

The Future Value Implications of E-Commerce on Urban Form, Office, Warehouse, Residential and University Owned Real Estate

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ABSTRACT

Continued growth of E-Commerce will have profound effects on the locational preferences, supply, demand, and future urban form in regard to single family homes, offices, warehouses, university real estate and other types of land uses. This study develops a theoretical framework of opportunities and problems presented by further expansion of E-Commerce. Various traditional classes of real estate will have value, use and demand implications due to technology that are not readily apparent. The paper presents futuristic views, causes and effects, and long-term investment performance projections. Key words/concepts: technology, land use, urban form, zoning, traffic plans/patters, valuation.

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INTRODUCTION

The changing roles and relationships between people, places and businesses due to the “Impact of Technology on Real Estate Markets and Values in the 21st Century” was the major thrust or theme of the Minnesota Chair in Real Estate Distinguished Lectures Series (Roulac and Baen, 1999) at St. Cloud State University. It was determined at that time, that a framework and theoretical model needed to be considered and developed that specifically addressed the cause and effect of technology on specific types / classes of real estate in order for meaningful research to proceed on the topic in the future. Table 1 represents the pattern of technology acceptance and resultant land use changes over time.

The flow of information, goods and services from business-to-business which is today commonly referred to as “B2B” was referenced in an article quoting Mr. Steven Johnson, Director of E-Commerce at Anderson Consulting in Chicago (Calgary Herald, 1998). While the “B2B” acronym is colloquial today in news articles, advertisements, business slogans and daily conversations, it is not precise or descriptive enough to consider the implications of technology on specific types / classes of real estate including but not being limited to:

- Homes
- Industrial / Manufacturing Facilities
- Warehouses
- Office Buildings
- Bank Buildings
- Educational Facilities (Universities, Schools, Etc.)

Table 2 offers examples of the expansion of “B2B” concept specifically for real estate property types, the communication path, functions and acronyms between real estate classes. Table 3 represents the traditional production / distribution model considering business function, participants (people), and real estate (places). Table 4 offers the impact of an E-Commerce agent / firm (Amazon.com) on various classes of real estate while Table 5 offers the impact of **pure** E-Commerce from producer / creator of intellectual products and/or goods and service directly to consumer. This appears to be the ultimate business model of the future and is achievable today with many intellectual products and services such as books, music, financial services, etc. (See Table 6)

This paper will develop a framework of various traditional “land uses” and property functions for society within a context which includes the importance and major changes augmented by technology. Processes, definitions and changes in the distribution of the flow of goods, services and people will be presented. Changes in traditional land use classifications, building uses, and urban form will be suggested.

Literature Review

The slow wheels of academic publications when combined with the accelerating impact and speed of change in today’s business and living environment results in a general lack of articles on the subject except various articles and quotes in the “popular” press.

Potential implications of technology on retail property values was considered by Baen (2000) which concluded that the value of profitability of traditional malls and retail properties are being challenged and affected by E-Commerce. Changes in building uses and the distribution of good processes, services or people from one class of real estate to another has impacts on other classes of property.

Totilo (2000) presents an exciting perspective of the home of tomorrow which has utility far beyond traditional residential living and suggests that these changes are forthcoming and imminent.

Technology Shares as a New Currency in the Real Estate Market

Venture capitalists, stock underwriters and sponsors have often taken stock in lieu of cash payment for their services. Accounting firms have begun the practice of accepting stakes in web start-ups in lieu of fees. (MacDonald, 2000)

Office landlords in both Texas and New York have begun to accept stock or stock options in new technology start-up firms in exchange for “free-rent” (Rich, 1999). While there has not been a documented case of real estate leasing agents or brokers taking their commissions in “E-tenant” stock shares, the lines between “bricks and sticks” in office, manufacturing, and light industrial real estate are “virtually” blurring.

This trend, however, may be more of an indication in falling demand or excess vacancies in these classes of real estate in those specific markets and more a case of landlords, sellers, and brokers preferring to have something that could have value rather than an empty structure and no commission / income. The long-term potential for traditional office space does appear to be changing due to technology which will be discussed later in the paper.

