



Investigating the interplay between structure and information and communications technology in the real estate industry

Information and
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Abstract *Information and communication technologies (ICTs) are reshaping many industries, often by reshaping how information is shared. However, while the effects and uses of ICT are often associated with organizations (and industries), their use occurs at the individual level. To explore the relationships between individual uses of ICT and changes to organization and industry structures, we examined the residential real estate industry. As agents, buyers and sellers increase their uses of ICT, they also change how they approach their daily work. The increasing uses of ICT are simultaneously altering industry structures by subverting some of the realtors' control over information while also reinforcing the existing contract-based structures. This structural perspective and our findings help to explain why information intermediaries persist when technology-based perspectives would suggest their disappearance.*

Information and communication technologies (ICT) are pervasive in many industries and are clearly reshaping some. Information-intensive industries by their nature show the greatest impacts due to ICT uses. However, it is too simple to note the presence of a new input (ICT) and some new output (such as an industrial-level outcome like average firm size).

We are currently studying the use of ICT in the residential real estate industry in the USA[1] to better understand how the uses of ICT both shape, and are shaped by, organizational and institutional arrangements. In pursuit of

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this understanding, we report on the ways that ICT uses are reshaping the roles of real estate agents[2].

We provide evidence of how individual uses of ICT shape, and are shaped by, organizational and industrial practices in a particular industry. To do this, we draw on structuration theory as an analytic perspective to interpret data from our ongoing fieldwork. This analysis provides a glimpse of one potential adaptation of organizational forms and industry structures in the presence of increased ICT use.

This paper continues in four sections. In the first section we outline our conceptualization of ICT use and then set this within a structural framework. In the second section we outline why residential real estate is an appropriate industry to study and lay out the data collection and analysis. The third section contains a discussion of the results. Last, we present implications for research and practice.

Conceptual basis

ICT are frequently described as “transformational technologies” – able and expected to transform (or indeed, create) entire industries. However, it is difficult to study ICT impacts at the level of an entire industry because of their size and complexity (Dess and Beard, 1984). Most researchers who work at this level have been restricted to drawing simple connections between the use of ICT (e.g. as measured by ICT investment in a particular industry) and some industry level outcome measure (e.g. firm size, profitability, etc.). While such studies have been successful in finding impacts, they necessarily omit much of the subtlety of the connections. These subtleties are the target of our study.

In the next section, we present a framework (shown graphically in Figure 1) for thinking about the connection between ICT use and higher-level outcomes. This framework situates ICT use in individual work and describes higher-level impacts as mediated by the organizational process to which the individual contributes (Crowston, 2000). This framework is pre-theoretical, so in a following section, we discuss the particular theories we selected for the study presented in this paper.

Conceptualizing ICT use

We start with the recognition that the mere existence of some information system is unlikely by itself to directly affect an organization or an industry. In our view, ICT use is enacted by individuals who, through their actions, change the conduct of their work in response to the availability of computing and communication technologies. These changes can be seen in the way software developers use computer-aided software engineering tools (Orlikowski, 1993a) or electronic meeting systems (Sawyer *et al.*, 1997), engineering technicians use computer-aided design tools (Kelley, 1990), help-desk personnel use Lotus Notes (Orlikowski, 1993b), and telephone operators use new information systems (Kraut *et al.*, 1989).

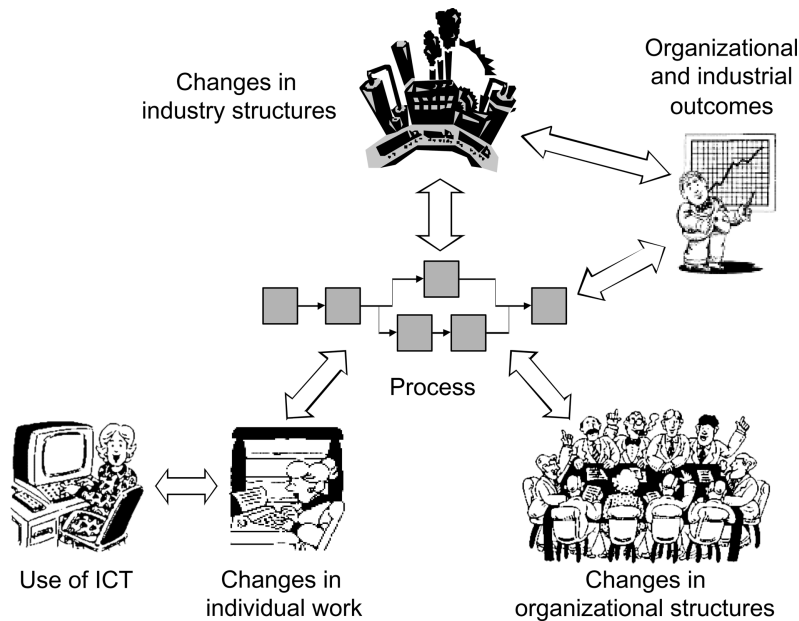


Figure 1. Framework relating ICT use, individual work, process and industrial and organizational structures and outcomes

Individual-level uses of ICT may be associated in turn with changes in the organizations in which the work is done. These effects manifest themselves, in part, as changes to organization processes and eventually in changes to organizational and industry structures and value-chains (Crowston, 2000). By organization processes, we mean the identification and sequencing of tasks to accomplish intended outcomes. Organization structures reflect how individuals are organized for reporting and dissemination of information and control. Industry structures include the division of work among companies (i.e. the position of firm boundaries) and the industrial value-chain, which can be seen as processes extended across multiple firms.

