

ADVANCES IN CUTTING EDGE TECHNOLOGY IN THE REAL ESTATE PROFESSION

John S. Baen, Ph.D.
FIREL Department
College of Business Administration
University of North Texas
PO Box 310410
Denton, TX 76203
Telephone: 940-565-3071
FAX: 940-565-4234
March 17, 1998

This DRAFT paper was presented at the American Real Estate Society annual meeting held April 15-19, 1998. Comments and requests for presentations are welcome. Please do not publish in any form without permission from the author.

Abstract. This paper examines contemporary applications of new technology in the professional real estate areas of brokerage, property management, mortgage originations, title insurance and appraisal practice. Traditional inefficiencies in the marketplace regarding the provision of real estate services is being rapidly replaced with information systems and programs that render results faster than at any other time in history. This research extends previous research on the subject of "theoretical" efficiencies that are coming in the property market with actual technological applications that are in current practice.

Key Words: Technology, Digitized Imagery, Electronic Information Transfers (EIS), Bar Coding, Online Appraisal, Courthouses and Ad Valorem Tax Offices.

Introduction

The current use of computer technology in the real estate brokerage profession has grown in at least one region of the U.S. to 87% (Sirmans, 1998). The general population has also gained momentum in accepting use of the World Wide Web through home computer use to an estimated 3.4 million households in 1995, 12.8 million in 1996, with expectation of growth in 1998 to 30.2 million households and ultimately to 103.4 million or 45% of all households by the year 2002 (Jaros, 1997). The expanding use and availability of real estate information by the customers of real estate service providers continues to expand challenges to traditional inefficiencies of market information and associated professional fees.

Zaby (1997) reports there were 4.25 million real estate transactions in 1997 and that agents in the highest annual income brackets who utilized the most technology earned \$74,200 more than agents in the same bracket who used only modest amounts of technology. Is this a permanent trend or will consumers armed with their own PCs evaporate their differentials in the form of cost savings?

The transfer of technology and new information sources from originators for specific uses to non-related uses in property, can only be accelerated by first researching and projecting possible applications in theory. Many of the

new technologies are not readily apparent in terms of their application to property related brokerage, management, financing, development, etc.

The purpose of this paper is to first identify new technologies that have operational use in the contemporary real estate transactions. Specifically, this study investigates readily available technologies and offers a theoretical framework for direct application to various users or technology "transfer" suggestions.

Measuring the effects of technology on the property professions beyond the obvious time savings and increased transaction capabilities is difficult except through measuring the delivery price of various real estate services offered in the marketplace. Data is presented that indicates dramatic reductions in fees charged in relation to mortgage lending, appraisals, and real estate brokerage commissions that can be attributed to both increased efficiencies and information flows due to technology.

Technology and Information Innovations

Researching contemporary magazines and trade journals for articles and advertisements describing innovations that have implications to real estate service providers and consumers reveals readily available products that will have profound effects on the traditional inefficient real estate related industries. The direct technology and information transfers to users of real estate information is not always readily apparent. The following briefly describes available new technologies and the implications of their applications in real estate. Exhibit 1 offers a broad view and summary of the continued shift of information from the professions to the consumer.

Innovations - Implications

Vehicle and Equipment Tracking Systems (VETS): Global Positioning Systems (GPS) displays real-time vehicle locations on a home-based computer utilizing a two-way radio link as developed by National Agri-Services (1998). The location of the vertical is displayed on detail street maps with simultaneous multiple location reporting capabilities.

Implications: The more efficient supervision of property managers, facility managers, maintenance personnel and others will be facilitated through continual monitoring of both vehicles and persons in the field. Technology transfers to the brokerage profession might someday allow wireless transfer of open house and listing locations with virtual maps to prospective property buyers.

Tax Rolls on CD (TxR-CD): The availability of the complete tax rolls on CD for the entire state of Florida (MMT, Inc. 1998) includes 8.2 million property records including current land use, comparable sales information, volume and page number of filed records, and extensive menu and search options.

Implications: Information formally available only through research and proprietary firm files owned by Realtors and appraisers has suddenly become accessible by all customers on four (4) CDs. The implication of this will cause additional pressure on professional fees as complete market information flows freely and is reliable due to being prepared by local tax offices.

Bar Code Technologies (BCT): Multifamily unit interior inspections, due diligence, exterior inspections, and equipment inventorying are being accomplished with handheld bar code readers (Sternagle, 1996) that store and transmit information instantaneously. A display panel indicates property component acquisitions dates, warranty information, repair dates, parts used, expected remaining life, etc. The wireless transmission of the scanned

information to senior property managers at a remote location allows joint decisions to be made in the field.

