Research article

Redefining access: uses and roles of information and communication technologies in the US residential real estate industry from 1995 to 2005

Steve Sawyer[1], Rolf T Wigand[2,3], Kevin Crowston[4]

[1]School of Information Sciences and Technology, The Pennsylvania State University, PA, USA
[2]Department of Information Science and Management, University of Arkansas at Little Rock, Little Rock, AR, USA
[3]Department of Management, University of Arkansas at Little Rock, Little Rock, AR, USA
[3]School of Information Studies, Syracuse University, Syracuse, NY, USA

Correspondence: S Sawyer, School of Information Sciences and Technology, The Pennsylvania State University, 301F IST Building, University Park, PA 16802, USA.
Tel: +1 814 865 4450;
Fax: +1 814 865 6426;
E-mail: sawyer@ist.psu.edu

Abstract

We discuss three industry-level changes in the US residential real estate industry due, in part, to the take up and uses of information and communication technologies (ICT): (1) changes in the processes of transacting residential real estate, (2) changing roles for information, and (3) changing nature of intermediation, with the real estate transaction as more complex than the seller–agent–buyer simplification would suggest. We speculate that these changes are currently indeterminate due to ongoing confusion among the impacts of first and second-level effects, the roles of ICT in redefining access to data, and the importance of localized, social structures of real estate markets. To develop these findings, we take an institutional perspective and draw on multiple data collection methods. This provides us a means to highlight the value of an institutional perspective for studying industrial-level change.
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Introduction

We report on changes in the United States residential real estate industry over a 10-year period of rapid computerization.[1] We do so for two reasons. First, information and communication technologies (ICT) are commonly portrayed as enabling industrial transformation. However, these analyses of likely impacts too-often seem to be based on simplistic application of transaction cost theory with little or no empirical support (Baen and Guttery, 1997; Bakos, 1998). We therefore sought an empirical setting that would provide more insight on possible changes. Second, we sought to gain insight into the roles of ICT on industry structurs and function. The research question we address is: 'What kinds of changes have taken place with the increased use of ICT and how have these uses and changes been influenced by the particular structure of this industry?'

The residential real estate industry is an ideal empirical setting because it is information-intensive service. Agents connect buyers to sellers and do so through control and dissemination of information provided through the Multiple Listing Service (MLS). Agents are valued for the information skills they can bring to bear on marketing and finding properties and on consummating sales. The traditional work processes of real estate agents have been and continue to be influenced and shaped by the use of ICT. These agents have embraced new ICT that might give them an advantage, such as computer databases, geographical information systems, pagers, cellular phones, and most recently, e-mail and the World Wide Web (Crowston and Wigand, 1999; Jud *et al.*, 2002; Tse and Webb, 2002; Kummerow and Lun, 2005).[2]

The residential real estate industry is also a significant economic force in the US. Numbers from the US National Association of Realtors (NAR) indicate that more then 2.5 million homes were sold in 2004, up from 1.8 million in the mid-1990s. And, the average house price is now close to $240,000, up nearly 40%. Membership in the NAR has risen over the past 10 years, and exceeds more than one million paid members in 2004. If one were to add in numbers from those employed in associated fields of mortgage banking/brokering, home inspection, and real estate law, the work of residential real estate accounts for more than 2% of the 140 million American workers in 2004. As a result, changes in this industry may also have significant economic implications.

Computerization and industrial change

Computerization studies have tended towards two broad portrayals of ICT (Mackenzie, 1992). Scholars who draw from economic theory often see ICT as an exogenous force whose arrival disrupts ongoing economic and social activity in unpredictable ways (e.g., Christensen, 1997). Scholars who engage social theory typically see ICT as an evolutionary and internal force, shaped in whole or part by participant's actions (e.g., Williams and Edge, 1995).

We use an institutional frame to study computerization in the US residential real estate industry (Powell, 1990; Swedberg, 1994; Crowston and Myers, 2004). Building on this we make two contributions. First, we highlight the complex inter-relations among the roles of intermediaries, information and core industrial processes. Second, we highlight how ICT are engaged to both alter and stabilize the roles of intermediaries, information and core industrial processes.

This article continues in five sections. First we develop our institutional perspective. We describe our research approach, data collection and data analysis in the next section. We present our findings and discuss them in subsequent sections, first by providing an overview of the US residential real estate industry and then discussing changes in the processes and practices that have occurred contemporaneously with the introduction of ICT. In the last section, we lay out implications for both the US residential real estate industry and for future studies of ICT and industrial change.

Institutional perspectives on computerization of US residential real estate industry

To frame our analysis of computerization in the US residential real estate industry, we draw on institutional theory. An institution can be defined as any standing legal entity exerting influence and regulation over other social entities. Institutions constrain and regularize behavior, and 'have the capacity to establish rules, inspect or review others' conformity to them, and as necessary, manipulate sanctions – rewards or punishments – in an attempt to influence future behavior' (Scott, 1995: 35). Agre (1999) notes more simply that institutions are enduring social forces. Examples include government agencies, international agencies, professional, trade, labor, and industry associations, education, and financial services (King et al., 1994).

