The Coming Downsizing in Real Estate: The Implications of Technology

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Executive Summary

Currently there is explosive growth in the availability of data-bases that may be merged to create "user friendly" real estate related market information and services. Reduction in traditional personal customer services required (e.g., _________________), and the ease of collection, assimilation, and processing of information, will have major implications for the real estate industry and future employment prospects. This study collects employment trends by SIC Codes and other sources, and analyzes the rapid changes occurring in the areas of real estate brokerage, finance, appraisal, leasing and title insurance, due to technology. The findings suggest that the number of real estate participants currently employed should decline significantly because of increased efficiencies. Home buyers and sellers may receive an income transfer from licensed agents, lenders, appraisers, attorneys, and loan servicers.

I. Introduction

Real estate agents, appraisers, mortgage loan originators, and title companies exist in part because of inefficiencies in the traditional real estate market. The lack of information between buyers and sellers of property and/or between mortgage borrowers and lenders, combined with the requirement of independent estimations of value and confirmation of valid land title, has in the past meant full employment for millions of Americans, as shown in Exhibits 1 through 5. For example, over the period 1980 through 1993, an average of 700,000 people per year were employed full- time as real estate agents or managers, nearly 2 million worked in the banking industry each year, and over 100,000 were subdividers and/or developers.

The current rapid growth of both consumer and real estate service provider business computing, coupled with the growing availability of market information databases for real estate participants, are revolutionizing the real estate industry. The real estate property and mortgage markets, together with all supporting professions and service providers, are experiencing a paradigm shift that will have major implications in levels of employment and compensation. This will reduce prevailing, comparatively high, transaction costs associated with the sale/purchase of all types of real estate.

Current Internet Real Estate Customer Profile

It has been estimated by Dun and Bradstreet (1996) that 17 percent of North Americans age 16 or older (37 million people) have Internet access, and 65 percent of these people used the

Internet during the first quarter of 1996. The demographic profile of Internet users includes the follows:

1) Sixty-six percent of Internet users are male.

2) Twenty-five percent of Web users' household annual income exceeds $80,000, while only 10 percent of the general population earns such income.

3) Fifty percent of Web users, compared with 27 percent of the population, consider themselves to be in professional/managerial occupations.

4) Sixty-four percent of Web users have at least one college degree, compared with 29 percent of the total population.

5) Web users average 5.5 hours per week on the Internet, compared with 2.5 hours on other on-line services.

An announcement in March, 1996 that AT&T would provide customers with five hours per month of free Internet access, and unlimited access thereafter for $19.95 per month, creates potential new links between the World Wide Web (WWW) and AT&T's millions of phone customers. This is only the beginning trend in the increasing availability and falling cost of both phone service (e.g., cellular phones) and the Internet.

The implications for the real estate industry are potentially enormous. In January, 1995 there were approximately 100 real estate Web sites that offered real estate for sale. By year-end, there were over 4000 real estate related Web sites. Exhibit 6 provides a sample selection of 36 randomly chosen Home Pages and a brief overview of their services offered. While some sites are Home Pages of individual properties for sale, others include offerings of over 500,000 listings across the country. Complete marketing and purchasing information is lacking in the majority of the Web sites, but it is looming on the horizon of this new real estate frontier.

The remainder of this study is as follows. Section 2 analyzes the effect of technology on the real estate brokerage market, both present and future, while Section 3 studies how advances in technology have impacted and will continue to impact the appraisal process. Sections 4 and 5 examine the effects of changing technology on the primary and secondary mortgage markets. Section 6 explores the role of changing technology on the title insurance industry. Section 7 contains the summary and conclusions.

II. Real Estate Brokerage

Technology Implications

Real estate agents in the United States have provided and will continue to provide valuable services to home buyers and sellers. While professionalism, technical information, ethics, financing information, and third party negotiations have long been the hallmark and justification for relatively high real estate sales fees of 6 to 7 percent, on average, in the U.S., commission rates average only 3-4 percent in South Africa and New Zealand, and 3 percent in the U.K. Informational inefficiencies in the residential real estate market are being capitalized into the real estate agents' fees. In any real estate market, information is power. This power has, in the past, been controlled largely by real estate agents via the National Association of Realtors (NAR) and its affiliated local chapters, and indirectly through the Multiple Listing Service's (MLS) barriers to entry for non-NAR members (Braswell and Poe (1992)).

Benjamin and Chinloy (1995) acknowledge the relatively high transaction costs of real estate brokerage in the U.S. They offer a methodology for valuing the technological innovation of electronic lockbox systems that provide keyless entry, enhanced security, and reduced communication time, concluding that sellers adopting the technology will achieve higher sale prices in shorter time periods. Their conclusion that technology will increase sale prices is questionable, if innovations are adopted throughout the market place. It implies that transaction costs (i.e., commissions) are fixed, and that any efficiencies and reduction in selling time will be captured only by sellers. Three parties, however, are affected by technological innovations and increased market efficiency: buyers, sellers and real estate service providers. Improved technology and efficiency are helping increase consumers' understanding of traditional marketing approaches. There are two markets that are independent of each other; technology will divide the *real estate market* (buyers and sellers) and the *real estate services market* (licensed agents and associated service providers), which until now have been linked in the public's mind.

Power struggles and litigation as to who is authorized to access the REALTOR® housing market information (i.e., MLS) is being challenged by the drive for increased efficiency through technology and the rapid emergence of virtually "free" information via the Internet. The real estate marketing revolution that is underway will further test and question who owns market information on particular homes or groups of homes that are for sale or have been sold. This information market explosion that is occurring offers the following viewpoint as to who (if anyone) will "own" real estate market information in the future:

1) <u>REALTORS®</u> still harbor the traditional view that data about properties that are for sale or have been sold are proprietary information, belonging only to authorized members of the MLS, NAR, and local boards.

2) <u>Buyers and Sellers</u> increasingly view information they create as their own. So, they believe that they reserve the right not to disclose asking and sale prices to the market place.

3) <u>Tax Assessor/Collectors</u> are under increasing pressure to disclose and publish specific and generalized sales data. The people on the information highway believe that specific comparable sales information utilized to calculate taxable values and federally insured loans belongs in the public domain. Many ad valorem tax office property sales databases are accessible on disks, magnetic tapes, and public on-line services. This information generally sells at a cost of 2¢ per comparable, or less.

4) <u>Appraisers</u> who collect and maintain comparable sales data are of the opinion that they own the information collected and maintained in their databases.