Urban Form Implications

Today’s cities were not designed for delivery of retail goods by large brown trucks parked on interurban narrow streets. Traditional catalog deliveries by mail have been replaced with door-to-door deliveries within hours. The question becomes “whose door will the product / merchandise be delivered and when?” In fact, most of the urban apartment, townhouse and urban loft/condo dwellers are not at home during the day, which often results in the shift of the delivery of goods from home to their place of employment, in high-rise office buildings during the day. Office managers are often irked by deliveries of personal goods to employees during the workday and the use of company computers during company time to buy personal items on the Internet.

Residential property managers are also reluctant to be responsible for the acceptance, responsibility, storage and ultimate re-delivery of goods to their residents. Delivery of goods directly to residents at night can result in noise, building access problems, loading and unloading of brown trucks and elevators in the middle of the night that disturbs neighbors. Opportunities may exist for commercial depositories and pick-up points, similar to a private mailbox establishments for commercial use, however, this can negate the convenience of retail ordering and shopping by E-Commerce or phone. Other urban form and function implications are:

1. The loss or shift of retail sales tax and property taxes (based on assessed values) to the Internet has serious implications to city revenues and capital improvement projects (Baen, 2000).
2. Technology in the form of better traffic information to both drivers and planners may increase the efficiency of existing roadways, reduce both traffic and the need to build or expand freeways.
3. Cities will continue to grow toward major airports as passengers and E-Commerce related freight and door-to-door delivery companies continue to increase in importance. Air travel will increase along with convenient residential growth nearby.
4. Smaller, more affordable, part-time residences may need to be developed (that are hotel room-like) to house telecommuters who physically come to the city only 1 or 2 days per week (a reverse of a weekend, 2 day escape pattern of today’s urban dwellers.)

5. Building codes, planning and zoning may require major changes in city personnel, inspectors and increased training to incorporate the new and expanded uses and systems at homes and offices.
6. On-line, real time, access of all city meetings, building permits (Leigh, 1998), specifications, zoning regulations, permits and an architectural plans / drawings will greatly improve and better inform residents on the changing urban form. On-line voting by residents may improve or strangle innovation in the new "E-Cities." General apathy and lack of citizens participation has allowed developers to generally maximize their rate of return on proposed developments with generally only city staff to guide them. . . . what if all citizens could vote on all zoning applications and projects? Could anything ever get developed?
7. Technology will allow further disbursement of people or "Rural Sprawl" and land uses that will result in lower densities / intensity of land uses and further reduce the prospects of public mass transit economics.

Office Property Investment Implications

Long-term office investment implications should trend toward an overall reduction in demand, effective occupancy rates and therefore flat to falling values due to technology (See Table 6). Perhaps over simplistic but straight forward reasons for this cause and effect are as follows:

1. The shift in traditional person-to-person financial services to "on-line" (OL) sales and services in the areas of insurance, stocks, bonds and real estate sales do not require legions of office workers and sales persons previously required.

Examples:

 - a. Stephen King's recent release (March 8, 2000) of the first major author to use the Internet to sell and download over 500,000 copies in the first 4 weeks directly to consumers (Gates and Sawhill, 2000) for \$2.50 is only an indication of things to come (Simon & Schuster was the "publisher" for this experiment and is sending shockwaves through the intellectual community of writers, musicians and artists who have new power.)
 - b. Allstate Insurance announced a layoff of 4,000 agents in a move to sell insurance on-line (*Fort Worth Star Telegram*, 1999). This equates to an immediate reduction of office space demand and increase supply of approximately 800,000 square feet (4,000 x 200 sq. ft. = 800,000 sq. ft.).
 - c. Reduced sales commission for Internet insurance sales. Commissions will be reduced to 2% (Lohse, 2000) which is over an 80% drop in current commissions paid to traditional agents. These jobs will be shifted to call-center salespersons and/or reduce the number of traditional insurance agents in the U.S. Banks have also been given the authority to market insurance and securities as part of their services.
2. Downsizing and closings of branch banks due to mergers, acquisitions, ATM machines, OL banking, "non-bank" competition (Wal-mart, Yahoo, USAA Credit Services, etc.) will overall reduce the number of employees and the demand for office space.