For example, Crowston *et al.* (1987) describe a company that introduced a computer-conferencing system to link plant human-resource managers to the specialists at headquarters. This system made it possible for the first time for plant-level personnel to see questions asked by their peers and to participate in policy discussions. Consequently, the firm was able to eliminate an intermediate level of managers, who had formerly answered plant-level questions individually, and instead have headquarters personnel interact directly with plant personnel.

Another example of how ICT use can lead to changes in individual work and changes to both organization and industry structures can be found in the airline travel industry (Lewis and Talalayevsky, 1997; Lewis *et al.*, 1998). Toll free (1-800) telephone numbers and more recently, the World Wide Web and electronic ticketing, enable airlines to provide schedule information and to sell tickets directly to the public, bypassing travel agents. Using these technologies, the end buyer now performs much of the search that might previously have

been done by an agent. Relatedly, many airlines have closed downtown sales offices in major cities and reduced travel agents' commissions. Many in the real estate industry fear that home buyers and sellers will similarly take on some of the work of finding each other, eliminating real estate agents from the transaction or at least forcing them to accept a reduced portion of the proceeds.

However, in most settings there also are strong organization and industry forces shaping how work is done (e.g. Abbott, 1995). These forces also affect how individuals do their work (as reflected by the double-headed arrows in Figure 1). For example, in real estate, as discussed below, realtors continue to enjoy privileged physical access to listed properties, independent of any ICT that might be used to ease the search process. The strength of these forces suggests that it will be hard to remove the agent solely through increased ICT use.

Finally, changes to industry and organization structures and processes, arising in part from how individual workers use ICT in their work, lead to changes in organization-level outcomes such as productivity or performance. Indeed, these outcomes are often the motivation for the decision to implement the ICT in the first place. However, the implication of this chain of relations is that the uses of ICT are not directly related to changes in these outcomes, nor mediated in any simple way. Therefore, eventual outcomes are impossible to predict in general. Instead, to understand the ways ICT can change and are changing work, our framework suggests the need to understand the individual, organizational and industrial levels simultaneously. From the interactions between individual work and both organization and industry structures emerge the uses of ICT, new forms of work and new ways of organizing (Markus and Robey, 1988; Orlikowski and Robey, 1991). Building on this broad conceptualization of ICT use, in the next section we discuss the specific theoretical perspective we choose for the current study.

A structural perspective

In this paper, we focus on the interplay between the actions taken by individuals using ICT and the processes and organizational and industrial contexts in which they work (the lower left-hand section of the framework shown in Figure 1). Given this focus, we chose to adopt a structural perspective of the relationship between ICT use and the work of real estate agents for this study. Structuration theory was chosen because it relates organization and industry structures with the actions of those that live within, and help to create and sustain, these structures (Giddens, 1984).

Structuration theory is a broad sociological theory that seeks to unite both form and structure. The theory is premised on the duality of structure. In this view, structure is recursive: the structural properties of a social system are both the means and the ends of the practices that constitute the social systems. Simply, by doing things, we create the way to do things. Sarason (1995, p. 48) explains that in structuration:

The central idea is that human actors or agents are both enabled and constrained by structures, yet these structures are the result of previous actions by agents. Structural

properties of a social system consist of the rules and resources that human agents use in their everyday interaction. These rules and resources mediate human action, while at the same time they are reaffirmed through being used by human actors or agents.

For us structuration serves as a more specific meta-perspective or epistemology to help us illustrate how ICT use helps to both recreate and maintain social structures. In particular, in the framework shown in Figure 1, the process is composed of the actions performed by individuals, while the process guides how those actions are performed.

Numerous authors have used a structurational perspective to support empirical analysis of ICT use (e.g. Barley, 1986; Newman and Robey, 1992; Orlikowski, 1992; Walsham, 1993; DeSanctis and Poole, 1994). A discussion of the merits of each use is beyond the scope of this paper. Here, we build on the view of structuration presented by Orlikowski (1992).

To apply structuration as a perspective to frame the changes to the real estate industry, three specific issues must be clarified. First, because structuration theory relates structure and function across time, a temporal component is needed in the analysis (Gregory, 1989). Thus, our analysis will first describe current (or traditional) practices and structures and then describe how these are changing in response to environmental changes and as ICT use becomes increasingly prevalent. In our use of structuration theory, we handle time-space relationships at a simple, stochastic, level (as did Orlikowski, 1992). That is, in order to explain how agents and structures are evolving in residential real estate, we present the changes as states or stages, and only highlight the “dislocation of routines” and other temporal disruptions that lead to these different states (Gregory, 1989).

Second, the types of rules and resources that comprise the structure must be clarified. As Cassell (1993, p. 119) says:

To study the structuration of a social system is to study the ways in which that system, via the application of generative rules and resources, in the context of unintended outcomes, is produced and reproduced through interaction.

For this work, we specifically consider three kinds of rules and resources: interpretive schemes, resources and norms (Stein and Vandenbosch, 1996). Individual actors’ interpretive schemes create structures of signification. The control of resources is the basis for power and thus the basis for structures of domination. The actor’s social norms create structures of legitimation.