If information is power, and more information about real estate markets will be available to the general public through technology, there will be a transfer of power to consumers that will devalue information and services previously available only through REALTORS®, their associates, and other real estate sales licensees. Their industry may be close to imploding, as they cannot agree on the vehicle to disseminate real estate information. Rosen (1996) finds, "Underlying the squabbling (among agents) is the very real specter that the information-laden Internet and World Wide Web could replace much of the public's need for agents' traditional house-hunting services. The fear mongers' theory is simple: If buyers and sellers can sit at their PCS and Macs and gather enough information about each other's offerings - and even make offers - why should they pay agents?"

NAR has named its listing access vehicle the REALTOR® Information Network (RIN), which is designed to keep agents in control of the information and consumers "out of the loop," by charging $180/per year per broker/agent, an $8 per hour access fee, and $1 per listing posted (Rosen (1996)). Local Boards are creating their own Internet systems open to the public and are also charging their agents local access fees and listing fees, while Microsoft's network system, Real Direct, will post anyone's listing for only 15¢. Technology is transforming and transferring valuable information previously monopolized by the real estate profession into a free service.

The Present: Current Technological Innovations and Resources

1) Internet real estate listings were located at over 8000 Web sites as of year-end 1996, with daily improvements in the information offered about specific properties, photos, useable neighborhood information, etc.

2) The MLS data are available in several cities on CD-Rom, updated weekly. Each disk contains twelve months of market data and offers valuable search options (Digital Data Systems, Inc., Irving, TX).

3) Electronic and FAX transfers of listing contracts and offers to purchase have become acceptable business practice, thereby reducing transaction costs, services required, and time.

4) Satellite auctions and property marketing channels are available.

5) Licensed telemarketing agents are interviewing homeowners for listings.

6) E-mail, Voice Mail, cellular phones, and pagers have increased efficiency and productivity of individual agents.

7) Long distance learning, seminars, and franchise informational meetings are being presented via satellite and video-phone conferencing technology.

8) CD-Rom contract forms have added efficiency, standardization, and professionalism to the preparation of contracts, leases, and other documents utilized by the industry.

9) Electronic cameras are replacing traditional ones. Photos are transmitted electronically and can be downloaded into a computer's hard drive. These cameras, which can store up to 300 photos, will increase the use of pictures beyond the traditional drive-up view to include landscaping, interior views, and neighborhood scenes, likely reducing the number of homes physically inspected by the average buyer.

10) Electronic transfers of home photographs and information are being transferred to VCR tapes and shipped overnight to prospective buyers around the globe.

11) Traditional real estate classified ads and photographs are being offered on the Internet at no charge. Reduced classified advertising budgets may reduce transaction costs for agents and/or sellers (See, for example, the Dallas Morning News' Internet real estate listings at http://cityview.com/dallas).

The Future: Anticipated Changes in Real Estate Marketing

1) Availability of complete property-specific and market information to *all* market participants, not just to members of NAR through its MLS monopoly.

2) The increased availability of and demand for merged databases about macro and micro market information beyond property prices and trends will include, but not be limited to, statistics on crime, the environment, local school performance on national exams, ad valorem tax rates, and historic appreciation rates.

3) Increased productivity/sales per full time agent in major markets will result in a gradual decline in the total number of active real estate agents.

4) Overall service and face-to-face customer contact time required by agents for home buyers and sellers, in order to complete a real estate transaction, will be reduced greatly.

5) A general decline in real estate commissions over time, with fixed marketing fees per transaction, will become the norm.

6) A growing trend toward agents offering support services that traditionally have been provided by others, such as collateral assessments (i.e., valuation) for loan processes, property inspections, coordination of required repairs, coordination of property closings between buyers/sellers, and electronic transfers of closing papers to mortgage lenders, is occurring.

7) Large franchise brokers will experience growth trends, with links in services and products currently associated with property ownership. Specifically, these brokers will provide services such as: (1) free hotel rooms for home buyers through ownership of hotels by major real estate franchises (Millman (1995))[(1)]; (2) home renovations and repair; (3) lawn care and maintenance; (4) home moving, storage, and transfer businesses; (5) home warranty plans and insurance; and, (6) one-stop shopping for homeowners, health, life, and auto insurance.[(2)]

8) Prospecting for listings will utilize professional, licensed real estate agents to tele-market sellers and to search Internet Home Pages, thereby accelerating competitive pricing for real estate services.

III. Real Estate Appraisal Services

Technology Implications

Technology and the growing availability of real estate databases have reduced regulatory requirements for appraisals by banks on houses valued under $250,000. In addition, appraisal requirements by mortgage investors in the secondary mortgage market have been relaxed. LaDuca (1996) offers a justification for the existence of appraisers within the traditional real estate marketplace: "Appraisers have defended their existence by statements about the uniqueness of property, the importance of personal inspections, and the complexity of an appraisal problem." He reports, however, that for a banking official who uses an appraisal, "... within five years, 70 percent of appraisals will be in a simple, (fully) automated format, and the other 30 percent will require more traditional appraisal formats." He concludes that with the growth of structured databases, more appraisals will be automated, resulting in *fewer appraisers* who will be *paid less money* to complete *more appraisals* in *less time*.

The media are now covering the implications of technology on the appraisal industry, as well. For example, one of the premier appraisal magazines ran a lead cover story by Branner (1995) that was entitled, "Artificial Intelligence: Is It Taking Your Job?" The author finds that both banks and the secondary mortgage market have "... made a decision to allow the use of non-licensed appraisers for some collateral assessments." O'Donnell (1995) writes for *Real Estate Valuation Magazine* that, "Whereas at one time, appraisers were relied upon for their independent knowledge and judgment, they are now being forced to conform their opinions to computer-generated adjustment grids, regression analysis, and statistical norms. In fact, many of the larger lending institutions have moved to "intelligent" (i.e., artificial intelligence program-generated) appraisals where the computer decides which comps are appropriate."

Regan (1996) reports that Freddie Mac has adopted and implemented an automated "collateral assessment" feature as part of their new Loan Prospector Program™, utilizing a nationwide network of real estate agents and brokers who merely drive by subject properties to make exterior inspections and "fraud checks." The current automated appraisals are available for 100 counties across the U.S. and are projected to include 350 counties by year-end 1996.