Implication: Bar Code technology will offer more complete due diligence inspections, maintenance and repair documentation for property and property systems. Increased efficiency and better information, reduced operating expenses and lower financial risk is projected to occur across all classes of real estate.

Soil Surveys on CD (SOIL CD): Soil Survey Geographical Database (SSURGO) has been developed in certified digital county soil maps for over 100 counties in the U.S., with 300 additional counties currently being developed by seven USDA-NRCS digitizing centers (Harward, 1998). It is projected that the entire U.S. will be available on CD-Rom by the year 2002.

Implications: Soil type information is routinely utilized by appraisers, farm and ranch brokers, agricultural lenders, developers, structural engineers and land planners. It has long been a partial justification for professional fees due to the difficulty for the average person to obtain.

Topography on CD-Rom (TOPO-CD): The availability of U.S.G.S. topography maps for general use by the real estate profession has become difficult to obtain except by mail due to the closing of federal regional mayo centers. The shift to formal written requests and advanced certified checks from one of the national service centers has reduced the availability and ease of acquisition of maps much more difficult. The offering of maps on CD-Rom that includes all the detail of "hard copy" (topography contours, structures, etc.) has recently become available for several states (Earthvision, 1998). What previously required 700 individual 24x24 quadrangle maps for the State of Maine has been reduced to a single CD.

Implications: Information previously compiled and reformatted by appraisers, land brokers, land planners, developers and others is now readily available to anyone. The assimilation of maps, plats, topography maps, and other documents depicting physical characteristics of land, was once a major service or part of consulting reports / appraisals that clients paid handsomely for.

3-D Digital Mapping (MAP-CD): The projection of contour maps in the form of relief maps or enhanced GIS format is not new but has been extremely expensive. The access of total spacial information as presented by Roulac (1995, 1996) in relation to any property including but not being limited to views, location relative to shadows and the sun, prevailing winds, etc., etc., is a powerful consumer tool for making real estate decisions (Whitestar, 1998).

Implication: The easily converted topography maps to 3-D format will reduce costs to developers and assist buyers in making better informed real estate decisions.

FEMA Flood Maps on CD (FEMA-CD): The availability of Federal Emergency Management Administration (FEMA) maps on CD-Rom (Lochsheil, 1998) is important to developers, home buyers, real estate agents, finance and insurance companies. Most of the U.S. is available with required standard flood hazard determination certifications available nationwide through Transamerica (1998) for a standard ten (10) dollars per property.

Implications: While flooding potential is generally documented prior to a residential mortgage closing, this information should now be available at the time of listing and reduce the inefficiencies (and sometimes surprises) during the home buying / marketing process.

Advanced Satellite Imagery (ASI): Digitized, high resolution satellite photographs available through NASA, the Russian space agency Sovinform Sputnik and various private joint ventures (Lockheed Martin Corp. and Raytheon Co.) make spy quality products that can distinguish sedans from minivans (Kerber, 1998).

Implications: High resolution and infrared photographs available to both public institutions and private companies have vast potential for property management, land management, facilities management, water management and land use control. Documented uses to date include: detecting unauthorized building, unreported road building, timber cutting, energy efficiency studies (heat loss) in office building and parking space utilization and documentation, as well as on site high security audits.

Affinity Marketing Electronic Tracking (AfMET): The whole point to affinity marketing is tracking consumers by their personal or corporate identification codes and offering them greater employee benefits and services at lower prices in the form of referral fees, rebated fees, discounts, etc., as part of their employee benefit packages (Heagerty, 1998). Large financial services firms, USAA for example with three million members, and PHH Relocation form alliances and demand cost savings, fee splitting, etc., for the direct benefit of their customers that are crammed down traditional real estate marketing firms in the form of reallocated fees. Electronically tagging consumers for an entire bundle of services with pre-negotiated discounts are resulting in reduced transaction costs directly to the consumer of real estate services.