Finally, structuration as a conceptual frame is largely context-free, with little guidance on how to explain particular contextual aspects – the social milieu (Stinchcombe, 1990). This contextualization must be provided descriptively. The social milieu in this case is the residential real estate industry in the USA. It provides the setting for, and affects the relationships between, agent’s actions and the social structures (rules and resources) in which they exist (see Stinchcombe, 1990). Accordingly, we describe the social milieu of residential real estate in the next section and return to this point in our discussion.

To summarize, our use of the structurational perspective is shaped by our desire to focus on the roles of real estate agents, the social milieu in which they conduct their work, their uses of ICT, and how these affect the rules and resources that we consider in this paper. Used this way, structuration is as much a worldview as it is a theory. This duality has led to a debate about the status of structuration theory (e.g. Kilminster, 1991). However, as we indicated above, our purpose in this paper is to use structuration as a conceptual perspective to help illuminate the findings from our fieldwork. Thus, the structurational perspective serves only to frame our exploration of the relationships among the organization and industry structures, the functions of the real-estate agents, and their uses of ICT. At the end of the paper, we return to the concepts of structuration to reflect on our rather functional use of this conceptually rich worldview.

Research approach

In this section, we first discuss why we choose to study the real estate industry. We next discuss our data sources and analysis techniques.

Selecting residential real estate industry as the research setting

Our general interest is in the way ICTs are shaped by and are reshaping the industry. The real estate industry is an excellent setting for studying this interaction for numerous reasons. First, the residential real-estate industry is both pervasive and large. Real estate is also an important factor in a nation's economy and real estate sales are monitored as an essential indicator of economic health. In the USA, 1998 sales of existing homes totaled US\$638 billion, up 31 percent from 1996 (National Association of Realtors, 1999). There are nearly 720,000 licensed real-estate brokers and agents in the USA, with active markets in every population center (URL <http://nar.realtor.com/research/home.htm>). This pervasiveness provides numerous opportunities to study the work of real estate at individual, organizational and industrial levels. As well, subtle (or not-so-subtle) variations in real estate practices from area to area help highlight how the local social structures both constrain and enable different activities around the same basic transaction. For example, a comparison of the US process to another country's approach illuminates aspects of structure that might otherwise go unnoticed.

Second, real estate is an information-intensive business. This industry highlights the role of information and underlying computing and communications technologies (Baen and Guttery, 1997; Tucillo, 1997). Agents connect buyers to sellers and do so through control and dissemination of information (i.e. the Multiple Listing Service or MLS). They are valued for the information skills they can bring to bear on making both listings and sales but particularly vulnerable to changes in the availability of such information.

Third, since agents and real-estate firms are pure market-intermediaries, their position in the transaction is always at risk. In particular, if new technologies appear that can supply this information more cheaply or conveniently, then agents may be replaced. This result would be consistent with predictions of disintermediation that have been made in other industries

(Benjamin and Wigand, 1995; Wigand, 1997, p. 4). Certainly, our data, and other contemporary literature (e.g. Buxmann and Gebauer, 1998; Crowston and Wigand, 1999), suggest that agents are concerned about their future roles in the face of the changes propelled by ICT use.

Fourth, real estate is a convenient industry in which to see changes in structures of organizing, because (at least in the US real estate industry), essentially all formal relationships are contractually or legally defined. Changes in structures have to be reflected in changes in these documented relationships. This aspect of real estate reduces some of the organization-level influences, since much of what is done in a buy/sell transaction is defined identically for all members of the industry in a particular area.

Fifth, houses are expensive and difficult to describe succinctly (indeed, each property is in some ways unique). These characteristics make real estate rather different from the low-cost, easily describable goods for which electronic commerce is currently successful (e.g. music CDs, books, airline tickets, stocks). As well, since houses are expensive and infrequently bought or sold, most individuals feel the need for assistance from a professional.

Finally, the traditional work processes of real estate agents have been and continue to be influenced and shaped by the use of ICT. Agents have rapidly embraced new technologies that give them an advantage, such as computer databases, geographical information systems (GIS), pagers, cellular phones, and most recently, e-mail and the World Wide Web (Crowston and Wigand, 1999). Of course, the impacts of these ICT are not unique to the real estate industry. Other industries, e.g. automobile sales and financial services, can be observed undergoing similar ICT-influenced changes.

In some ways, real estate is an atypical industry. Even if it were unique, a more complete understanding of the role of ICT at multiple levels of an industry would still be of value. However, and more germane to this proposal, real estate is like what many industries are predicted to become (Malone and Laubacher, 1998). Given the hyperbole about the massive and impending changes to many industries due to the rise of the service economy and knowledge-intensive work (Nohria and Eccles, 1992; Quinn, 1992), our study can provide some insights regarding the potential, level and form of the anticipated ICT-induced effects in such industries.

Data sources

We used the standard data collection methods of fieldwork: interviewing (both semi-structured and structured), observation, and archival records collection (including Web site documentation – Jackson, 1987). Field notes were prepared after every encounter. These have two parts: a chronology of action and then an interpretation of these actions. The first represents a factual recounting of the observation period from the observer's perspective. The second provides for a more free-flowing account of the intuitions, innuendoes, and interactions that arose during, and because of, the observation.