These and other innovations and initiatives by a major secondary mortgage market participant are extremely significant from the standpoint of traditional banking and appraisal practices:

1) Independent certified appraisers are not utilized;

2) In-house, primary lender, "on staff" appraisers are not utilized;

3) Interior inspections are seldom required;

4) The request for valuation is ordered independently by secondary mortgage investors, not by the home purchaser or primary lender; and,

5) Mass appraisal firms "... typically (will) receive a little more than half the fee they generally receive (currently)."[(3)]

Freddie Mac's Vice President of Automatic Underwriting, Mr. Peter Masalli, has stated: "We offer a collateral assessment solution for all risk profiles, relieving lenders of this responsibility, as well as the need to represent and warrant appraisals" (Regan (1996)). The implication of this statement, if adopted by the entire secondary mortgage market, would set the scene for a possible partial by-pass or complete elimination of both appraisers and primary lenders in the marketplace, allowing home buyers/borrowers to proceed directly to the secondary mortgage market for loan application, underwriting, approval, and funding. In the new technological state-of-the-world, many inefficient real estate services are likely to be eliminated altogether. Warren (1996) notes that, "Appraisers also are watching with anxiety the development of computerized appraising. Some note that lenders are experimenting with computer programs that could render the profession obsolete." The secondary mortgage market may become the primary and only market for mortgages that traditionally are sold to investors, such as fixed-rate mortgages.

Some appraisers, however, have embraced the concepts of Artificial Intelligence Appraising (Raburn and Tosh (1995)), Computer Assisted Appraisals (Detweiler and Radigan (1996)), and Cyberspace Appraisals (Gilon and Cardenas (1995)). This likely will accelerate the trend toward less human involvement, fewer appraisers, and lower fees. Some solace for appraisers is offered by Worzala, Lenk, and Silva (1995), who issue caution to both appraisers and the banking industry. They find the use of Neural Network Appraising presents serious questions as to the reliability of computer-generated valuation conclusions.

The Present: Current Technological Innovations, Trends, and Resources

1) EDI Electronic Data Interchange (paperless appraisals via modem or satellite).

2) Electronic cameras and digital imaging that interface with personal computers and appraisal reports.

3) Floor plan sketching and area calculation using CADD programs.

4) Site Plan (lot plat and structure platting).

5) Electronic transmission of appraisals (O'Rourke (1995)).

6) Access to county courthouse records on-line (Schwartz (1995)).

7) Artificial Intelligence computer-generated appraisals (O'Donnell (1995)).

8) Integrated computer software that merges report forms, sketches, maps, photos, and demographic information (Residential Appraiser - Software 1996).

9) Consolidated home appraisal regulations and updates (AllRegs - 1996).

10) On-line environmental reports (Marshall and Swift - 1996).

11) Replacement Cost Estimator (Marshall and Swift, available for several years).

12) Portable, hand-held Newton® Message Pad® and printing of property inspection reports (Manning/RAL Information Services - 1996).

13) Freddie Mac's statistically-based models for assessing collateral nationwide (1996).

14) Freddie Mac's agreement with real estate agency affiliates of the Mortgage Guaranty Insurance Corporation (MGIC) to offer additional collateral assessment alternatives.

15) Fannie Mae's Mini-URAR Form 1095 and Form 2055 for "drive-by" appraisals (October 1995).

16) FNMA's 1996 adoption of TRW Credit Reporting Services' REDI National Property Information databases.

17) Availability of digitized, on-line flood certification services.

18) Geographic Information Services (GIS) desktop mapping, demographics, and neighborhood identification programs (e.g., Map Info, Arc Info, TIGR).

19) Reduction in commercial appraisal fees for, say, a 200-unit apartment complex from an average of $4,000 in 1993 to $2,500 in 1996 (Warren (1996)).[(4)]

The Future: New, Non-Core Business Innovations

A serious reduction in the future demand for residential real estate appraisals and, therefore, appraisers is anticipated. New business activities for appraisers should include:

1) Home inspection services,

2) Business valuation services,

3) Environmental assessment services,

4) Investment and disposition consulting,

5) Lead based paint assessment, inspection, abatement, and other related activities (Branner (1995)),

6) Ad valorem tax consulting and property owner representation (although technology may eliminate this business in a matter of years),

7) Future refinements and use of computer-generated appraisals, and

8) Creation of "spot check" audits, whereby FNMA and/or mortgage originators perform traditional appraisals to measure the accuracy of Artificial Intelligence.

IV. The Primary Mortgage Market

Technology Implications

Technology has played a major role in the emerging "new bank" and in commercial bank downsizing. There has been a significant decline in the number of accountants, receptionists, and secretaries, due in part to banking executives preforming many secretarial support tasks (e.g., word processing and spreadsheets) and using e-mail, voice mail, faxes by modem, etc. ATMs have replaced many tellers, while advances such as electronic deposit and withdrawal capabilities have transformed both banks and their customers into a new relationship, whereby they seldom, if ever, need face-to-face contact with each other. Fax/modem consumer loan applications provide 24 hour service and funding guarantees. The need for faithful and friendly customer service at the teller's window has been minimized to the point that many banks are charging "personal teller window service" fees. Customer loyalty has also begun to evaporate, as it is very difficult to form lasting relationships with ATM machines and automated telephone voice-mail account executives. These features of the new banking environment are on the cutting edge of where many real estate services are likely to be in the near future.

Banks, thrifts, and mortgage companies downsized in several regions of the country in the late 1980s due to bankruptcies and forced government closures. Many of these bank closures were due to bad real estate loans (Ghosh, Guttery, and Sirmans (1996)). Subsequently, there have been many regional "superbank" mergers and expansions (e.g., NationsBank, Midatlantic Bank, Meridian Bank, Chemical Bank) that have resulted in the closure of many previously competing branches, further reducing banking employment.

Even downsized, more efficient, and technologically improved banks that may be enjoying prosperity are now being challenged severely by new, non-regulated "Non-location -- Non-banks," that are utilizing only mail and phone line transactions. These non-bank "branches" are located in every home that has a telephone and/or mailbox. An article by Cocheo (1996) in the *ABA Banking Journal*, entitled, "USSA: Stealth Bank or "Bank" of the Future," suggests both traditional and "non-banks" will be faced with even more competition from Internet Banking. Lunt (1996) reports Security First Bank (Internet http://www.sfub.com), for example, is open 24 hours per day, 365 days per year. During its first two weeks of operation on the Internet, 750 new depositors from 32 states opened accounts.

Since 1990, many depositors and real estate borrowers have utilized both automated direct deposits and mortgage payment debits. Rules are in place to protect a customer's funds in case of electronic errors, under the 1995 Federal Reserve Electronic Funds Transfer Act and the National Automated House Association Guidelines (Dunsmore (1996)). The concept of the fully automated bank is a reality, in terms of deposits, withdrawals, saving and checking accounts, consumer loans, and credit cards. How real estate loans will be originated, underwritten, and serviced in the future electronic bank remains to be seen. As the new technological era (i.e., the Internet) moves relentlessly toward increased efficiency, speed, and reduction of many real estate service providers, the secondary mortgage market and consumers may by-pass primary leaders altogether.