3. There has been a shift of traditional sales office space to industrial / warehouse / brown box 24-hour “call centers” and “service centers” at vastly reduced total cost of occupancy per employee per year when contrasted to typical office rents and triple-net lease expenses and common area maintained (CAM). Expanded business hours require less required effective total space than 8 a.m. – 5 p.m. offices of yesterday.[\[1\]](#)
4. The reduction in traditional filing space (paperless office system) and smaller acceptable work area space per office workers has been declining for years due to electronic filing, smaller computers, movable partitions, open office concepts. (Down from 215 sq. ft. of office space per person to 160 sq. ft. / person.)
5. The “new economy” has developed a new type of account executive who doesn’t have or need a traditional business office but is a “road-warrior” or “sky-pilot” and conducts business wherever their assignment takes them. These consultants, sales persons, service “reps,” etc., are in the “real” world, but only connected by e-mail, mobile phone, faxes and quarterly or annual meeting with employers and have no office.
6. Video conferences and video phones, when developed as standard equipment in all homes and offices, will reduce the need for face-to-face daily contact.
7. Telecommuting and “flex scheduling” combinations of office workdays and home workdays have resulted in some companies adapting rotating offices between office mates utilizing the same space. It has been estimated that 19.6 million people, or 10 percent of all U.S. adults, currently work from home at least one day a month during regular business hours. (Kunde, 1999)

Of all the factors above, telecommuting may eventually have the most pronounced effect on office space demand due to the absolute economies gained from both employers and employees, as well as an increase in the quality of life of telecommuters who save time lost in traffic, downtown parking, etc. This will also have an important impact on locational decisions in the design, quality and quantity of residential dwellers / workers in the future.

AT&T has calculated real saving of \$10,000 annually per employee gained through reduce office space requirements, absenteeism, lower turnover rates and competitive hiring practice to attract and retain good workers. Direct real estate cost savings calculated by AT&T have been estimated to be \$6,000 / employee. (Kunde, 1999) Employees also save or make more money due to less unpaid absenteeism due to family or medical related errands expended by traditional office workers plus reduced auto or other forms of commuting to “real offices.” It was also noted that productivity of these employees was significantly higher.

Between the trends toward telecommuting, E-Commerce shopping and distance learning opportunities, the freedom of family homes to be located at greater distances from traditional cities, will allow increased opportunities of “life-style” changes and improvements for those who choose to locate in rural or recreational areas. Savings in commuting, travel, car expense, insurance and reduced risks of automobile accidents associated with traffic may contribute to choices to office from home and/or allow persons to justify larger investment in their homes or choose residential living in rural or recreational areas rather than convenience / travel-time to a traditional office. Efficiency in the “new economy” may actually allow people to choose a simpler, less expensive life-style than otherwise would be possible . . . it may also lead to serious elimination, displacement and/or reallocation of persons in traditional jobs to seek new opportunities (See Table 5).

Warehouse Investment Implications

Direct shipping from traditional printers and/or downloading books, magazines, music, etc., directly from the intellectual creator (author, musician, programmer, etc.) eliminates the traditional need for warehousing, distribution centers and retail space altogether. Distribution related land uses are then transferred to short-term distributions / warehouse space utilized by UPS, FedEx and similar rapid delivery functional real estate having intensive utilization with high turnover rates.

Traditional book distribution and retailing, as well as hybrids E-Commerce distribution firms (as an example – Amazon) would theoretically require the exact same net amount of warehouse space unless the demand was greater for whatever reason. As an example, Amazon built a 322,560 sq. ft. regional warehouse / distribution in Reno, Nevada (*Associated Press*, 1999) and hired 300 employees that would have otherwise been handled by existing traditional distribution real estate and employees. Unless the overall demand for warehouse space grows, there exists a duplication of buildings within the existing stock of warehouse stock and therefore can result in excess supply of warehouse space and employees that must be reallocated or vacancies, values and employment will/would decline due to technology unless the entire economy continues to expand at the current historical record rate of growth.

The use of 3-D ten-story warehousing with high-tech robotics in new warehouses eliminates the need for most traditional warehouse employees and is currently being tested by J.C. Penney at Dallas / Fort Worth in conjunction with a FedEx regional hub and commercial airport location (Alliance) for ground, rail and air distribution of products. As labor is a major component of traditional distribution / warehouse properties, 3-D warehousing could reduce demand for conventional warehouses and decrease their value through functional obsolescence unless alternative uses can be found.