For the current research, we have focused on one local market that encompasses a medium-sized US city and its suburbs. This focus allows for more convenient data collection in the pilot study. In this local market, the six years before 1998 saw recession-like conditions in residential housing sales. The 1992 market figures were US\$350 million in sales, but this fell to US\$290 million in 1998. This last figure represents an 8 percent increase over 1997 sales, the first year-to-year increase since 1991. During the same period, the local association of realtors reported a drop in the number of licensed real estate agents from approximately 2,300 in 1992 to just over 900 in 1998. Clearly, though, the drop in the number of agents reflects much more than just a contraction in the markets.

A series of 14 interviews and observations were conducted from September 1998 through February 1999 with the agents, brokers, brokerage owners, and the local realty association president (who also is the president of the local MLS). Interviewees included four experienced and two relatively new agents, an agency owner (broker), and an agency manager (who was also a broker). Three agents were interviewed twice and one, three times. This set of agents included two who were technologically sophisticated. For example, these agents had developed extensive Web sites, used computing extensively (linking their personal digital assistant, lap top and desktop computers), and had integrated their voice mail, pager and cellular phone systems. The rest of the agents we considered technologically naive, though they also had integrated their telephony and typically had use of a computer. We made initial contacts with three agents and most other agents were referred to us (a form of snowball sampling). During this period, we also followed two home sales from listing through closing. We also observed two meetings of the committee on new ICT at the local board of realtors.

The archival record collection encompasses the gathering of memos, correspondence, and other printed or written material that we can gather. Often, these “organizational droppings” provide insight into observed behaviors, allow for historical insight, and set out future issues. Current archival data collection includes items provided to us by the agents/interviewees, material sent along by the local board of realtors, and extensive library and Web research by two graduate students.

Data analysis

Two analysis techniques were used to analyze the data: interim documentation and explanatory event matrices (Miles, 1979; Miles and Huberman, 1994). Interim documentation arises from the reflective, ongoing analysis of field notes and began immediately after the first interview had been transcribed. This was done by each researcher and jointly among all researchers. This technique enabled the synthesis of data to support and refute interim propositions. Moreover, discussions among the researchers, arising from interim analysis, helped to both clarify and shape the analysis. These discussions, arising from the series of interim analysis, helped to the data collection efforts. For example,

following an initial round of interviews the research team met to discuss the notes. This discussion centered on the unexpected attention that both agents placed on developing social contacts (which they both called “suspects”) and “prospecting” for new clients. This led the team to hypothesize that social contacts (and thus, social capital) were central to the agent’s work. In turn this led to revising the interview guide to probe more deeply for evidence of attention to social contacts (and the presence of weak and strong ties that Granovetter’s (1973, 1982) theory of weak ties would suggest)

Explanatory event matrices relate constructs to events, organizing a rich set of data to respond to propositions (Miles and Huberman, 1994). This demands an a priori theoretical (or at least categorical) set of constructs to serve as one axis of the matrix, the other axis being sources of data. Our analytical basis is structuration theory, specifically the three forms of rules and resources, and these form one axis of the explanatory matrix. In the Appendix, we present a portion of one explanatory matrix to illustrate this approach.

Results

To provide the context for our discussion of results and to ground one end of our temporal comparison, we begin this section by outlining the historical structure of the residential real estate industry in the USA. We then focus in turn on specific structures of signification, domination and legitimization, and current changes to these historical social structures and the emerging roles for ICT.

Real estate historically

Our description of the real estate process is based on our particular study setting. Though the general outline is similar in other parts of the USA and in other countries, there are often significant differences in the details. We argued above that process served as a conceptual link between individual actions and organizational and industrial outcomes (Crowston, 2000). Therefore, it is important to present the details of the process as it unfolds in this setting to explicate the link.

The essential process in real estate is the sale: buyer finding seller. Historically, the role of real estate agents is to bring together the seller and a buyer of a property and advise these principals on the transaction. In the USA, there are typically two agents. A listing agent helps a seller market a property by helping to determine an asking price, guiding the seller to make the property attractive, advertising it and screening potential buyers. When offers to buy the property are received, the seller’s agent helps in the negotiations and details of the transaction. In return, the seller promises to pay the listing agent a commission, usually a percentage of the sales price (in our setting, typically 6-7 percent, less for houses that are more expensive). In the US residential real estate, these commissions usually must be paid regardless of how the property is sold (e.g. even if the agent is not the one who finds the eventual buyer).

A buyer's agent helps a buyer find suitable properties among those offered for sale and narrow the selection to a specific property. Usually the buyer physically inspects (via a "curb showing" or "walk through") several potential properties before deciding, and the agent arranges these visits (and usually does all the driving as well). Once a property is selected, the buyer's agent provides advice on making an offer to purchase the property and, again, helps in the negotiations and details of the transaction. In return, the buyer's agent is paid a share (usually 50 percent) of the seller's commission (or in rare cases, is paid directly by the buyer, as discussed below).

Depending on the market, different aspects of the above process will be more important. For example, if real estate is in high demand (a "seller's market"), an agent can provide a great service to buyers by passing on information about newly offered properties and may in fact demand a premium for this information. Conversely, in a buyer's market, an agent can be of great help in marketing a property and locating buyers.

Once an offer is made and accepted, there are typically a set of contingencies on the contract that need to be addressed, such as the buyer's obtaining financing, a favorable inspection and appraisal of the property, etc. Again, an agent can help by providing access to resources to address these issues. For example, an agent might refer a buyer to a bank, house inspector or other necessary professionals.