Technological Innovations

1) Electronic deposits and withdrawals have created instantaneous, on-time, mortgage payments. Insufficient funds in the mortgagor's

account creates immediate mortgage default.

2) Mortgage interest rate bulletin boards and "electronic listing services" will provide increased competition in mortgage lending rates, thereby driving rates down, ceteris paribus.

3) Faxed mortgage applications and other real estate related documents are common.

4) Internet loan applications will be posted by potential borrowers, who will then receive "bids" or offers on loans from lenders. This role-reversal will result in lenders seeking borrowers, not vice versa.

5) Growth of Internet banks with distant or non-public facilities will increase competition with traditional banks, reduce overhead, and make interest rates more competitive.

6) Growth of "non-banks" (e.g., G.E. Capital, USAA) will increase competition, due in part to reduced regulation.

7) Reduction in mortgage loan application time, due to electronic verifications, credit checks, and relaxing of appraisal requirements for loans under $250,000, is occurring.

8) Electronic secondary loan sales, approvals, commitments purchases, and transfers are becoming commonplace.

9) Computer-generated loan application programs with built-in, automatic audit and verification features are being developed by the larger lenders.

10) Computer-generated mortgage documents for each loan type are being generated and provided to borrowers at the time of loan approval.

11) Remote telemarketing of mortgage lending, refinancing equity loans, and home improvement loans is growing.

V. The Secondary Mortgage Market

Technology Implications

The Federal National Mortgage Association (FNMA or Fannie Mae) and the Federal Home Loan Mortgage Corporation (FHLMC or Freddie Mac) have taken the lead in terms of the implementation of applied business computing and technology. These mortgage investors anticipate other real estate industry participants will follow suit. FNMA and Freddie Mac have set standards that have been adopted in the residential mortgage market. Therefore, they can require others to follow their lead and to use their computer programs and technological innovations. This new methodology affects primary lenders, appraisers, mortgage servicing firms, and, ultimately, home buyers. This shift in power is due in part to the secondary mortgage market participating in virtually all residential loan types, including fixed-rate mortgages, adjustable-rate mortgages, graduated payment mortgages, growing equity mortgages, manufactured housing loans, construction loans, second mortgages, federally funded public housing loans, and jumbo loans, for both single-family and 2-4 unit multi-family dwellings. Commercial loans are also being collateralized at an increasing rate.

Their initiatives and technological innovations in the real estate market have them poised to conduct mortgage operations at every level via remote electronic means. These include, but are not limited to: (1) customer/buyer education of residential and investment properties; (2) direct lending activities; (3) traditional and new loan products for primary lenders; and, (4) developing new markets and operating systems services through computer software and technologies that are copyrighted and retain their trademarks(™). The many innovations initiated by Freddie Mac (e.g., the automated Loan Prospector) and Fannie Mae (e.g., Desktop Originator™ and Desktop Underwriter™) are fully automated, desktop personal computer programs that organize borrower information, qualify borrowers for the appropriate loan, perform underwriting tasks, and prepare associated documents in a standardized format and quality. While primary lenders generally collect borrower information, originate mortgage loans, and eventually sell the loans in the secondary mortgage market, there appears to be streamlining and efficiency that could allow FNMA, GNMA, and Freddie Mac to make loans directly to borrowers.

Technological Innovations

1) Fully automated and electronic information systems that include such programs as Desktop Trader™, Rate Sheet Express™, Market Express™, and SmarT™. Appendix A offers a sampling of publications and technology innovations in this area, as provided by FNMA (1995).

2) Acceptance of Electronic Data Information (EDI) transfers of appraisals.

3) Creation of Form 2055 that permits drive-by appraisals.

4) Desktop Underwriter's™ risk assessment of loans.

5) Creation of borrower credit scoring, which consolidates electronically and simplifies the credit report status to a single number.

6) Freddie Mac's statistically-based models for assessing collateral nationwide.

7) Electronically automated, on-line flood certification services.

8) The use of MGIC's network of real estate agents to perform collateral assessments.

VI. The Title Insurance Industry

Technology Implications

Title companies provide important title information and guarantees for buyers and lenders. Nevertheless, technology is impacting courthouses, ad valorem tax offices, and title insurance companies. Many courthouses and tax offices are merging information by assigning shared property or parcel identification numbers. Public records are being transferred to electronic data files that can generate complete historic "chains of title" that are updated daily as new documents are filed on individual properties. Rampy (1995) reports that one firm reduced 30 file cabinets of documents to 18 CD-Rom discs at a cost of 8¢ per page. Title company microfilming is being replaced rapidly by Computer Output to Laser Disc (C.O.L.D.), compact discs, or optical discs that allow computer-generated reports on mainframes to be transferred on-line. It is even conceivable that the public sector could provide title and tax reports in a useable form on demand, directly to anyone desiring title/tax information. While interpretation and assurance of marketable title require professional opinions, there is an explosion of organized, precise title and tax information that is quickly replacing out-moded title searches through historic documents.

Title companies' on-staff attorneys traditionally have provided important closing or escrow services that extend beyond insuring the title of a particular property, including the preparation of deeds and mortgages. Technology is challenging who may provide these services in the future, however. Virtual Lawyers™ and Real Estate Lawyer™ (Outlook Software Corp., Dallas, TX) are software programs that create customized, legally-binding, real estate documents, including sales agreements, residential and commercial leases, mortgages, and deeds. It remains to be seen whether the legal profession and title companies will have their services transferred to lenders, the secondary mortgage market, and/or others. Increased competition and efficiency due to technology will have major implications in the future.

Technological Innovations

1) Courthouses are replacing microfilm with Computer Output to Laser Disc (C.O.L.D.), CD-Rom, and/or Optical Discs that provide computer-generated reports on individual properties.

2) Instant tax certificates and summary "chains of title" reports on individual properties will be available to the general public.

3) Electronic transfers and filing of papers will become a reality after notary and verification of signature technologies are developed.

4) Primary and secondary mortgage market participants will request title reports and insurance from regional wholesale title insurance companies.

5) Increased accessibility and retrieveability of title and tax information from courthouses (Adams (1996)), due to improved technology, will challenge state-imposed title insurance premium rates (as in Texas) and the proposed required use of attorneys for title opinions (as in Virginia).

6) The cost and charges for document preparation associated with property transactions will decrease, due both to widespread availability of Real Estate Lawyer and other similar software and to consolidated services of primary and secondary mortgage service providers.