Future warehouses will require more intensive use of land with multi-storied 3-D robotic systems or continually **larger floor plates** (100,000 sq. ft.+) **having increased ceiling heights** than historical buildings as indicated in Table 7. Older existing low clearance ceiling height warehouses, which are generally smaller structures, will either be utilized for smaller independent business owners or adapted to alternative uses such as call centers, or will be vacant. Changes in warehouse properties markets may include:

1. Demand for warehouses being reduced due to both manufacturing on-demand and the trend toward less inventories due to computer scheduling, ordering and manufacturing techniques (robotics). These efficiencies will result in less long to medium term storage and inventorying.
2. Warehouse properties will continue grow “higher tech” in their internal systems of moving products, more efficient land/air routing and site locational decisions. The new term “logistics” has been coined to describe these concepts.
3. Economies of scale will continue to expand both the size (100,000 sq. ft.+) ceiling heights (40 ft.+) and 3-D designs (6-9 stories).
4. Well located warehouse, manufacturing and “brown box” retail warehouse type structures may more frequently have alternative uses that yield higher rents per square foot than its originally designed purpose. (Call centers, service centers, etc., however “work” only in a few special cases due to parking restraints.)
5. Successful new warehouses and distribution centers will be located immediately adjoining major highways / interstates, and regional airport “hubs” of delivery companies such as FedEx, UPS, etc. As E-Commerce and retailing expands, the demand for these specifically located and designed warehouse facilities will increase.

Residential-Single Family Home Investments

The highest and best use of single family homes with a singular use is rapidly changing to a “higher and better use” that expands traditional residential units into places to conduct business, shop, recreate and download books, movies, magazines and recreational games.

The rapid expansion of the traditional single family home into places of business for telecommuters and home shopping as well as places for education, printing on-line books, downloading movies, videos, music and other activities will increase both the cost and locational preferences and options for home buyers. The value and cost implications of existing homes that will require both physical and electronic upgrading for the “new electronic economy” (home offices, rewiring, new electronics, fiber optic infrastructure, etc., etc.) are significant and daunting.

1. Telecommuters will be freed from locational considerations on choosing a home based on commuting time or distance to a traditional workplace. While new locational freedoms of choice may sound “good” it may cause an acceleration of “Rural Sprawl” a new form of rural or recreational area flight. The prospects of these possibilities have huge implications to dwellers and adds a whole new meaning to the term “Urban Sprawl.”
2. New “smart homes” will cost more, but will be both more efficient and important as valuable places and spaces due to more activities routinely taking place there: living, working, education, recreation, etc.
3. New social networks for residents will need to be developed or replaced that are “lost” from day-to-day human interaction, socializing and learning at the traditional workplace / office environment.
4. Distant telecommuters may purchase or lease small condos, apartments or budget hotel rooms in the city or suburban areas for use a few days per week or month rather than having a weekend escape “vacation” cottage or condo. This represents a reverse of time and location of the traditional work weeks travel and would be perceived to be a higher quality of life.

University Real Estate Implications

While “distance learning” is not for every student, on-line universities are increasing their offerings dramatically. This trend will raise university incomes substantially, although temporarily, without requiring more classroom space or other “bricks and sticks.” There are an estimated 1.7 million students currently enrolled in the U.S. and Canada (Anderson, 2000) which is both impressive and distressing from a traditionalists education point of view.

The implication for both physical university structures, faculty and students are profound. While most major universities are entering Internet / distance learning at the “speed of light,” for competitive and financial reasons, few have contemplated the long-term effects of this truly global market for higher education. All universities picture themselves as “selling” or offering their online classes to an unlimited number of potential students world-wide, however the quality and program reputations will vary widely.

The problem of course is that only a few universities have truly world-class professors and programs. If it costs the same tuition for any student to attend Harvard, Yale, etc., on-line as it does to attend either a bricks and sticks or any virtual university class at say the University of Kansas, where will the prospective student “attend?” Which degree is “worth” more?