Institutional theories contrast with economic theories, where the focus is on efficient structures and governance via markets or hierarchies based on several aspects of the good or service engaged (Mackenzie, 1992). Institutional theories highlight that legitimization, social forces, and overlapping and conflicting goals are always at work in shaping form and function. Further, there are dependencies over time and these trajectories of structure and action, legitimization and conflict, lead to constant indeterminancy. That is, efficiency is neither a unitary concept, nor is it sole goal of social organization (Scott, 2001). Social institutions have a dual character: they provide governance functions for society and also define a style of living (Powell, 1990; Scott, 2001). Institutions structure, but do not determine, the behavior of individuals. Similarly, individuals structure, but do not fully determine, the institutions in which they operate.

An institutional perspective leads us to include those firms that compete to supply a given set of products or services, the regulatory framework that specifies allowable competition, and the professional associations (such as the NAR), educational norms (of, say, bankers or economists) and other players (politicians, consumers) whose actions, helps shape these rules. An institutional perspective incorporates both rational economic and social aspects of decision-making such as concerns of legitimacy, stability, and enhanced survival prospects (Meyer and Rowan, 1977).

One focus of institutional theory is to attend the structure and ongoing functions of the regulatory and contractual framework governing the industry. This focuses attention on the organizations that regulate and control interactions – and how these institutions shape and are shaped through the processes of regulation. In the particular context of the US residential real estate industry, we focus on legal and regulatory arrangements as engaged by major professional associations (such as the NAR), the federal government, and the home mortgage and banking industry.

A second thrust of institutional theory is to explain the isomorphism of organizational fields and the establishment of institutional norms. Institutional theorists focus on the development, and maintenance of, isomorphic institutional environments. Isomorphism is what drives organizations to become increasingly similar over time. Isomorphism is accomplished through the movement towards, and the maintenance of, institutional norms through coercive, mimetic, and normative processes (DiMaggio and Powell, 1983; Scott, 2001).

Institutional theorists further acknowledge that computing can be both an element of structure and a cultural force (Agre, 1999, 2000; Scott, 2001). When computing is framed as an element of structure its primary roles are functional or as a means to formalize and standardize. When computing is viewed as a social force the focus is on social norms and socialization processes of use. We highlight both structural and social perspectives in this analysis of computerization.

Research approach

We engaged multiple methods to study the US residential real estate industry. Between 1997 and 2005, we gathered

data using interviews, participant observation, surveys, secondary data collection (from several agencies of the US federal government, the states, the NAR, and other stakeholder associations and institutions), and published works found in the academic, public, and professional presses; policy documents; and other sources. We drew on these multiple forms of data collection based on the particular issues on which we focused. For example, early in our project we conducted in-depth interviews, engaged in participant observation and some pilot surveys of one local real estate market.

To gain insight into the structure of the residential real estate industry we read widely (including text books and popular books on the topic). We interviewed members of the NAR, US government, and other agencies and associations. And, as we began to develop findings from our work, we presented at industry conferences, engaging participants directly. Across this time we have formally interviewed nearly 100 people on a range of topics, informally spoken with hundreds more, and had regional and national survey responses returned from nearly 1000 people (of the 8000 we asked). In addition, we have drawn on data from dozens of secondary sources.

Agar (2005) makes clear the importance, and difficulty, of gaining an understanding of a domain. Our work, while extensive, helps us to make strong claims on aspects of the residential real estate industry. We make no claims on a complete understanding: our claim is only that we understand how to understand the intellectual terrain of residential real estate. Our analytical approach has been to carry out iterative interim analyses (see Miles and Huberman, 1994). Here we report summary findings drawn from these interim analyses. That is, in the ongoing discussions and reflections of our data and findings to date, we often speculated on both the meaning and importance of certain facets of the industry. Particular events and series of activities caught our attention because they seemed to reflect theoretical anomalies or become a significant and visible phenomenon. This would lead to us re-analyze existing data, collect more, and often to rework our conceptual understanding (indeed, the findings reported in Crowston et al. (2001) reflects just such a revamped understanding).[3]

Findings: the US residential real estate industry

In this section, we review the structure of the real estate industry in the United States, then outline the stages of a typical residential real estate transaction. Much of this information was developed from our fieldwork (Crowston et al., 2001; Sawyer et al., 2003). In the rest of this section, we provide a generic description touching upon the common aspects of the set of steps resulting in a sale of a house (the 'closing'). Law and the regulations of professional societies govern real estate work, so the process we describe is specific to the US and is further differentiated by state and local laws, regional and local customs as well as legal precedent.

The actors

The main actors in the real estate process are the buyers, sellers, and real estate agents. The role of real estate agents is to bring together the seller and buyer of a property and to advise both of these principals, independently, regarding the transaction. In the US there are typically two agents involved in each transaction. The listing (or seller's) agent assists a seller in marketing 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 advises in the negotiations and details of the transaction. The second (typically known as the buyer's) agent helps a buyer find suitable properties among those offered for sale and narrow the selection to a specific property. The buyer's agent advises the buyer on the purchase. Thus, the typical house sale/purchase has the buyer and seller negotiating with the intermediation of the buyer's agent and the seller's agent.