7) There are proposals for all county title records to be on-line and available to the public (Schwartz and Yates (1995)).

8) Increased competition and technological innovations will lead to national competitive pricing of title insurance policies, thereby

eliminating state-imposed laws and other restrictive barriers (Adams (1996)).

VII. The Implications of Technology on Employment

Exhibits 7 and 8 depict the effects of technology on employment in real estate related professions. Under the 20th Century traditional real estate transaction, at least 16 participants are involved in the process of transferring title on a residential dwelling. The seller lists his or her house with a broker, generally via one of the broker's subagents. The property is listed in the MLS system, the local newspaper, and perhaps the Internet. An interested buyer contacts the listing agent through his or her representative broker or broker's subagent. Once the earnest money contract (i.e., the purchase agreement) is signed, the title company issues an opinion on the merchantability of the title. Simultaneously, the buyer/borrower makes loan application with a mortgage banker or mortgage broker. This involves a loan officer, an underwriter, and a mortgage investor. The lender requires a third-party opinion of value, so an appraiser is hired. To satisfy the buyer's concern as to the physical condition of the improvement, a home inspector is employed. Once the loan is approved, the title company completes the closing documents, the buyer secures insurance (e.g., homeowners, flood, PMI), and the selling subagent orders the pest inspection, survey, and other incidentals. After funding, this mortgage loan is pooled with others and sold in the secondary mortgage market, and the originator either retains or sells the servicing rights.

Under the 21st Century cyber-tech real estate transaction, only 4 to 5 participants are involved in the process of transferring title. The educated home seller lists his or her house on an Internet listing service. Interested buyers seek out such sellers and showings are arranged via the telephone or e-mail. If the parties wish to employ the services of a real estate participant who is knowledgeable is real estate negotiations, this "facilitator" can be hired for a nominal fee, perhaps $500 to $1,000. The buyer/borrower posts his or her loan requirements on the Internet and lenders bid their contract rates, closing costs, and discount points. Once the borrower selects the mortgage lender, virtually all of the origination process is performed electronically. These activities include electronic credit reports, appraisal scoring methods, and automatic closing papers. The borrower and lender correspond via e-mail, fascimile, and telephone. Once the loan is approved, a notary authenticates the signatures on all documents and forwards the papers to the lender. Then the loan is sold in the secondary market.

Exhibit 9 offers a comparative analysis of closing costs between the traditional real estate transaction and the cyber-tech transaction. Brokerage fees are estimated to be $7,500 under the traditional commission structure of 6%, but only $4,375 under the new regime, where the commission is assumed to be 3.5 percent. The mortgage application fees, appraisal, home inspection fees, origination fees, servicing fees and title insurance costs are all expected to be lower under the cyber-tech transaction. The total transaction costs will be nearly $11,000 under the traditional closing, but only $4,900 for the cyber-tech closing. Clearly, some of these savings will be captured by the buyer/borrower, at the expense of other real estate participants.

Commercial real estate loans will be originated, approved, and sold in a similar manner. Unlike the residential market, however, there generally will be more sophistocated participants. Consequently, one would expect the process to flow even more smoothly. Specifically, the seller of an income producing property posts the property on the Internet, investors bid on the asset, one of the bids is accepted through negotiation, the successful bidder is approved for a commercial loan, and the closing transpires. Because of the nature of income producing property being valued as the present value of the future expected income, however, the duration from posting to closing should be longer than residential property. This is due primarily to the buyer requesting rent rolls and performing due diligence. Once complete, the closing process can be handled electronically, with a notary authenticating the signatures. Then, the loan can be securitized in the secondary commercial real estate mortgage market, once the rating agencies rate the quality of the issue.

VIII. Conclusions

The implications of technology on the real estate industry and markets will be profound. The traditional real estate transaction of the 20th century, when contrasted with the very real prospect of the 21st century "Cyber/Technology"-driven market of the very near future, has startling implications for real estate employment. There likely will be serious downsizing in terms of the number of service providers required, as well as a reduction in the total cost per transaction. These reduced transaction costs in the marketing process will amount to an income transfer from licensed agents, lenders, appraisers, attorneys, and loan servicers to buyers and sellers. There will be a tremendous cost to the real estate profession in terms of income, and therefore, employment.

Gilon and Cardenas (1995) offer the following signpost to the future: "Bill Gates, chairman and founder of Microsoft Corporation, the world's largest computer software company, recently identified real estate as one of the industries that will be 'revolutionized' by technological change. The change has already started and is moving at a fast pace; those who realize this and welcome it will ensure their survival in the profession." Only time will tell if technology and the real estate profession are compatible. Is real estate an art or a science? Is real estate a unique asset or just another commodity to be purchased and sold? For certain, more research needs to be conducted to study the logic and direction of technology, and its ramifications on consumers, financial institutions, and the real estate industry.

EXHIBIT 1

The number of real estate sales agents and managers over the period 1980 through 1995.

EXHIBIT 2

The number of commercial banks and savings institutions over the period 1980 through 1995.

EXHIBIT 3

The number of members in the Mortgage Banking Association over the period 1980 through 1995.

EXHIBIT 4

The number of legal services providers (SIC Code 81) over the period 1980 through 1995.

EXHIBIT 5

The number of real estate developers and subdividers over the period 1980 through 1995.

EXHIBIT 6

An overview of randomly selected real estate web sites.

Site	Name of Real Estate Network	Location
1	**Global Directory of Real Estate World Wide Web Sites.**	http://onramp.net/ired
2	**Realtors Information Network**	http://www.realtor.com
	(NAR) - 50,000 homes in 32 states, photos, no addresses, amenity and price search.	
3	**Real Direct -** Only 3 states, photos, complete information and addresses, price search.	http://www.realdirect.com
4	**Home Web -** Home search via Zip Code, photos, commercial homes, land, good information, few listings, price search.	http://www.us_digital.com/homeweb
5	**Home and Land Magazine -**	http://www.homes.com/welcome.html
	160,000 homes, ads from 43 states, price and rental search.	
6	**Coldwell Banker -** 25,000 homes in 36 states and Canada.	http://www.coldwellbanker.com
7	**Fractalnet Real Estate -** List of real estate firms by state and local area.	http://www.fractals.com/realestate.html
8	**Global Real Estate Registry -**	http://www.goglobal.com
	Only a few listings in 4 states.	
9	**The Guide to Real Estate -**Links 209 web sites in all 50 states and 33 countries; also two For Sale By Owner web sites.	http://www.travelersonline.com//cgil/guide.exe/ALL
10	**Home Net -** 5,000 properties in 7 states, investment properties for sale, good information and area trends.	http://www.netprop.com
11	**The Home Front** - Central New Jersey homes.	http://www.homefrontbbs.com
12	**Homes Internet Magazine** - Custom search responds to users' e-mail addresses.	http://www.homesmag.odc.com/index.html
13	**Listinglink** - California, photo of homes, advertising type information.	http://www.listinglink.com
14	**Matchpoint -** Scattered states, will search and respond to e-mail address, anonymous I.D. option, and price change notifications.	http://www.nji.com/mp
15	**New York Real Estate Guide -**	http://www.nyrealty.com/NYC.html
	Apartment Sales and rentals in New York, cross links to firms' web sites.	