A few implications of Internet / distance learning for university real estate are as follows:

1. On-line education should be a compliment to the traditional university education where students learn as much from each other and skills for life as they do from their text (which will be sold and downloaded on-line).
2. Traditional funding and subsidies for tuition from various state governments that support traditional universities will be attacked as not applicable for Internet / distance learning and “profits” anticipated now may evaporate to zero after recapture or return of E-course development costs.
3. The “new economy” may hire new employees according to what they “know” and their functional productivity rather than a degree from any traditional or virtual university.
4. Large vacancies and falling enrollments at universities may occur if virtual degrees from top universities are either perceived, or actually are superior to mediocre traditional colleges and universities.
5. Universities and public funding sources should seriously consider the policy implications and planning for the future of traditional education and stop all construction on new buildings until the full implications and economics of distance learning is considered.
6. Alternative use plans for contingent vacant university space need to be developed. Think tank high-tech industry co-occupancy joint ventures could be developed instead of off-campus industry “technology parks” that have been developed by many U.S. universities in conjunction with start-up companies and research and development firms.
7. Academic research data collection, analysis, assimilation, review processes and publication in the traditional format requiring two (2) years from start to finish is completely unacceptable considering the amount and rate of change brought about in business and society as a result of technology. In order to deliver quality teaching on the cutting edge that incorporates contemporary research and publications, university education will be devalued and bypassed by both students and employers . . . and should be, unless major changes occur. By the time this article is published, it will be outdated for practical use and planning!

Conclusions

Technology will be both a blessing and a curse to real estate investors / owners in that there will be a real location and change of the importance of various classes of real estate. As real estate is considered a “long term asset” incapable of being moved to new locations, for new uses, there will be a great deal of turmoil and fluctuation in the market place as people, time, business functions and places will be impacted by technology. The virtual firm described by Michael Dell (Dell, 1999) may be an overstatement of the importance of the Internet and E-Commerce on society when he stated: “physical infrastructures are becoming obsolete.” (Michael Dell, Dell Computers, *The Economists*, September 16, 1999.) People must be somewhere and do something. This paper has attempted to visualize the future of various classes of real estate considering the exciting and confounding implications of technology beyond the “known” to the “unknown” future.

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**Table 1: The Pattern of Technology Acceptance and Land Use Change
By John S. Baen and Stephen Roulac**

New Technology

↓

Novelty

↓

Widespread Use

↓

**Transfer of Jobs / Wealth → Land Use Change, Supply, Demand for Land
or Existing Structures**

↓

Denial

↓

Reality of Change in Society
and Economy



- “Necessity” of Technology → Obsolescence of Previous Land Use / Facility
- Alternative Use of Real Estate
- Or
- Vacancy
- Or
- More Intensive Use of Existing Land Use

Table 2: Beyond Business-to-Business (“B2B”) in Form and Function of Real Estate
By John S. Baen and Stephen Roulac

<u>COMMUNICATION PATH</u>	<u>ACROYNIM*</u>	<u>FUNCTION</u>
Home-to-Business	H2B	Direct Purchase of Financial Services, Consumer Services and Technical Support
Home-to-Home	H2H	Production And Purchase Of Intellectual Products, Music, Video, Books, Crafts, Direct From Creator
Home-to-Manufacturer	H2M	Purchase Marketing Direct from /to Manufacturers - Produced on Demand (Not Warehoused)
Home-to-Office	H2O	Telecommuting All or Part of Ones Employment
Home-to-University	H2U	On-line University Training and Instruction
Home-to-Call Center	H2C	Phone and On-line Ordering of Retail Products from Call Center to Warehouse

Home-to-Warehouse/Distribution Center	H2W	Delivery of Call Center (H2C) Item if Not Directly from Manufacturer
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* The reverse acronym also applies. (i.e., B2H is the same as H2B.)