The real estate process

The process of selling and buying a house can be divided into: listing, search, negotiation, and closing.

Listing

The first stage in the process is listing, where a prospective seller puts the house on the market. Sellers can market the house themselves, or then can contract with an agent to represent them. A key component in the US residential real estate process is the MLS, a shared database of properties for sale. When a listing agent signs a contract with the seller of a property, the agent enters a description of the property in the MLS database. Originally, the MLS was shared solely among agents and brokers as a printed book combining listings from all its members. Today, MLS are computerized (and, increasingly, online, web-accessible and public) databases.

The MLS for a particular region is usually owned by the local realtors' organization (the 'board') but typically operated by a specialized, yet separate MLS company. Real estate agents pay an annual fee to participate in the MLS. Typically, membership in the realtor association is required to join the MLS. This membership also covers dues for the NAR (see www.realtor.org). Real estate agents who are members of the NAR are called 'realtors' (a trademarked term).

Most MLS databases are based on proprietary technology and were developed to handle specific regional issues. Currently this degree of customization makes it difficult for one MLS database system to easily interoperate with others. As we note below, regional MLS are aggregating. What gets reported on the Internet-accessible realtor site (see www.realtor.com) reflects a subset of data available in an MLS database.

Search

A prospective house buyer can look for properties advertised in the newspaper, by posted signs, or work with an agent. Agents who are members of the MLS can search the MLS database for properties that fit their clients' needs. Usually the buyer physically inspects several potential properties before deciding which to buy, with the buyer's agent making the arrangements for these visits and accompanying the buyer. The agents can more easily show

MLS-listed properties because the door key to many MLS-listed properties is made available to other members of the MLS (through a 'lock box' to which members have access, attached to the front door handle of the property). The lock box records all accesses to the key, providing the selling agent a record of who has viewed the property. Thus, the MLS is more than just an information repository since it includes services and agreements that shape the relationship among agents and becomes an important element within the value chain.

Negotiation

Once a property is selected, the buyer's agent provides advice (to the buyer) on making an offer to purchase the property and helps in the negotiations and details of the transaction. When an offer is made and accepted there are typically a set of contingencies on the contract that need to be addressed. These contingencies typically include the buyer's financing, inspection and appraisal of the property, etc. Both the listing and selling agent typically help by providing access to resources to address these issues. For example, a buyer's agent might refer a buyer to a lender, house inspector or other necessary professionals. A listing agent might suggest several repair personnel to help the seller redress work demanded by the buyer.

Closing

The final stage of the transaction is the closing, at which the title to the property and the payment changes hands. At the center of this transaction is the HUD1 form. This form is mandated by the US Housing and Urban Development (HUD) Agency via the Real Estate Settlement Protection Act (RESPA). The RESPA is decided on by HUD, who serves as the overseer of the commercial transaction of real estate in the same way the Federal Securities and Exchange Commission provides oversight to financial transactions. The HUD1 form provides detailed information (in a line-by-line format split into two columns – one for the buyer and one for the seller) on the expenses incurred for selling and buying a property. The details reflected in the line items have been negotiated by a number of stakeholders and, in essence, serve to structure the closing.

In finalizing a residential real estate transaction, the HUD1 form and the purchase and sales (P&S) contract are central documents and together help to structure the process of buying or selling a property. The contracts made between real estate agents and both buyers and sellers help to structure the listing and seeking aspects of the process. The contract between a real estate agent and a broker or owner structures the agency. Broker/owners (and perhaps agents) participate in the MLS and this provides them a means to share their information on houses for sale (listings) with others who also belong to the MLS (or access the MLS via online and offline sources). Along the way, both buyers and sellers enact contracts with a range of value-adding service providers including mortgage-providing financial services firms (such as local banks), home inspectors, and lawyers. Simply, the entire set of players involved in a real estate transaction is driven by contractual relationships. It is the structure and form of these contractual arrangements that define the core processes of the residential real estate industry.

The RESPA and its HUD1 form are shaped through the ongoing interaction among a number of professional associations and large players. Most of these associations and players have a significant presence in Washington, DC and, in these interactions, engage in policy discussions and policy shaping that gets instantiated in HUD1 and RESPA. These associations and players include (as a representative, not exhaustive, list): the HUD, Fannie Mae and Freddie Mac (the government sponsored enterprises (GSE) guaranteeing most mortgages in the US), the NAR, the Mortgage Bankers Association, the Appraisal Institute, American Land Title Institute, The Real Estate Service Providers Council, Cendant and others.[4]