16	**The Property Network -** 7,000 Dallas/Ft. Worth MLS homes, good information and addresses, I.D. required.	http://www.textnet.com
17	**RE/MAX International -** 50 states, 3 countries, few listings, good information.	http://www.remax.com
18	**Renet -** 65 California cities, random homes.	http://www.marketlink.com/renet
19	**Virtual Realty -** Minneapolis/St. Paul area homes.	http://www.mnrealty.com
20	**Welburne & Purdy -** Upstate New York homes, color photos, operated by above firm.	http://www.globalone.net/W&P
21	**Windermere Real Estate -** Northwestern U.S., good information, color photos.	http://windermere.com
22	**National Real Estate Exchange Network -** Maui, Hawaii properties for IRC Sec. 1031 Tax-Deferred Exchanges.	http://maui.net/qmartyn/exchange.html
23	**UnReal Estate Cartoons** - real estate humor - No information.	http://mindlink.net:/rick_carlsen/unreal.html
24	**Real Estate 101 -** Colorado	http://www.databahn.net/trilakes/coloinfo.html
	home regulations when buying or selling in Colorado.	
25	**Sand Dollar Realty** - Padre Island, Texas resort area listings.	http://rampages.onramp.net:80/sandolar
26	**Barbara Sue Seals Properties, Inc. -** Portland, Oregon listings.	http://bsue.oneworld.com/real_index.html
27	**Arnon Corp. of Ottowa -** Commercial and apartment listings.	http://www.synapse.net/arnon
28	**California Association of Realtors -** Los Angeles, CA	http://www.car.org
	regional economic information and list of active agents.	
29	**Hawaii Real Estate Network -** Hawaii property listings.	http://hoohana.aloha.net/hspub/re_mag
30	**Worldwide Timeshare Mall -**	http://timesharemall.com
	Timeshare listings, rentals and exchange information.	
31	**Northern Virginia Association of Realtors -** Regional economics, articles, and Virginia Realtors information.	http://www.nvar.com
32	**Maine Solar House -** Solar home information.	http://solstice.crest.org/renewables/wlord
33	**Net Estate in London -** London real estate information.	http://netestate.dsres.com
34	**HomeScout -** Real estate web site cross links.	http://homescout.com
35	**Centex Homes -** Home builder page, variety of information.	http://www.centex-homes.com
36	**Blackburn Real Estate -** Mountain Home, AR real estate consumer information.	http://www.crl.com/ozark/mtnhome

EXHIBIT 7

Twentieth Century traditional real estate transaction, which includes at least 16 real estate participants and service providers.

EXHIBIT 8

Twenty-first Century "cyber-tech" real estate transaction, which includes 4.5 to 5 real estate participants and service providers.

EXHIBIT 9

Sale/Purchase of $125,000 home with 80 percent financing. Comparative closing cost analysis between traditional real estate transaction and Cyber-Technology real estate transaction.

	Closing Costs: Traditional	Closing Costs: Cyber-Tech
Real Estate Commission	$7,500	$4,375[5]
Mortgage Application Fee	350	0
"Appraisal" Fee	300	25[6]
Home Inspection Fee	150	0[7]
Loan Origination Fee	1,000	200
Annual Servicing Fee *	250	0
Discount Points	equal	equal
Title Insurance and Misc.	1,200	300[8]
PMI	equal	equal
Total Transaction Costs	**$10,750**	**$ 4,900**
Time to Close Transaction	4-6 weeks	1 week

*Does not reflect present value of mortgage servicing fee over life of loan.

Appendix A

Secondary Market Innovations, Publications, and

Computer Programs (Fannie Mae, 1995)

Technology Publications:

1) SmarT™ for MORTNETPlus.

Secondary marketing strategy programs that minimize risk, maximize yield, and link with Desktop Originator® and Desktop Underwriter®.

2) Desktop Home Counselor™ Version 2.0: For Lenders.

Provides information on benefits, functional enhancements, affordability, analysis, credit report, and reconciliation.

3) Desktop Trader™.

Automated electronic FNMA cash prices, take down cash commitments, and contract number allocations from any remote location via a personal computer.

4) Rate Sheet Express™.

Automated broadcast FAX services to multiple locations on current loan rates, etc.

5) Market Express™.

Detail mortgage finance information on all loan programs, updated daily.

6) Guide Express™ by ADFINET.

Administrative directives and automated library of secondary guidelines (e.g., FHA, VA, RESPA).

7) MORNETPlus: Equipment Information.

8) Funding Express™

MornetPlus electronic submissions of loans, reports, and detailed loan-level information.

Multi-family Publications:

1) Financing Multi-family Targeted Affordable Housing.

Refinancing and direct loan initiatives for new construction or refurbishing low income housing.

2) A DUS Primer.

Multi-family financing information about FNMA's Delegated Underwriting and Servicing lenders.

3) Multi-family Delegated Underwriting and Servicing (DUS).

4) Multi-family Convertible ARMs.

5) FannieMaps® version 1.2: Explore Untapped Markets.

Computerized mapping of mortgage market opportunities merged with census data, demographic information, and neighborhood household information.

6) Guide to Home ownership (audio version and Braille versions).

Customer Education Publications/Marketing Innovations for Lending:

1) Originating Residential Mortgages: Strategies for Increasing Mortgage Loan Production.

FNMA Mortgage marketing kits for marketing loan products to Real Estate agents, borrowers, and for taking loan applications.

2) Becoming a Landlord: Rewards, risks, and responsibilities for owner/occupants of two-to- four family homes.

Direct and lender marketing of loan products to prospective investors (buyers/borrowers) in two-to-four family investment properties. Kits and workbooks for seminars and classroom use.

3) Foreclosure Prevention Workbook.

Designed to help lenders and borrowers prevent foreclosure and to work out delinquencies.

Affordable/Special-Needs Housing Publications for Lenders and Borrowers:

1) Opening Doors with Fannie Mae's Community Lending Products: Brochure.