In addition to the contracts among agents and buyers and sellers, the relationships between agents and agencies are contractual. Legally, only a person with a broker's license can convey real property, so most agents are affiliated with a real estate agency, which employs (or is headed by) a broker. However, the agents are independent contractors rather than employees. The agents enter into listing contracts with sellers on behalf of the broker, get a variety of services from the agency and in return, split their commissions with the agency. A highly productive agent can negotiate to receive more services or a more favorable division of the commission.

Finally, there is also a well-defined set of relationships between agents. In the USA, most agents share listings through a multiple-listing service (MLS). After listing agents sign a contract with the seller of a property, they enter a description of the property in a shared database. Agents who are members of the MLS can search the database for properties that meet their clients' needs. If a client buys a property in the MLS, the MLS listing agreement guarantees that the buyer's agent will be paid a share of the selling agent's commission.

As well, members of the MLS can more easily show properties. The entrance key to many MLS-listed properties is made available in an "MLS lock box," to which all members have access. The lock box is usually on the property for convenient access (e.g. hanging on the front door). This access has been extended in some cases to other professionals who need to enter the property, such as home inspectors or appraisers.

Structures in the real estate industry

In this section, we analyze the process described above from the three perspectives of structuration theory introduced above: structures of signification, domination and legitimation. A summary of this analysis is presented in Table I.

Structures of signification. Structures of signification involve the interpretive schema through which actors view their worlds. In the case of the real estate industry, many schemas are captured in legal or contractual language. For example, standard contracts define roles in the process of buying and selling, important features of a property, stages in the transaction, etc. In particular, an important event in the transaction is the closing: the point at which the property (and money) changes hands. All our interviewees remarked how closing is the central action of residential real estate. This centrality is reflected in the wording of contracts, with all events contingent on either being completed before closing (and vice versa) or occurring following a closing.

Of course, many interpretive schemas are tacit rather than written. For example, one agent described how she classifies people as suspects, prospects, customers or clients depending on the degree of their relationship and treats people in different categories in specific ways. A buyer's agent sounds out the client in several ways to determine their needs, drawing specific information based on the interpretive schema of the agent. The robustness and complexity of the agent's interpretive scheme in conducting this information gathering appears to be a major differentiator among agents (Lamb, 1997).

Structures of domination. Structures of domination involve power derived from control of resources. While there are many types of power, with different sources and effects, a complete discussion of these issues is beyond the scope of this paper. Rather we simply consider what actions are open to particular actors and unavailable to others because of differences in access to resources. An important resource in this industry is information about buyers and about

Structure	Example from study	Action shaped
Signification	Contractually defined roles, property features, transaction stages Classification of people by agents as prospects, suspects, customer and clients	What action to take next; e.g. arranging for a house inspection How to treat each person; responsibilities owed
Domination	Control of information about available properties and buyers MLS lock box providing access to properties	Who can easily search for properties or be found in a search Who can easily inspect a property
Legitimation	Real estate laws and practices Process knowledge	What information agents can provide What to do next in the process, when to take corrective action to fix a developing problem

Table I.
Examples of structures in real estate and how they shape individual action

properties for sale. This domination structure shows up in two forms. First, if most buyers are working with agents, then sellers also have to work with agents to gain access to these buyers. In interviews with the agents, they indicated that they like to focus on recruiting sellers, since buyers would be easier to attract if the agents had properties listed.

A second form of information-based domination is access to the information in the MLS. If most properties are listed in the MLS and if only agents have access to the MLS information, then again agents gain control over the transaction. Essentially, an individual agent having information is not important. The domination of information control comes through (restricted) sharing of the MLS information. That is, agent-controlled access to MLS data provides for domination of agents over buyers and sellers. In some areas (such as Ann Arbor, MI and many parts of CA), agents have reinforced this power by lobbying for laws against “For sale” signs on a property, restricting the ability of sellers to distribute information directly to buyers. The agents and brokers we spoke with envied this control. In its absence, they use the “For sale” signs to broadcast as much information about their personal competence as possible. Often these signs have names, phone numbers, pictures of the agent, URLs of their Web site, and even 800 numbers that put the caller on to a pre-recorded message describing the house (called “talking ads” by real estate agents).

Finally, agents have an advantage in scheduling property walk-throughs through control of lock boxes. Sellers will find it much more convenient to show their property and buyers will find it much more convenient to see properties if they are working with an agent because agents control lock box access and thus access to the property. (Of course, a seller and a buyer can arrange showings on their own, just much less conveniently.) The local real estate association maintains control of access to the lock boxes. Again, because of their control of a resource, agents are able to exert a level of control over the transaction.

Structures of legitimation. Finally, structures of legitimation involve the norms that govern the actions of the actors, i.e. what agents, buyers and sellers can and cannot do. For example, there are legal and ethical restrictions on what an agent is allowed to tell someone about a property. In particular, because agents are paid by the sellers, they owe a fiduciary duty to the seller. Therefore, they must share any important information they have with the seller, such as how interested or price sensitive a potential buyer is. On the other hand, by law agents in the USA cannot talk about details such as the demographics of a neighborhood, even if a customer asks.