Relationships among actors

One characteristic of the residential real estate industry is that all relationships are contractual, governed by an intricate set of contracts, laws, and institutional policies. The relationship between an agent and seller is governed by the listing contract the seller signs. In most cases the seller pays both agents, and this is part of the closing settlement. When listing a property, the seller contracts to pay the seller's agent a commission, usually a percentage of the sales price, when the transaction closes. These commissions are typically in the range of 5–7% of the value of the property. Thus, while exact figures are not kept, we estimate that in 1998 total commissions exceeded \$42B and in 2004 they exceeded \$78B.[5]

In residential real estate, the seller agrees to pay the commission even if the seller's agent does not find the eventual buyer. As a result, an agent can simply accept a listing and wait for a buyer to emerge. This somewhat lopsided relationship in favor of the agent may have consequences for trust perceptions and may create potential conflicts of interest in the agent's relationships with buyers and sellers. However, a seller's agent is considered to owe a fiduciary duty to the seller, which includes the responsibility to provide a reasonable level of effort.

A buyer need not have any contractual agreement with an agent. A formal contract is not needed because a seller listing a property in the MLS, agrees (as noted in the MLS agreement) to pay any agent who introduces the buyer one-half of the total agent commission (the seller's agent receives the other half). Again, the MLS goes far beyond a simple information conduit to include these agreements. Since the seller pays both agents, traditionally both owe a fiduciary duty only to the seller, creating a difference of interest between the buyer and an agent with whom they may be working. For example, an agent working with a buyer must disclose to the seller the maximum they think the buyer would be willing to pay for the property, even though this is clearly not in the best interests of the buyer.

However, a buyer can independently contract with an agent for what is called buyer's agency. In this case, if a buyer purchases a property offered directly by a seller, such as a for-sale-by-owner or FSBO, the buyer must pay the agent's commission. If the buyer selects an MLS property, the seller pays the commission. In return for the commis-

sion, the buyer's agent owes a fiduciary duty to the buyer, not to the seller.

Disintermediation

In the real estate process, disintermediation means a buyer and seller finding each other without using a real estate agent as the middle person. In an FSBO sale, the owners advertise on their own, and not through the MLS. And, the seller negotiates directly with the buyer. Lawyers and title clerks (who may both clear the title record and record the transfer of ownership into the local 'deed books') are typically involved in both agent-supported and FSBO sales, as are inspectors, appraisers, mortgage bankers, etc.

Agents and brokers

In all states in the US, agents are affiliated with a real estate firm that employs, or is headed by, a broker. Real estate firms range in size from a single-agent-broker to dozens of agents along with clerical and managerial staff. Some agencies are franchises of national chains (e.g., Prudential or RE/Max); others are local. Agents enter into listing contracts on behalf of the broker, get a variety of services from the firm and, in return, give the firm a share of their commissions. These relationships are contractual, as agents are independent contractors rather than employees of the agency. A highly productive agent has the bargaining power to negotiate for additional services or a more favorable division of the commission. In other words, the organization structure of the real estate industry is primarily contractual, agents essentially acting as 'companies of one.' Independent agent-brokers provide their own resources and develop their own network. Independent real estate agents do not have to share their commissions with an agency, but do not have access to the resources of the agency as an affiliated agent does such as pooled information resources and ICT.

Findings: changes in the US residential real estate practices

Our work in understanding of the industry-level changes in residential real estate, due in part, to the take up and uses of a range of ICT lead to three broad findings: (1) changes to the processes of transacting residential real estate; (2) changes in the ways in which pertinent information for these processes are being gathered, shared, and used; and (3) intermediation in the real estate transaction is more complex than the common seller–agent–buyer simplification would suggest.

(1) Process changes in the transaction of real estate

Rapid computerization in residential real estate has led several process changes, listed in Table 1 and discussed briefly, below. While each seems relatively minor we contend their combined effect is substantial. As context for this discussion, recall that the process of transacting a house has several elements: it must be listed for sale, a buyer must find this listing, there must be a P&S contract, there must be a set of activities to resolve contingencies, and the transaction must be completed according to applicable federal, state and local laws.

Shift house search to buyer

The rise of online repositories of houses for sale allows potential buyers to search for viable houses without engaging an agent or even driving to see these houses. The online listing of houses is increasingly common with many houses viewable from local and national web sites. These sites include local broker's personal web site, their brokerage's local and perhaps national web site, and the searchable MLS at www.realtor.com or one of the discount/for-sale-by-owner sites or private listings. Increasingly, this searching is done prior to engaging the services of an agent. The NAR reports that more than 70% of house buyers begin their search on their own on the Internet, before contacting a real estate agent (National Association of Realtors, 2004). Subsequently, the buyer approaches an agent with a short list of viable properties. The agent can then spend his/her time understanding buyer's needs and wants without the time-consuming (and non-revenue producing) activity of early search. In this situation, both the buyers and the agents gain value by using ICT to shift more of the search to the buyer and to do so through the intermediating activity of online searching of listings.