2) Opening Doors with Fannie Mae's Community Lending Products: Complete Kit.

3) Tools You Can Use to Open More Doors to Home ownership.

4) Guaranteed Rural Housing & Rural Direct Loan Leveraging Programs.

5) Community Living® information for lenders.

6) Community Living® information for borrowers.

7) Community Banks: Doing Business with the Secondary Mortgage Market.

8) Community Lending Quarterly.

9) Fannie Mae's Community Home Buyer's Program consumer booklets.

Available in English, Spanish, and Chinese.

Marketing Publications:

1) One-Month LIBOR-Indexed ARMs with Payment Caps.

London InterBank Offered Rate 30 year loan/U.S. dollar-denomination with monthly interest adjustments and annual payment adjustments.

2) FHA/VA Adjustable-Rate Mortgage-Backed Securities (MBS).

Pooling of current production mortgages at lower FNMA pricing, pooling structure, and funding options.

3) ARM Flex® Plus.

Flexible servicing fee structure, at both individual loan level and pool level, by trading off excess servicing on fixed MBS margin pools.

4) ARM Fannie Majors® - Flexible pooling options for adjustable-rate mortgages.

5) Document Custody Services for MBS.

Fannie Mae's Document Delivery Facility (DDF) accepts loan documents for MBS and allows retrieval of individual loan information.

6) Release of Loan Documents from DDF.

Electronic requests of loan document (copies or originals) are processed within 48 hours.

7) As Soon As Pooled® Plus.

Lenders can perform electronic transfers on individual loans within mortgage pools, allowing funding, pooling, repooling, clearance and document custody services all within 24 hours of request by lender.

8) MBS Loan-Level Servicing Transfers.

Electronic servicing transfers allows the purchase, transfer, and/or retention of servicing on individual loans within FNMA pools.

9) MORNET Loan Stratification System (LSS®).

Electronic 1100-character format stratifies, sorts, classifies, and groups individual loans according to lenders or purchasers (FNMA) parameters.

10) Multi-family Seniors Housing Pilot.

11) Credit Enhancement for Floating Rate, Multi-family, Tax-Exempt Bonds.

Guide Announcements:

1) Expansion of Native American Housing Initiative.

2) Management and Disposition of Acquired Properties.

3) "Full-File" Reporting to Credit Repositories.

As of March 31, 1996, loan servicers no longer report delinquencies to credit reporting agencies. Instead, they report "Full-file" requests electronically.

4) Changes to Eligibility Requirements for Community Living Group Homes.

5) Data Submitted in REOgrams® (or Datagrams).

Triggers inspections and appointment of pre-approved real estate agents to market/manage property.

6) Post Foreclosure Property Inspection.

7) Violations of Lead-Based Paint Laws.

8) Non-traditional Mortgage Credit Reports.

9) Custody of Mortgage Documents Related to Reclassified Mortgages.

Lender Letters:

1) Delinquency Management.

2) Measuring Credit Risk.

Discussion of the use of Credit Scores for individual and collective loan profiles.

3) Extended Deadline for Using Revised Appraisal Forms.

4) Reproducing Security Instruments and Miscellaneous Mortgage Documents.

5) Fair Lending and the Appraisal Process.

6) Bilingual (Spanish-English) Loan Application Documents.

--Residential Loan Application

--Assets and Liabilities

--Requests for verifications of deposits and employment

7) Standard Cash Transactions and Products.

PC-based committing and pricing software with automatic confirmation within 24 hours.

REFERENCES

Adams, S., Backlash - Va Real, *Forbes Magazine*, March 25, 1996, p. 46.

AllRegs® Mortgage Resource Center, Inc., 3460 Washington Drive, Suite 216, Eagan, MN 55122-1338 (to order, call 612-683-9705).

Benjamin, John D. and Peter T. Chinloy, 1995, Technological Innovation in Real Estate Brokerage, *The Journal of Real Estate Research*, 10, 1, 35-44.

Blumenthal, Karen, Brokers Begin to List Homes On-Line, *The Wall Street Journal*, January 19, 1996, p. B1.

Blumenthal, Karen, Brokers Offer Financial, Consumer Services, *The Wall Street Journal*, January 19, 1996, p. B1.

Branner, D., 1995, The Next Boom Industry?, *The Communicator Magazine*, 2, 2, 18-19.

Braswell, Michael K. and Stephen L. Poe, 1992, The Residential Real Estate Brokerage Industry: A Proposal for Reform, *American Business Law Journal*, 30, 2, 271-334.

Cocheo, S., 1996, USAA: Stealth Bank or "Bank" of the Future, *ABA Banking Journal*, 88, 2, 43-45.

Detweiler, J. and R. Radigan, 1996, Computer-Assisted Real Estate Appraisal: A Tool for the Practicing Appraiser, *The Appraisal Journal*, 64, 1, 91-102.

Dun and Bradstreet, 1996, Internet Demographics Survey (published by Dun and Bradstreet's Nielsen Media Research and Commerce Net).

Dunsmore, P., Banking With Ease, *Times Record News*, March 5, 1996, p. 1B, Wichita Falls, Texas.

Fannie Mae's Market Line Digest, Fannie Mae Fulfillment Center, 9060 Junction Drive, Suite 12, Anapolis Junction, MD 20701, December 1995 (to order, call 800-471-5554).

Fannie Mae's Market Line Digest, Single Family Marketing, 3900 Wisconsin Ave. NW, Washington, DC 20016-2897, January 1996.

Fletcher, June and David Crook, 1995, A Guide to Selected Real Estate Sites on the Web, *The Wall Street Journal*, January 19, 1996, p. B8.

Fletcher, June, How to Shop for a Home on the Internet, *The Wall Street Journal*, January 19, 1996, p. B8.

Ghosh, Chinmoy, Randall S. Guttery, and C. F. Sirmans, The Effects of the Real Estate Crisis on Institutional Stock Prices, Working Paper, University of Connecticut, 1996.

Gilon, P. and C. Cardenas, 1995, Appraisers and Cyberspace: An Introduction to the Internet, *The Appraisal Journal*, 63, 4, 469-481.

Grogan, Gwin, Home on the Internet, *Dallas Business Journal*, February 9-15, 1996, p. 22.

LaDuca, Angelo L., 1996, Change Is In The Air, *Appraiser-Gram*, 26, 1, p. 1.

Lunt, P., 1996, Welcome to "sfnb.com" The Paradigm Just Shifted, *ABA Banking Journal*, 87, 2, 40-47.

Manning, Chris, 1996, RAL Information Services, Carmel, Indiana (800-766-2366 ext. 833).

