview With	<name(s)>	<title(s)>
<company name> <phone number>	<address>	<date> <time>
<name(s) of interviewer(s)>	Systematic Study Design	File: <interview guide>

1. Basic Questions	
Who am I interviewing?	<ul style="list-style-type: none"> • What "department" are they in? • What do they do there? • What is the relationship (of this person) to the rest of the firm? • What is this person's educational/experiential background? • What are their professional affiliations?
What's the major focus/product of this firm?	<ul style="list-style-type: none"> • What is its relationship to the rest of the industry?
What is the general technological orientation of this firm?	<ul style="list-style-type: none"> • Does everyone have/use a computer? • Does everyone have/use email? • Does the firm have an "attitude" about computer/online use? • Technophilic/technophobic?
Who are their competitors?	<ul style="list-style-type: none"> • What is the competitive environment like? • Are there times when competition is intense? • Are there alliances or cooperative associations? • What about mergers, subcontracting, partnering, outsourcing? • How do regulators interact with the firms?

2. Interorganizational Relationships (IRs)	
Clinical Trials, Expert Witnesses, Subcontracting, Investments	<ul style="list-style-type: none"> • Mention we have seen OI resources used during these: <ul style="list-style-type: none"> — Used in forming these relationships? — Used to check out clients/customers? — Used to check out competitors/opponents? — Used during these relationships? • Ask about any other IRs • What is the context of these IRs? • How many of these over the years?
Persistence over time:	<ul style="list-style-type: none"> • Are these new kinds of IRs for this firm?
Frequency:	<ul style="list-style-type: none"> • How often (in a year) do these IRs occur?
Importance:	<ul style="list-style-type: none"> • Do these IRs bring in a lot of revenue to the firm? • Do these IRs bring prestige to the firm?
Which ones involve OI resource use at this firm?	<ul style="list-style-type: none"> • What fraction of OI use is for IR or outside firm research? • What fraction of OI use is not linked to IR at all?

3. Activity Sequences of IRs	
What is done?	
In what order?	
Where do information resources fit in?	<ul style="list-style-type: none"> • Electronic media? • Print-based media? • Personal contacts?
How is the IR established?	
How is the IR maintained?	
Were things always done this way?	
Are any new ways of doing these being tried?	

4. Intermediary Roles (re: Activity Sequences)	
Who does what?	<ul style="list-style-type: none"> • Who gets what type of information?
What is their relationship to other intermediaries inside the firm?	<ul style="list-style-type: none"> • Outside the firm? • Is there a shift from personal contacts to databases? • Make this concrete: How many now versus before? • Is there a shift from org. contacts to other intermediary contacts (e.g., more lawyers and consultants doing research)? • Make this concrete: How many now versus before?
How do they share IR information?	<ul style="list-style-type: none"> • Professional affiliations?
Is intermediation a driver of certain types of activities?	<ul style="list-style-type: none"> • What kind of activity does it drive? • Is OI researching that kind of activity?

5. Conceptualizations of Roles of Resources	
Accuracy or completeness of identity picture that can be constructed from all resources	<ul style="list-style-type: none"> • What's perceived to be best? • Why? • Are some resources more legitimate than others?
Who constructs the identities?	<ul style="list-style-type: none"> • Gathers the information • Compiles the reports
Who interprets the constructions?	

6. OI Usage and Changes Over Time	
Overall:	<ul style="list-style-type: none"> • Is there an increase/decrease/shift in kind? • Per unit (economies of scale) or across the board?
In Context:	<ul style="list-style-type: none"> • When is it used most? • Are these instances increasing/decreasing/shifting? • What is the relation of IR search to other search occasions?
How much do they use? (yearly/monthly)	<ul style="list-style-type: none"> • Prior to online what did they do? • Paper only?
How critical are OI resources?	(substitutability)