Aggregate listings for public viewing

The publicly viewable MLS is a fundamental shift. These listings were once carefully guarded by real estate agents and this was seen to be protecting their information monopoly. Our earlier work made clear that information intermediation is but one of the three areas where real estate agents provide value (the other two being process knowledge and social capital that can be used to support

Table 1 Process changes in residential real estate due in part to computerization

Shift house search to buyer (more often done via online search prior to engaging)

Aggregate listings for public viewing (the publicly viewable MLS and many other sites)

Multi-channel communications (ubiquity of mobile phone and fax, increasing use of email)

Semi-automation of some process steps (digital forms, online applications)

Agent specialization (many models of service bundling and unbundling)

Changes to closing (RESPA and the HUD1 form)

closing needs of buyers and sellers) (Crowston *et al.*, 2001; Sawyer *et al.*, 2003). With the online MLS, both sellers and buyers have greater access to relevant information. Most, however, need assistance in making sense of this information.

Multi-channel communications

The ubiquity of mobile phone and fax use among real estate agents, the widespread use of email, and the increasingly sophisticated web sites (with value-adding links to relevant sources, digital pictures and virtual tours of houses using digital video) improves the flow of information during the purchase and closing processes. This leads to where the process is more transparent and it is easier to identify and resolve issues along the way.

Semi-automation of some process steps

The use of digital forms (for the P&S agreement and other documents such as the appraisal and home inspection) and the use of online applications (for mortgages, listings and search profiles) provide some semi-automation of various steps in the listing and selling of residential real estate. The cumulative effect of this semi-automation leads to an increasing percentage of the transaction information being shared in digital form, discussions about standardizing the form and structure of data, and the use of this data for analysis and additional value-adding functions.

Agent specialization

The concept of the full service agent remains a dominant model for residential real estate. This continues to be an active area of innovation and there are many models of service bundling and unbundling. For example, the growth of buyer agency, the number of pairings (where agents who specialize in finding listing partners with agents who specialize in supporting buyers), discount models (where agents will unbundle their services to individually price listing, marketing and closing activities), and agent networks (where a senior and successful agent hires on younger or more specialty-focused agents to support their efforts). The contribution to these innovations due to computerization varies, and they continue as agents, brokerages and consumers explore alternative business models/arrangements.

Changes to closing

Changes to closing continue to garner more attention than some of the other aspects of transacting residential real estate in the US, likely because it is the culminating event in any sale. The most fundamental changes are those made via RESPA and the HUD1 form. For the past several years, roughly coinciding with the change in administrations in Washington, DC, there has been an ongoing effort to submerge the detailed disclosure of elements of closing in favor of a bundled or 'one number' closing form. The rationale for the single number is simplicity. The rationale for the detailed disclosure is transparency. There has also been some discussion and a few trials to do virtual, or fully online, closings. And, there is some discussion of the Federal government reclassifying the sale of residential real estate as a financial, not commercial transaction. Only the

virtual closing has much to do with the take up and uses of ICT in residential real estate. The other two seem more political and ideological.

(2) Changing roles for information

Here we highlight three findings regarding the changing roles for information relative to the residential real estate process: (1) access to information is increasingly transparent, (2) standards for digital data structure and exchange are seen as increasingly important, and (3) the value of informational control in listing data and sharing information continue to characterize policy-level activity.

Increasingly transparent access to information

The most visible evidence of increased transparency of information is the public access to the MLS. Data in regional MLS can be accessed via the www.realtor.com site, many local brokerages, franchises, individual agent's web sites, and community portals. And, the evidence is that people are doing just that: online house looking is a 21st century fashion (Boyce and Rainey, 2002; Kim and Heineman, 2003). The open access, and consolidated access portals such as the www.realtor.com site mask the intense local market competition that defines residential real estate. That is, access is too easily mistaken as creating a national market. The more complex and relevant issue with this increased access to information is that buyers and sellers are more knowledgeable about local comparisons with price, location, schools, etc.

Standards for digital data structure and exchange

There are several competing efforts to create standard data structures for collecting and sharing real estate data, typically using some variation of extensible mark-up language (XML). The value of a standard data structure for real estate (and basing it on a popular and widely used data structuring standard) is that data transfer via digital means is enabled. Many of the players speculate that this will help speed up the selling, buying and closing processes, increase the value-adding potential for players (who can more easily engage in large-scale analysis of data) and reduce data quality errors (since the chief source of data quality errors are re-keying or re-entering data).

Regional MLS are not central players in this XML-standards activity (the mortgage bankers, appraisers and title inspectors are much more engaged). This is due in part to the legacy structures of their proprietary databases and database systems. The regional MLS franchises are focusing on consolidating (with larger or wealthier regional boards buying or merging with smaller and less wealthy boards). This consolidation leads to de facto data standards based on market share of the particular regional MLS.

Third-party vendors who provide turn-key software systems for real estate office sales and management have been aggressively entering the market. Some have introduced their own proprietary data structures (tied to their proprietary software). Most have developed means to share data via XML or engaged multiple MLS data structures in order to be more appealing to agents and agencies looking to purchase these enterprise systems.