Millman, J., Patel, Inc., *Forbes Magazine*, August 4, 1995, p. 88.

O'Donnell, James, Appraisers Capture Data Online, *Real Estate Valuation Magazine,* 45, Fall 1995, p. 10.

O'Rourke, Ann, Surfing the Net, *Real Estate Valuation Magazine*, 45, Fall 1995, 4-11.

Rampy, J., Trading Places, *Dallas Business Journal*, October 27, 1995, p. B1.

Rayburn, W. and D. Tosh, 1995, Artificial Intelligence: The Future of Appraising, *The Appraisal Journal*, 63, 4, 429-435.

Regan, Cheryl, Freddie Mac Enhances Loan Prospector, *Real Estate Valuation Magazine,* 46, Winter 1996, p. 34. (Ms. Regan is Media Relations Manager for Freddie Mac at 800-424-5401.)

Rosen, M., Virtual Realty - Real Estate Agents Face Extinction in an Information-Rich Century 21, *Dallas Observer*, January 18, 1996, p. 6.

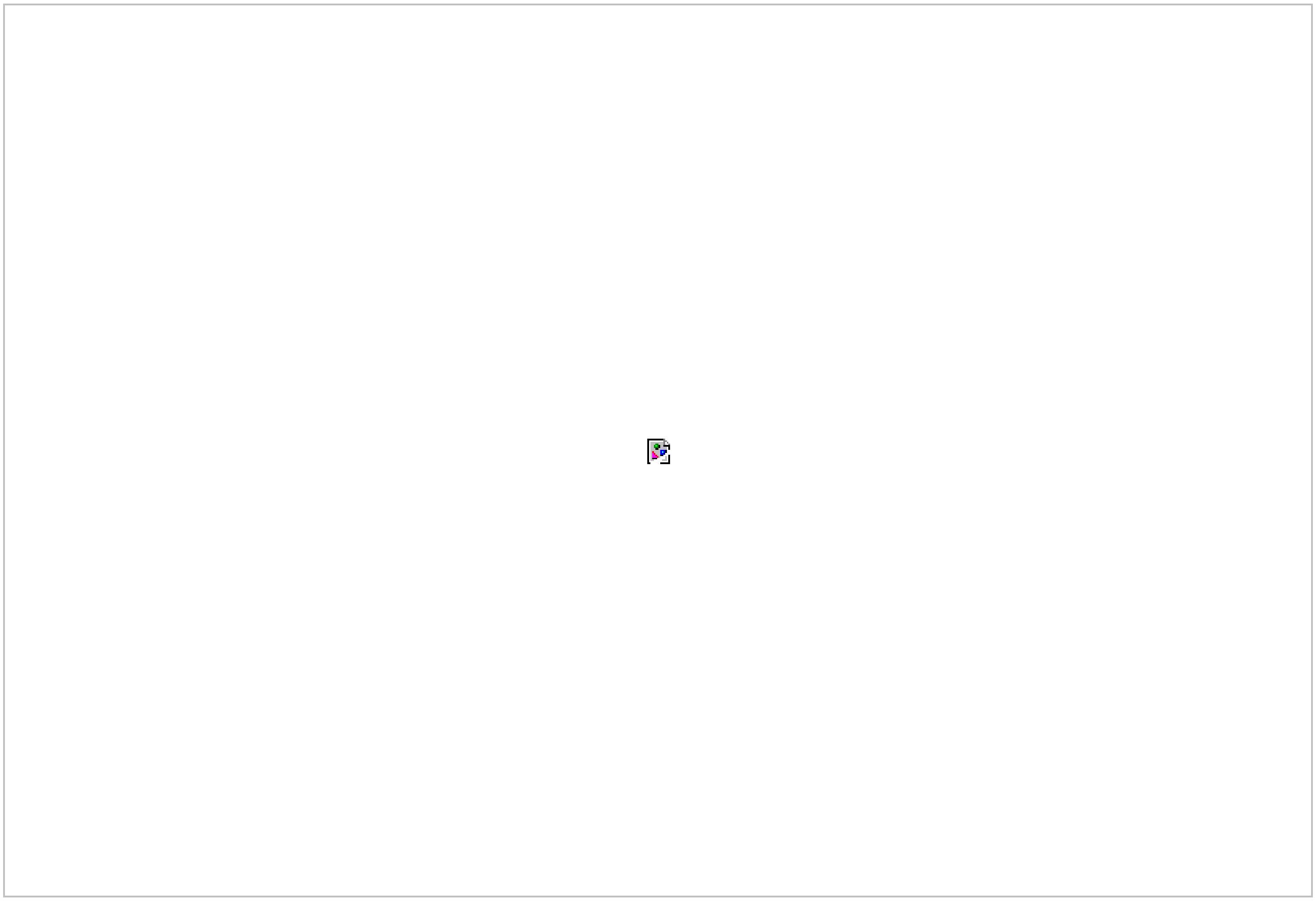
Schwartz, P. and D. Yates, Information on Location, *Real Estate Valuation Magazine*, 45, Fall 1995, p. 7.

Software for Real Estate Professionals, 1996, 7423 Picardy Ave., Suite F, Baton Rouge, LA 70803-4362.

Staff Editor, 1995, If You Don't Like How Things Are, ..., *The Communicator Magazine*, 2, 3, p. 10.

Warren, S., If Texas Appraisers Suffer Feelings of Low Self-Worth, They Have Cause, *The Wall Street Journal,* March 20, 1996, p. B14.

Worzala, E., Margarita Lenk, and Ana Silva, 1995, An Exploration of Neural Networks and Its Application to Real Estate Valuation, *The Journal of Real Estate Research*, 10, 2, 185-202.



1. Hospitality Franchise System, Inc., with over 4000 Ramada Inn, Days Inn, Super 8, and Howard Johnson hotels, purchased Century 21 Real Estate Corporation that sold $90 billion of property in 1994 throughout its 6000 sales offices.

2. Sears/Allstate/Coldwell Banker and Metropolitan Life/Century 21 were perhaps correct in their assessment, but wrong in their timing.

3. Kenneth Nicholson, president of the Appraisal Institute, in a 1996 interview with Cocheo (opt. cite).

4. This is a function of both technology and an increase in the supply of qualified appraisers.

5. Assumes fees will be reduced to international levels; however, could be reduced to flat fees, regardless of transaction size.

6. Collateral Assessment fee provided by real estate agents.

7. Service merged with Collateral Assessment fee.

8. Assumes regional and national discount title companies and continuation of improvement and digitizing of county tax and title records of every individual property by parcel number. This is in progress in many counties.