Implications: It is a rare consumer who can afford to reject the financial rebate or discount or dismiss an employee benefit package. Previous loyalties or considerations of superior service may take a back seat in regards to real estate brokers, mortgage lenders, home insurance, etc., utilized in the sale or acquisition of transferee's homes. While unaffiliated brokers face a dwindling percentage of market share (Heagerty, 1998) than those that participate, increasingly "there will be fee splitting with faceless third-party companies commandeering commission dollars." In the future agents will waste countless emotional hours saying, "It just isn't fair for someone who has nothing to do with this transaction to participate in the commission." (Tappe, 1998)

Collaborative Design by Project Web Site (PROJ-CD): McMorrow (1997) reports that a single web site for each construction project is the "virtual file cabinet" for plans, specifications, memos, hand written notes, suggestions, contracts, budgets, etc., and is used as a "collecting place" for all people who collaborate and contribute to projects. An example is Singapore, where all building permits and plans have recently been required to be submitted electronically (Bartz, 1997) which city departments and inspectors make comments to the design and construction teams.

Implications: Simultaneous and complete information between government and construction participants insures a free flow of information, efficiency and enforcement of construction standards from design through completion. The local tax offices, fire departments and police departments all have complete information from project inception through occupancy.

E-mail Negative Auctions (E-Auc): Internet reverse auctions are available to locate suppliers, building materials, supplies and services at reduced costs. Purchasing agents for firms such as Free Markets Online represent buyers earning fees on the cost savings rather than commission from suppliers with average savings of fifteen percent (Woolley, 1998).

Implications: Cost savings are obvious for every facet of construction, property management, facilities management and may eventually be applicable to individual mortgage borrowers who are bid on by lenders on both commercial and residential loans. Property investors should benefit from reduced construction costs,

operating costs and mortgage costs in the form of higher rates of return.

Online Shopping with FedEx Delivery (OL SHOP): Andersen Consulting projects that 15-20 million households (15-20%) will shop for groceries from their home computers (Tanaka, 1998). Modest success in the sales of books, computer software and music CDs over the internet is well documented but does not seem to have had any significant effect on traditional retail shopping with only 3.2 households making purchases on the net in 1996, and 7 million during 1997. However, as noted by Sandberg (1998), fifty percent of online households have used the Internet to research purchases. Online transactions were estimated to be 2.6 billion in 1997 and are expected to grow to \$600 billion within a few years (Ferguson, 1998).

Implications: If projections came to pass and retailers become "cyber marketeers," the impact on retail property values and percentage rents could be substantial. The transfer of sales from a retail location to the internet is a transfer of wealth from the commercial property owner to either the retailer or cost savings to buyers. City, county and state sales taxes could also be negatively effected by online sales if cyber sales are untrackable and taxes unenforceable. Further, traditional retailers themselves and commercial property investors are at some risk of erosion of market share from "no location" internet merchants (Sandberg, 1997). High-traffic Web merchants are paying cyber "advanced rent" in exchange for prominent Web page placements: Amazon.com (\$19 million to AOL); 1-800-Flowers (\$25 million to AOL); CUC International (\$50 million to AOL + fee for each new customer); and Tel-Save Holdings Inc., (\$100 million to AOL).

On-Line Mortgage Shopping (OL-MORT): Internet Web sites of individual lenders promising substantial savings on both interest rates and closing costs have been overshadowed and made honest by on-line sites that competitively shop nationwide and report on as many as 2,000 firms daily (Tejada, 1998).

Implications: As confirmed elsewhere in this paper, interest rates and closing costs are becoming more competitive between large numbers of mortgage companies. Increased competition and rapidly improving mortgage market information results in "tighter" interest rates and closing cost patterns, resulting in savings to the consumers and less profits for lenders. It is also note worthy that "knowledge of the mortgage market" was once considered a major service provided by the National Association of Realtors (1978) as part of their bundle of services. Lower origination fees, faxed mortgage applications and 24 hour "call centers" for taking and processing loan applications utilizing lower skilled and lesser paid loan clerks will eventually reduce the demand for formally trained university finance graduates and traditional mortgage loan officers.

WWW Home Appraisals (OL-App): Individual home valuations on the Internet have been reported by Fletcher (1997) to be plus or minus seven percent (7%) of market value as compared to traditional appraisals estimated to be accurate within five and one-half percent (5.5%). Internet appraisal service providers include: Case Shiller Weiss (1998); Experian (1998); Homeshark (1998); and Tax CMA (1998). Costs range from free to \$80 per appraisal, and generally offer subject property as well as comparable property physical details, sale dates, terms, neighborhood descriptions, etc., etc.

Implications: Beyond the obvious impact to traditional appraisers, there are numerous other users of home value information: buyers, sellers, nosy neighbors, refinancers and property tax protesters. Both closing costs and time savings in the average real estate transaction should be significant and contribute to more efficient property markets. The acceptability of on-line appraisals by mortgage lenders varies widely.