Debates on information control

A common and widely held view among those practicing and politicking in the residential real estate industry is that control and ownership of the data and information on listings provides competitive advantage. And, evidence suggests that those agents who list more houses are involved in more transactions. With the increasing transparency, and with more of these data in digital form, current debates on information control are vibrant but indeterminate. For example, the move to alter RESPA and the HUD1 form to reduce the level of detail visible to buyers and sellers would shift control towards financial institutions and away from the consumer (even as the use of digital forms and movement towards standardized data structures would make it easier to populate the form semi-automatically). The NAR policy on posting and access to MLS data is a second area of passionate debate regarding information control. The NAR policy makes it difficult for those not a member of the NAR to gain full access to the database. Real estate agents can opt to share their information with others, directly. However, MLS is designed to prevent data harvesting.

The rapid expansion of access to information about schools, neighborhoods, communities and houses for sale in local markets (via the many interlinked web sites) is driving local governments to provide online deed and title registry data and to increase their uses of ICT. These activities will be difficult and expensive, and the debates on how to engage and pay for these activities will be an increasingly central issue to the tens of thousands of local governments in the US.

(3) Role of intermediation

When appropriate ICT (such as computers connected to the Internet) can reach the consumer (including home buyers and sellers) directly, there exists the potential to leap-frog or by-pass the players within a value chain. All that is needed is someone in the middle who reconnects the remaining players. This is the classical case of disintermediation. When re-intermediation occurs, the re-intermediary is often a new player or one playing a different role in the value chain (see Benjamin and Wigand, 1995; Wigand and Benjamin, 1995). Intermediation in real estate has consistently been characterized as what real estate agents do. In Sawyer *et al.* (2003) we noted that the increasing availability of real estate information on the web did not dis-intermediate the real estate transaction per se, it just altered the roles played by the agents and the MLS. Instead, we found that the relationship with the agent starts later in the process: After buyers search the Internet for suitable houses, they typically contact an agent who then takes on the traditional role of linking buyer and seller.

Dis-intermediating the transaction would lead to where the FSBO model dominates. Yet, FSBO sales have stayed relatively constant over the past 10 years. Local areas characterized by highly desirable locations and strong social networks among community members continue to be where FSBOs make for a larger than typical share of transactions. Within-family sales are a second common reason for FSBO success. And, as we noted above, there are a number of innovations and business model experiments with unbundling of services and discount brokerages that are 'less intermediated' than the traditional model.

A more complete picture of the real estate transaction leads to an even more complex understanding of inter-mediation. For example, once a buyer has found a house to buy and he/she and the seller have engaged a P&S agreement, in order for the transaction to complete there are a number of intermediaries who participate. Beyond the MLS and real estate agents, these can include lawyers (for the seller, for the buyer, for the bank and perhaps other parties), mortgage brokers, and bankers. The analytic simplicity of categorizing complex transactions as either intermediated or not belies the web of connections and actions that make selling and buying real estate a multi-state and multi-step process. And, its a very fluid, interdependent, and remarkably regulated process, one that varies in subtle and sometimes important ways from local market to local market.

Industry-level computerization: issues and implications

These findings from our ongoing attention to the computerization of the US residential real estate industry helps make clear that the uses, and effects, of ICT can be found across all aspects of the processes of listing, purchasing, and closing on the sale of homes. We note there are many micro-level innovations and that the ongoing computerization of the US residential real estate industry continues. The more difficult assessment is the extent to which these micro-level changes are reflected in changes to the industry structure, its core processes, or its competitive basis.

To date, the two most visible macro-level changes are: (1) the rapid computerization and (2) the increased access to information and data on houses by both sellers and buyers. The effects of these two changes continue to evolve and are the center of passionate, though still indeterminate, theoretical and political debates. Here we comment on aspects of these changes including first- and second-level effects, redefining access, and the localized, social structure of markets.

First and second-level effects

Unintended, unimagined, and unexpected effects of using ICT are one by-product of computerization. This is such a common experience that it requires little additional comment other than to note in passing some amazement that this is too often ignored. Sproull and Kiesler (1991) note that second-level effects are both positive and negative. Kling (1996) highlights that these second-level effects are likely to be where the value of an ICT are seen. These scholars also points out that, too often, decision-makers focus on first-level, or intended, effects. However, these first-level effects are rarely seen and, too often, are based on short-sighted analyses and limited understandings of the ICT being taken-up.

Our findings on the ongoing and rapid computerization of residential real estate (with the nearly ubiquitous take up of mobile phones and the substantial penetration of the Internet as host to house listings in less than 10 years as two measures) suggests that residential real estate is beginning to see some second-level effects. But, too much attention continues to be paid to first-level effect arguments, making

it easy to miss that the ongoing changes are indeterminate at this point.

Redefining access

Dutton (2004) notes that new ICT help to reshape how people come to think about access to information. That is, as people begin to use a new ICT to access information and to interact with one-another, they begin to rethink their relationships with information and communication. It is this reshaping or redefining that often leads to innovation and change. For example, sellers have more information available, which allows them to better assess their market value. This in turn allows them to rethink how they handle their house – as an asset that they can manage relative to refinancing, renovations, etc. The change in access to information on real estate allows a series of subtle changes to redefine what it means to use the ICT available.