A second legitimizing structure is the requirement for professional licensing and affiliation with the local realty association. In the USA, real estate agents must be licensed by a state agency to work as an agent. Getting the license requires passing a set of exams, which usually requires significant study of the rules and norms of real estate practice. As well, many agents go on to get further credentials, in part to signal their competency, and these credentials provide further norms for behavior.

Affiliation with the realty association provides the agent with access to the MLS and the codes to open the house lock boxes (an important set of resources, as discussed above). As well, the realtor board promulgates and enforces a code of conduct, again providing a strong set of norms for action. Further, in some cases, the association provides a collection of standard contracts (e.g. for listing a house, making an offer, removing contingencies, etc.) in both paper and electronic forms.

To a lesser extent, the brokerage also is a legitimizing structure to keep organizations in place. Each realty organization is headed by a broker. The broker officially signs off on each transaction. Brokers employ agents, who can only work for one broker (they actually turn their licenses in to the broker, who holds them while that agent works for them). Thus, the broker control provides a means to legitimize organization structures since the only way an agent could work independently is to become a broker.

Third, the combination of legal and contractual complexity and the lack of understanding most buyers and sellers have regarding property sales legitimizes agents. The agents we interviewed described themselves as “hand-holders,” “baby-sitters,” “social workers” and guides for buyers and sellers. In turn, the buyers and sellers, most of whom only rarely buy or sell a house, turn to agents to help them navigate the entire transaction process. The agent’s experience with the nuances of the formal contracts provides buyers and sellers some comfort that they will not be “taken.” Thus, agents provide a set of legitimizing value-adding roles beyond the market intermediation signified by their historic control of the MLS’s information.

Recent changes to the historical structure of real estate industry

As the residential real estate industry adapts to market and technology changes, it drives changes in activities and thus in changes to the structures of signification, domination and legitimation. In this section, we briefly analyze two examples of changes in structures: the rise of buyer agency and the increasing effects of the use of ICTs (in particular, the World Wide Web). Table II summarizes some of these changes.

The evolution of buyer agency. As the property market strengthens, it becomes easier to sell a house. As well, as prices rise, the agent’s commission increases. For both reasons, in a strong market, sellers have a greater incentive to sell their properties themselves (for sale by owner, or FSBO) rather than going

Structure	Changes related to buyer agency	Changes related to use of the Web
Signification	Meaning of being a “buyer’s agent”	Listings as advertisement vs content
Domination		Ability to access listing information via the Web
Legitimation	Norms for what an agent can say	Requirement for having listing on the Web

Table II.
Examples of changes
to structures in real
estate

through an agent. Perhaps coincidentally, when the market strengthened in the 1980s, new laws and contracts were developed to allow an agent to contract with a buyer directly. When an agent represents the buyer, the buyer promises the agent a commission if they buy a house. If the seller has listed with an MLS agent, the buyer's agent is still paid a share of the selling agent's commission, but if the seller will not pay (e.g. a FSBO), then the buyer pays directly.

This change in agency has implications for the structures described above. In particular, buyer's agency requires new norms for behavior, e.g. about what a buyer's agent can tell a buyer or seller. On the one hand, since the agent has a contract with the buyer, a buyer's agent cannot reveal information to the seller that would be disadvantageous to the buyer (e.g. price sensitivity). On the other hand, since buyer's agents are guaranteed a commission from the buyer, they can recommend FSBO houses, which agents usually are unwilling to discuss because the seller will not pay their commission.

The emerging uses of ICT in the real estate industry. Of particular interest for this paper, the use of ICT also modifies structures in the industry, that is, interpretive schema, control of resources and norms that enable and constrain the actions of buyers, sellers and agents. In particular, the use of ICT changes the ability of actors to access information, which we have already identified as an essential resource in real estate. For example, many MLS systems now publish listings on the Web. Consequently, buyers can search the listings themselves and then come in with a list of houses already picked out. This change in control over this information resource changes the structure of domination in this industry.

Some realty organizations are advertising listings beyond individual agent's own efforts. Contractual arrangements bring more of the commission to the organization when a potential buyer (or seller) cold-calls an agency. At the same time, technology-savvy agents are putting up their own sites (and using these to add additional data, making their listings more attractive to buyers, and more of a value-add for sellers). Additionally, third parties are getting involved with listings. For example, some local chambers of commerce list real estate in the hope of luring people/new businesses to move to the area (Buxmann and Gebauer, 1998; Crowston and Wigand, 1999). One way to view these emerging third party efforts, most notably the Web site developers who support postings of MLS data (and their implicit control over content that their systems provide), is as potential new information intermediaries. This leads to the potential changes in real estate agents' roles, as we discuss in more detail, below.

Similarly, the use of new ICT opens new avenues for action that over time may come to be seen as legitimate. For example, as buyers begin to search for properties on the Web, it becomes important to sellers to have their properties on the Web. Companies who have difficulty providing this service may start to lose business. Increasingly, agents are seeing a demand for service by e-mail. Other ICT-1-800 phone links (for the talking ads), direct mail, and myriad personal devices (pager, Fax and cell phone) are increasingly prevalent. These

allow for expanded data collection and marketing so agents can increase their contact/suspect pool (of sellers and buyers).