Appendix C

Online Services Study Analytical Coding

Data collection and analysis were conducted concurrently, allowing for theoretical sampling (Glaser and Strauss 1967). First, guided by rationalist theories about intensive information use, we chose sites that were heavy users of DIALOG information services. After several interviews at biotechnology and law firms, we realized that these were all sites in highly institutional settings. We reviewed institutionalist explanations of industry differences and revised our sampling approach using Scott's (1987) technical/ institutional industry classification to include real estate firms and to guide further site selection. Our emergent analytical categories were based on coded data elements, primarily from interviews, but also from supporting DIALOG usage reports and published information about the firms in our study. We followed Becker's (1998) sampling approach of "finding what doesn't fit" (p. 83) for developing data categories and descriptions that would lead to generalizable observations. (See Table C1 for a few examples of the coding and analysis categories.) Knowing that we needed to account for both technical and institutional aspects in each organizational context, we examined our data, classified it in these two broad categories, then began looking at elements that didn't seem to fit. Both open coding and thematic coding methods were initially used to analyze the interview data. However, we found that, with iterative refinement, thematic coding techniques developed data categories that were more appropriate for comparative analyses.

Table C1. Analytical Coding Structures			
Coded Data Elements*	Emergent Analytical Categories	Influences Shaping Organizational Online Use	Social Actor Dimensions
Client Demands	Perceived Utility of Information Resources	Load Shifting	Affiliations
Load Shifting Arrangements	Institutional Proximity	Load Shifting	Affiliations
Clinical Trials Biotechnology Practice	Institutional Proximity	Load Shifting	
Full Service	Perceived Utility of Information Resources		Affiliations
Changing Jobs	Institutional Proximity		Affiliations
Global Financial/Fiduciary Practices	Perceived Utility of Information Resources		Environments
Industry or Organizational Field	Perceived Utility of Information Resources		Environments
Organizational ICT Investment	Perceived Utility of Information Resources		Environments
Infrastructural Richness	Role-Based Data Exchange	Information Infrastructural Richness	Environments
Public Disclosure	Role-Based Data Exchange	Information Infrastructural Richness	
Public Libraries	Perceived Utility of Information Resources	Information Infrastructural Richness	
Documentation	Institutional Proximity	Regulatory Compliance	Interactions
Making Information Actionable	Profiling		Interactions
Design in Use			Interactions
Organization Members	Profiling		Interactions
Presentation	Perceived Utility of Information Resources	Customer Expectations Management	Identities
Multilevel Identities	Profiling		Identities
Expert/Novice	Hybrid Specialists		
Hybrid	Hybrid Specialists		Identities
Profiling Self-Monitoring	Profiling	Profiling and Packaging	Identities
Pace of Business	Perceived Utility of Information Resources	Customer Expectations Management	

*See the findings in the Research Design and Empirical Results section of this paper for the actual exemplar data items for some of the codes listed in column 1. This list is just a sample of elements from the entire study. The codes are taken from the data examples presented in this paper and an earlier paper on informational environments (Lamb et al. 2003).

Our first theory-building analysis of the influences shaping organizational online use gave us an understanding of organization-level adoption based on institutionalist concepts (see Table C1, column 3). This became our informational environments view (Lamb et al. 2003). But that analysis still left unaddressed a good deal of the activity in which we saw people engaging and some important categories that had emerged from the study data. Therefore, we reexamined the data from the view of an organization member, with the intention of bringing the organizational and individual levels of analysis together to construct a multidimensional view of social actors. We then refocused our analysis around a refined categorization and linked this to constructivist and interactionist theories while maintaining conceptual links to institutional concepts (see Table C1, column 4). This is where Scott's synthesis proved helpful, allowing us to provide a coherent theoretical explanation for the dimensions that had come to define our social actor.

This approach builds a social actor model that is an empirically anchored extension to theoretical understandings of organizational ICT use. It follows a style of grounded theory development refined over many years of research by sociologists who study how people interact in complex social settings (most notably Becker [1998], his colleagues and his students). This method is particularly appropriate for developing theoretical extensions to existing theory through systematic analysis of the data and iterative refinement of the research focus, data collection, and sample selection. It results in a set of related, often overlapping, thematic coding structures that can be used to examine the explanatory power of applicable theories, to find weaknesses in those explanations, and to suggest areas where theoretical extension might be empirically based on the research data. This explanation, along with the examples in Table C1, should help readers see how our research and analysis process derived the four social actor dimensions—**affiliations, environments, interactions, and identities**—through iterative analysis and conceptual refinement.