The ongoing innovations that draw on online access to the MLS (for buyers, sellers and agents) and the increasing attention to relying on digital forms of data across the listing, purchasing and closing of a house are two areas where redefined access is likely to lead to continued innovation. At the industry level, we further highlight the policy issues relative to access to this information (by whom and for what) as central to the industrial structure and function. This redefined access is at the center of debates on the role of banks entering the real estate agency and the fair use of online information from the MLS (Zumpano, 2002; Hahn et al., 2005).

Social structures of markets

Our previous work helped to make clear that real estate transactions take place through an intricate set of social networks. We also found that these networks were primarily driven by the professional ties that real estate agents develop in their work. And, we noted real estate agents add value to the transaction via their ability to draw on and use social capital (invested in these professional social networks) to guide the P&S activity to a successful closing (Crowston et al., 2001; Sawyer et al., 2003).

These findings draw on the concepts of economic sociology and the social structure of markets (White, 1981; Baker, 1984; Swedberg, 1994; Bar, 2001). This line of theorizing is supported by a long succession of empirical studies (see Nohria and Eccles (1992) for a collection) showing how markets are localized, social, structures mediated through interaction (Leifer and White, 1987; Burt, 1992). Seen this way, the value of real estate agents is that they come together to transact real estate and in doing so create local real estate markets. Their commerce is, in part, the making of a real estate transaction. That is, real estate agents are market makers. This market is localized, built on the collective engagement of many professional social networks.

As an institution, local real estate markets are omni-present across the US. They exist in small towns, rural areas and also overlap as micro-markets across major metropolitan areas. These myriad local markets span political and geographic lines. And, they are similar in structure and function (as the principle of institutional isomorphism suggests: Dimaggio and Powell, 1983). Each operates embedded into its local economic community.

Institutional isomorphism allows us to analyze the structure of a local real estate market and from that expect that other local real estate markets will have similar structures and functions. This is due in part to the roles that rules and norms play, and in part to the common goal of each of these local real estate markets. However, the players and specifics of each local market will vary. However, in policy discussions, this is too easily lost in the abstracted debates on the best rules and procedures for market structure and process.

Issues for practice

We have noted that the US residential real estate industry has grown substantially over the past 10 years, during a period of rapid computerization. It is impossible to disentangle these two forces. What is clear, however, is the net result has been to make this a growth industry, with rising wages and increased participation.

Our institutional perspective focuses attention towards two easily overlooked aspects of practice. First, local markets are made, in large part, by the social structures of local real estate agents. Second, that local real estate markets are similar in structure and function to one-another, but this does not make them one market. Our attention to the take up and uses of ICT helps make clear that the rapid computerization in the industry has helped redefine access to information for all players. And, finally, we are beginning to see some second-level effects from these changes. It seems too early to tell how they will play out and the danger is to continue focusing, naively, on first-level effects.

We speculate here on three issues that will be at the core of policy and practice debates in residential real estate over the foreseeable future: (1) information access and control, (2) innovations (second-level effects) due in part to the increased uses of ICT, and (3) professionalization of the workforce.

(1) Information access and control

Debates on the flow of information, including the form and standards for share and the ownership and fair uses of both property and transaction data are likely to continue. There is much at stake and these issues are not well understood. Given the growth of, and healthy competition in, local residential real estate markets, it seems unwise to move quickly. And, as we note below, we anticipate that a large number of second-level effects will begin to emerge as people's uses of ICT mature and micro-innovations that occur within local real estate markets are picked up, adapted and shared. This seems a dangerous space and time for policy change.

(2) Innovations (second-level effects) due in part to the increased uses of ICT

The roles ICT are playing are expanding and we expect this to continue. We expect that there will be increased uses of the Internet to share data on listings, processes, and value-adding services. The use of enterprise-level systems to support firm level operations is likely to expand (particu-

larly among franchised firms). And, the increasing presence of digital data across all the elements of listing, purchasing and selling, and closing will continue to reshape concepts of information access and use. We note, again, that this increased access by consumers to information and the ongoing, second-level, changes due to this redefined access may be the engine driving the boom in residential real estate.

(3) Professionalization of the workforce

Institutional perspectives suggest that over time social organization becomes more complex. One example of this in residential real estate are the increasing technological sophistication demanded of real estate agents to use the ICT-based systems that are ever more present. A second example is the increasing number of people engaged in transacting real estate, the levels of specialization and expertise, and the increased temporal pace and pressure for performance. We anticipate that this will lead to an increasing professionalization of the workforce. There will be increased demands for formal and ongoing education. The start-up and operational costs will demand more capitalization and raise the low barriers to entry and exit. And, the costs of engaging the new ICT and the investments in skill training will, in turn, lead to increasing importance of organizations as mediators for agents (the inverse of both Bakos' (1998) and Baen and Guttery's (1997) predictions).