Finally, in real estate we see an example of interpretive schemas in conflict. For real estate agents, listings are advertisements, used to attract buyers. Part of the commission an agent receives is used to pay for different types of advertisements. From this perspective, listings on the Web are simply another form of ad and agents are prepared to pay a fee to have their houses shown in this way if it will attract buyers. However, from the point of view of Web site developers, information like house listings is content. Content for a Web site developer is something valuable that will attract visitors to a site, to view advertisements or to be steered to some other services. Developers expect to pay for valuable content. This clash of interpretive schema leads to interesting situations, such as agents paying someone to put their listings on the Web and Web site developers paying again to get access to these listings for their site. Our data suggest that agents are divided on the value of control of access to MLS data.

Implications for practice and research

The uses of ICT in real estate continue to expand, opening new possibilities for action, which in turn affect the structure of the industry. The analysis sketched above can be extended to make tentative predictions of how the real estate industry might evolve and for insights on how other information-intensive industries will adapt as ICT use increases.

Changes to the agent's position as a market intermediary

From a market/economic perspective, the growth in ICT use allows for the removal of information intermediaries – the real estate agents (Benjamin and Wigand, 1995; Crowston and Wigand, 1999). Analysis of the data from a structural perspective suggests that real estate agents have lost some of the domination originally created by their control over the information resources. However, our data also show that this change in industry structure is much more complex than simple disintermediation. Real estate agents are by their own actions helping to restructure their roles. We describe several of these new structures in the following paragraphs.

One response to the trend towards disintermediation is for real estate agents to refocus their business on service. The structural perspective is valuable here in directing attention to the resources agents continue to control. The refocusing takes two forms. First, buyers' agents can provide resources from their social network, such as information about mortgage providers, house inspectors, skilled workers, etc. In this way, they provide a value-adding service to potential buyers. Second, agents can also provide a value-adding service for both sellers and buyers – guiding them through the series of steps that are required to complete a transaction. That is, agents can use their transaction knowledge to provide service beyond simply matching buyers with sellers.

This analysis suggests that the role of a real estate agent can now be thought of as having three distinct components. First, agents are information

intermediaries between buyers and sellers. Control of listing information helps maintain this position. It is this traditional role that is most challenged by the growing uses of ICT and the rise of potential rival intermediaries (as we discuss, below). Second, agents draw on large informal social networks to provide value-adding services to prospective buyers (and sellers). These informal social networks have many traits that can be described as weak ties (Granovetter, 1973, 1982). That is, the networks are composed of people who have only limited connections to each other and are only rarely used (in this case, almost solely for work-related services). However, agents with larger networks of weak ties are often able to provide better service. These large networks have a serendipitous effect of reinforcing the agent's first role – listing properties to sell and finding buyers. Third, agents are process or transaction consultants. A limited network of stronger ties (consisting mainly of lawyers and title search agents) helps agents provide buyers and sellers with guidance while they prepare the property for sale (closing). Current research on this combination of a small network of strong ties and a large network of weak ties suggests that the real estate agents have an optimal social network for their needs (Hansen, 1999).

The changes due to increasing use of ICT have a strong impact on the first component described above, but do little to affect the process support or the development of the agent's social networks. Thus, agents who have large social networks composed of many weak ties and/or who have deep knowledge of the closing process may be able to adapt more easily to their reduced role as an information intermediary. This analysis also implies that the greatest difficulty facing novice realtors entering this changing industry is that their social networks are too sparse – that they do not have enough weak ties. Further, the theory of weak ties implies that most new information is introduced to a social network via weak ties (Granovetter, 1973, 1982, 1985). This observation further amplifies the increased difficulty facing realtors (especially novice agents). Not only is the increasing use of ICT reducing their intermediary power, the strength of their social network provides both value-adding services and the source of new information (about potential listings and potential buyers).

On the other hand, agents might act to regain their control over listing information. For example, high volume agencies may be motivated to drop out of the MLS and instead promote their listings directly on the Web. Web search agents might enable buyers to search across multiple agencies, recreating some of the convenience of the MLS. This move would allow potential buyers to learn about properties, but would force them to work with an agent from the listing agency. In fact, not sharing listings is the standard practice in many countries, including England, New Zealand and Australia. It is clear from our interviews that realtor boards (which represent industry-level issues), real estate organizations, and the individual agents have no clear ideas at present how best to proceed.

Finally, extensive ICT use, and specifically the use of Web sites in the real estate industry, provides new sources for some of the activities long performed by agents. Agents may be forced to unbundle these previously packaged

services, pricing individual services separately in response to customer demands for some but not all of their services. For example, within the region we have been studying, some real estate agents have offered lock-box services for US\$50 per month without the property owner having to pay a standard commission. Other real estate agents are partnering – e.g. one agent focusing on finding buyers and the other focused on finding listings – and agreeing to share their commissions. Still others have begun to alter the commission percentage based on their agreement with the seller. For example, commission levels may vary by the number of tasks (such as open houses or additional marketing) that agents will provide. Similar unbundling has been seen over the last few years in other industries (e.g. travel agents, brokers, financial services) in which various forms of disintermediation (enabled by increased ICT use) are observable (Benjamin and Wigand, 1995; Wigand *et al.*, 1997).

Implications for research on ICT's effects

Our work reinforces the value of the recent focus on viewing ICTs as both the product and the shaper of human action (Barley, 1986; Newman and Robey, 1992; Orlikowski, 1992). For example, increased use of Web-based systems to advertise listings can both help and hurt an agent's current roles. They help by extending the agent's ability to market their listings. The increased ICT use hurts because it reduces the agent's control over information. This allows other potential intermediaries (such as the Web site owners/developers) to participate. Moreover, the increased uses of ICT also change the agents' roles and practices – they spend less time as a pure market intermediary and more time as a process/transaction supporter.