Empirical Evidence of Increasing Brokerage Efficiencies and Real Estate Commission Rates Down Pressure

Evidence exists that there is downward pressure on traditional real estate fees due to public access to on-line multiple listing service (MLS) access by the public as well as increased competition which follows what was previously a "closed information" system. As reported by Collins (1998), when Australian real estate fees became deregulated, fees went down, not up from a previously stabilized rate of 2.5%.

American fees are also under pressure from buyer rebates offered as well as schemes to allow public access to MLS data and advertising for anyone of the following rates (see Exhibit 2):

- 4% commission if sold through MLS agent
- 3% commission if sold by listing agent
- 1% if shown by owner
- \$120/month per homeowner listing in MLS through a broker
- \$300 flat fee per transaction to assist in transaction contracts and closings

Empirical Evidence of Increasing Efficiencies in the Residential Mortgage Market

The primary mortgage market has traditionally been a "local" market of available lenders who originated loans, underwrote and packaged them for resale in the national secondary mortgage market. As a primarily fee driven business, the variance of fees and interest rates charged or quoted has been very high.

In the Spring of 1997, within a given week, fifty-six (56) real estate students were requested to obtain mortgage quotes from 35 residential mortgage companies. Each mortgage company was called twice by two different students for the same exact mortgage. Their request included twelve questions to be answered over the telephone interview concerning the following type loan:

Convention Loan

Contract Price \$100,000

Principle Down Payment \$10,000

Loan to Value Ratio 90%

Fixed Interest Rate

30 Year Mortgage

Two students called each lender with the same questions as a cross check of loan quote integrity and reliability. Small variances were averaged (one-quarter percent interest rate and \$250 in closing cost differentials). Of 35 firms contacted, information was analyzed for only 28 as information obtained on the following two (2) primary questions was either to "vague" or did not meet the variance test:

1. For a fixed rate loan for 30 years with 10% down on a \$100,000 home purchase, what is your current interest rate with a 30 day lock in guarantee?

2. What are the total estimate closing costs for this loan included in a standard good faith estimate?

This experiment was conducted during two (2) semesters approximately six (6) months apart. The assignment to call their individual mortgage company was assigned on a Thursday and their complete questionnaire was due on the following Tuesday at 8:00 a.m. Partial explanation of variances could be explained by the fact that students could have called lenders on any one of three business days with some mortgage market fluctuation occurring. Further research could be improved by assigning a particular day to collect the information although variations are generally small over a short period of time. The problem of mortgage brokers and firms quoting possible undeliverable "tickler rate" mortgages and low fees is a shell game and another concern in our study.

The results as found in Exhibits 3 and 4 are both interesting and significant. It is obvious that the mortgage market is becoming more competitive in both interest rates and fees which can only be attributed to one if not all of the following factors:

1. Better flow of information to borrowers via Internet mortgage loan quotes, national electronic bulletin boards or comparative information published in newspapers that is collected from said sources.
2. Increased competition between lenders due to better flow of information to borrowers because of number 1.

The change in market interest rates over the time period is not the point of Exhibits 3 and 4, but the variance of rates and fees quoted.

Conclusion

Identifying and measuring the effects and implications of technology and technology transfers on real estate transactions appears to be heavily weighted to the benefit of the consumer at the "expense" of the traditional service providers. Continued pressure on fees due to increased competition, easy accessibility of information directly by consumers, and affinity marketing / collective bargaining / rebate schemes is exciting news for consumers and ominous for service providers who do not increase their volume of production. A summary of these technology effects is offered in Exhibit 1.

References

Baen, J.S. and R.S. Guttery, "The Coming Downsizing of Real Estate: Implications of

Technology," *Journal of Real Estate Portfolio Management*, Volume 3, Number 1, 1997, pp 1-18.

Bartz, C., Autodesk Incorporated Speech at A/E/C Systems Conference Ad Exhibition, Philadelphia, PA, June 1997 (referenced in McMorrow 1997).

Chase Shiller Weiss, Quarterly home-price forecasts (available 1998 at <http://www.cswwonline.com>).

Earthvision, Topography on a Disk (For information 1-800-627-7236 or <http://www.earthvision.com>).

Experian, Comprehensive On-line Valuations (available 1998 at <http://www.experian.com>), 5 comps for \$8, neighborhood profile \$4.