Implications for research

We began this article, and our research effort, by noting that the US residential real estate industry provides a means to gain insight into information-based work and the rise of the knowledge economy. We also noted that the changes in this industry over the period 1995 to date are a window into computerization. In fact, this industry is a living laboratory for ICT-enabled industrial change. Finally, and in contrast to the economic perspective, we chose to frame our analysis of the computerization of the residential real estate industry from an institutional perspective (c.f., Mackenzie, 1992; Scott, 2001; Crowston and Myers, 2004).

We conclude by highlighting the value of an institutional perspective for studying industrial change. An institutional perspective provides a viable, and often insightful, alternative to the more common economic perspective on industrial change. The institutional perspective highlights the complex and overlapping roles that social institutions play in forming and maintaining industrial structures and processes. The institutional perspective provides means to conceptualize computerization as both process and structure. And, the principles of institutional isomorphism helps make clear that multiple local markets are neither one singular market nor are they so dissimilar that analytic insights drawn from one can help inform that actions and structures of another.

There is great opportunity to continue both the study of computerization and industrial change. For example, we have noted the importance of rules and norms, but have not been able to explore their genesis and ongoing maintenance and adaptation. We have noted that real estate, and believe that they typify many mature industries, is a complex and overlapping set of institutional interactions. This leads to a state of constant indeterminism: forces and trajectories are shaping, not determining, future events and actions.

Notes

1 We focus on the residential, rather than the commercial real estate market. See Lamb (1997) for a detailed discussion of the differences.
2 Both our data and other contemporary literature (e.g., Crowston et al., 2001; Muhanna and Wolf, 2002; Kummerow and Lun, 2005) suggest knowledgeable agents are concerned about their future roles in the face of the potential changes to real estate. As we noted, concerns about the impacts of ICT are not unique to the real estate industry.
3 Estimated using 6% commission on total dollar sales.
4 Space constraints and the review orientation of this article preclude a more detailed discussion of our data collection and analysis efforts. For more about our project and methods see http://crowston.syr.edu/real-estate/.
5 A representative listing of relevant institutions involved in the US residential real estate industry:

American Land Title Association (http://www.alta.org/)
Appraisal Institute (http://www.appraisalinstitute.org/)
Credit Union National Association (http://www.cuna.org/)
Fannie Mae (http://www.fanniemae.com/index.jhtml)
Freddie Mac (http://www.freddiemac.com/)
Housing and Urban Development (http://www.hud.gov/)
Mortgage Bankers Association of America (http://www.mbaa.org/)
National Association of Realtors (http://www.nar.org)
National Association of Mortgage Brokers (http://www.namb.org/)
Real Estate Settlement Providers Council (http://www.respro.org/)

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About the authors

Steve Sawyer is a founding member and an Associate Professor at the Pennsylvania State University's School of Information Sciences and Technology. Steve holds affiliate appointments in Management and Organizations; Labor Studies and Industrial Relations; and the Science, Technology and Society. Steve does social and organizational informatics research with a particular focus on people working together using information and communication technologies.

Dr. Rolf T Wigand is the Maulden-Entergy Chair and Distinguished Professor of Information Science and Management at the University of Arkansas at Little Rock. He is the immediate past director of the Center for Digital Commerce and the Graduate Program in Information Management at Syracuse University. Wigand researches and consults in information management, electronic commerce and markets, IS standards and the strategic deployment of information and communication technology. His research interests lie at the intersection of information and communication business issues, the role of newer information technologies and their strategic alignment within business and industry. Wigand has taught on the faculty of Syracuse University, Arizona State University, Michigan State University, Universidad Iberoamericana, Mexico City, and the University of Munich. His research has been supported by the National Science Foundation, the German National Science Foundation (DFG), the Volkswagen Foundation, the International Social Science Council, Rome Laboratory, and other funding agencies. He is an editorial board and review member of almost 30 academic and professional journals, book series, and yearbooks. Wigand is the author of five books and over 110 articles, book chapters, and monographs.

Kevin Crowston is an Associate Professor in the School of Information Studies at Syracuse University and director of the Ph.D. program. He joined the school in 1996. He received his A.B. (1984) in Applied Mathematics (Computer Science) from Harvard University and a Ph.D. (1991) in Information Technologies from the Sloan School of

Management, Massachusetts Institute of Technology (MIT). Before moving to Syracuse he was a founding member of the Collaboratory for Research on Electronic Work at the University of Michigan and of the Centre for Coordination Science at MIT. His current research interests focus on new ways of organizing made possible by the use of information and communications technology. He approaches this issue in several ways: empirical studies of coordination-intensive processes in human organizations; theoretical characterizations of coordination problems and alternative methods for managing them; and design and empirical evaluation of new kinds of computer systems to support people working together. Specific topics include the virtual organizations, development practices of Free/Libre Open Source Software teams and the application of document genre to the World-Wide Web. He is the principal investigator (PI) on an NSF grant for 'Effective work practices for Open Source Software development' and co-PI on 'How can document-genre metadata improve information-access for large digital collections?'