Future work

In this paper, we have focused on one aspect of the connection between ICT use and organizational and industrial change, namely the interplay between the actions taken by individuals using ICT and the processes and organizational and industrial contexts in which they work (the lower left-hand section of the framework shown in Figure 1). We are in the midst of a further study to address the other aspects of this framework. Specifically, we are planning a larger-scale study in other parts of the USA and in other countries to better illuminate difference in the structures and the implications of these differences. This work requires a different set of theoretical perspectives. Our current plans include the use of transaction cost economics, social networks and coordination theory, though other perspectives might be illuminating, such as institutional theory. Work completed to date includes a pilot survey of real estate agents to determine what ICTs they use and where in the sales process they are useful.

Conclusion

The technology enabling the understanding and conveying of information expands in speed, efficiency and boundary-spanning daily. This, in turn, may throw entire industries into turmoil, some roles becoming redundant while

completely new ones emerge. New approaches to work, knowledge, information, ICT and organization structure are essential prerequisites to survive in this new environment. Advances in computer technology, near friction-less, low-cost transmission of transactions, as well as the growth of the World Wide Web have placed pressures on the real estate industry as never before and challenge traditional assumptions about real estate transactions. The structural perspective advanced here provides a means to explain how agents' use of ICT both enables and constrains how they participate in real estate transactions. By framing the analysis in terms of signification, dominance and legitimation we are able to better characterize current developments within the real estate industry as ICT uses increase.

Our study is designed to capture these developments as the trends addressed here continue and intensify. Owing to the pervasiveness of the Internet, the analysis of our findings suggests an eroding power position of real estate professionals, because of their previous familiarity with and exclusive access to the MLS. In contrast, such listings of information on the Internet and WWW make real estate information the property of seemingly everyone, in turn reducing the need for agency and interpretation. On the other hand, our data suggests that agents control other valuable resources. It seems that ICT use may, in turn, provide a means (e.g. data visualization, broad-band telecommunications, interactive communications, dispersion of jobs and work, relationship marketing, use of intelligent agents) to make this possible even as it changes the traditional roles agents play.

The above described developments, some actual and some anticipated, will not only affect the real estate industry. Lessons learned and knowledge gained may be applied to other information and ICT-intensive industries. Lastly, our findings are likely to shed new light on the fast growing field of electronic commerce that is rapidly reshaping many transaction-intensive aspects of business worldwide.

Notes

1. We chose to study the real estate industry in a single country for pragmatic reasons, such as access to existing archival data, Web-based data and to fieldwork sites. We intend to extend the study to address national differences, as discussed below.
2. We focus on the residential real estate industry, which includes both new and existing home sales to owner occupants. This industry is related to but distinct from the commercial/investment real estate industry. For a more detailed discussion of the differences, see Lamb (1997). In this paper, real estate refers to residential real estate.

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Appendix. Explanatory matrix development and example

Explanatory matrices provide a means to relate concepts with sources of evidence. The data set from which we draw evidence includes the field notes from the 14 interviews, observations of two meetings and the two closings. Additional evidence from various archival and/or literature sources are also incorporated into the matrix. These form the horizontal axis. The size of the collection of evidence means that the horizontal axis may be quite lengthy at times. The vertical axis reflects concepts for which we seek evidence. In some cases this may be a single concept, but often there are multiple rows. It may be that the rows are distinct concepts or are facets of a single concept. There may be multiple entries in any one cell depending on the number of elements in the source of evidence that relate to the concept.

In the reproduced piece of one explanatory matrix (Table AI), we include several sources of evidence as they relate to several facets of one concept. The sections in italics are embedded notes to explain the elements that we present.

Concept: Signification Facets:	Source: PH073097 <i>(This source is the field notes derived from interviewing one of the real estate agents)</i>	Source: Close198 <i>(This source is the field notes derived from following one of the closing processes)</i>	Source: NAR Buyer Agency literature from Web site <i>(This source is a related document that we have collected)</i>
Role of contracts	<i>(Typically these notes point to segments of source document. In this example, we use summaries of the points as placeholders in the cells)</i> Hard (for her) to learn Knowledge an important source of competitive advantage Changes seem to help the lawyers more than the agents	Each contract is specified Would not move forward toward closing without contracts being signed. Would not negotiate price changes without adjusting contract (and all parties had to initial changes) Local realtor board makes these available on CD ROM for use Agent was able to explain the purpose of each contract and almost all clauses (She later called me back to explain the two she could not) Made the point of representing us but these are turned over to a lawyer to process	Explicit wording of roles of both listing agent and buyer's agent Section on conflict of interest with procedures about how to such conflicts Pointers to realtors code of ethics
Status relative to prospective buyer/seller	Outlines people as suspects, prospects, customers or clients Discusses personal struggle with interacting with clients whom she does not like much: her intent is to be very professional to all clients	Has a well-defined set of norms about who to contact for what. Listing agent NEVER contacts the buyer directly, nor does buyer agent allow direct contact to buyers. Both agents are present when buyers and sellers are to meet in person	Explains what a buyer's agent will do. ALSO explains what is expected of buyer, seller, listing agent and broker

Table AI.
An explanatory matrix segment