Ferguson, T.W., Web Grab? *Forbes*, March 9, 1998, p. 125.

Fetcher, J., On the Web: What's Your House Worth? *The Wall Street Journal*, September 26, 1997, p. B-12.

Harward, K., Precision Agriculture Successful Farming, Vol. 96, No. 4, March 1998, p. 35. (For information contact Ken Harward, USDA-NRCS, Information Technology Center, Fort Collins, CO.)

Heagerty, C., Affinity Marketing - Danger or Opportunity, *Texas Realtor*, February 1998, p. 13-19.

Homeshark, Free comparable (available 1998 at <http://www.homeshark.com>).

Jaros, A., Trends in the Consumer Web / Online Services Market 1997: Consumer Market Analysis and Forecast, Cowles Simber Report (available 203-358-4241 or www.simbanet.com).

Kerber, R., When is a Satellite Photo an Unreasonable Search? *The Wall Street Journal*, January 28, 1998, p. B-1.

Lochsheil, Corp FEMA Flood Maps on CD-Rom (For information 1-888-356-6362 or <http://www.lochsheil.com>).

McMorrow, E., The Download Low Down Facilities Design and Management, July 1997, p.3.

MMT, Inc., Entire Florida Tax Roll on CD! Advertisement in *Real Estate Valuation Magazine*, Winner 1998, p.7 (available at 1-800-239-1668 or <http://www.mmtinfo.com> or E-mail: mmt@mmtinfo.com).

National Agri-Services, Inc., Global Positioning System, *Successful Farming*, Vol. 96 No. 4, March 1998, p.35. (For information 1-800-367-7501 or <http://www.nationalag.com>).

National Association of Realtors, Brochure provided to buyers and sellers of real estate in the U.S.

Roulac, S.E., Strategic Decision Models: Multiple Perceptions, Unifying Structure. *Journal of Real Estate Research*, 1993, 10:5, pp. 495-500.

Roulac, S.E., The Strategic Real Estate Framework: Processes, Linkages, Decisions. *Journal of Real Estate Research*, 1996, 12:3, pp. 323-346.

Sandberg, J., On-Line Shopping Shows Signs of Life, But Still No Mass Appeal, *The Wall Street Journal*, March 12, 1998, p. B6.

Sandberg, J., Retailers Pay Big for Prime Internet Real Estate, *The Wall Street Journal*, July 8, 1997, p. B1.

Sirmans, G.S., Profiling Texas Real Estate Licensees: Determining Income. Technical Report 1221, 1998, Real Estate Center at Texas A&M University.

Sternagto, E., INFOspect™ / Rent Roll Inc., 2395 Midway Road, Carrollton, TX 75006, 214-250-8003.

Tanaka, J., Technology From Soup to Nuts, *Newsweek*, March 16, 1998, p.77.

Tax CMA, Software-driven-tax based comparative market analysis (available for \$80 in 1998 at

http://members.sol.com/TAXCMA).

Tejada, C., Guide to On-line Mortgages, Refinancing. *The Wall Street Journal*, p. 98.

Transamerica, Flood Hazard Certification (available at 1-800-247-3384 or Flood Fax 1-800-553-3424 at \$10.00 per residential dwelling).

Whitestar Corp., Digital Mapping Solutions 1998 (available 1-800-736-MAPS or http://www.whitestar.com).

Woolley, S., E-muscle, *Forbes*, March 9, 1998, p.204.

Zaby, P., Broker Strategies, *Texas Realtor*, November 1997, p. 26-27.

Exhibit 1: Implications of Technology on Real Estate Professions / Service Providers

	Investors / Buyers / Sellers	Broker / Agents	Appraisers	Lenders	Property Managers	Developers	Government / Regulator
VETS / GPS	+ ⁽¹⁾				+	+	+
TxR - CD	+	<& ⁽²⁾	<&	+	+	+	+
BCT	+				+		+
SOIL - CD	+	<&	<&	+		+	+
TOPO CD	+	<&	<&	+		+	+
3-D MAP - CD	+	<&	<&	+		+	+
FEMA - CD	+		<&	+		+	+
ASI	+	<&			+	+	+
AfMET	+	<&					
PROJ - CD	+				+	+	+
E-Auc	+			<&	+	+	
OL - Shop	+			<&	+	+	
OL Mort	+			<&			
OL App	+	<&	<&	+			



1. ¹Note: + = more accessible and reduced cost of information or improved efficiencies.

2. ²Note: <& = reduced income implications without increased business volume