Table 3: Traditional Production and Distribution Model and Land Uses
By John S. Baen and Stephen Roulac

<u>FUNCTION</u>		<u>PEOPLE</u>		<u>PLACES</u>
Intellectual Creator	←	Book Author	→	House
		↓		
Brand Name Producer / Merchandiser	←	Publisher	→	Office Building
		↓		
Manufacturer	←	Printing Company	→	Industrial Building
		↓		
National Bulk Storage	←	Book Storage Firm	→	Warehouse
		↓		
Manufacturers "Reps"		Marketing Reps	→	Office, Home, Car
		↓		
←				
Regional Distribution		Wholesale Distributor	→	Warehouse / Distribution Center
		↓		
←				
Direct Marketing / Delivery	←	Retailer / Merchant	→	Shopping Center / Retail Outlet
		↓		
Consumer Product	←	Consumer / Book Buyer	→	House
		↓		
Recycle Product	←	Used Book Buyer	→	Class C Retail Outlet
		↓		
Ultimate Disposal	←	Disposal Company	→	Urban Landfill or Recycle Center

Table 4: The Current Elimination or Reduced Demand / Value Implications of Various Land Uses (Places), Employment (People), and "Value-Added" Cost Due to Efficiencies Gained Through Technology.
By John S. Baen and Stephen Roulac

<u>PEOPLE</u>		<u>PLACES</u>
Book Author	→	House
↓		

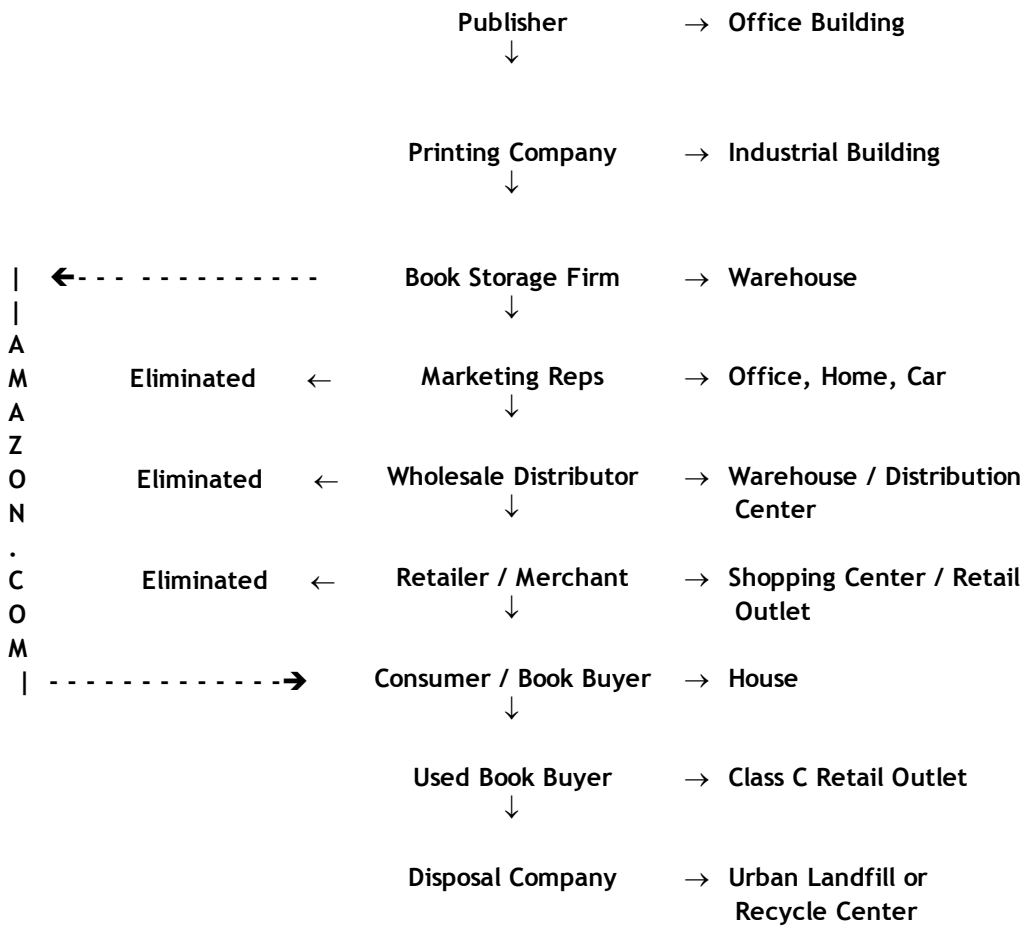
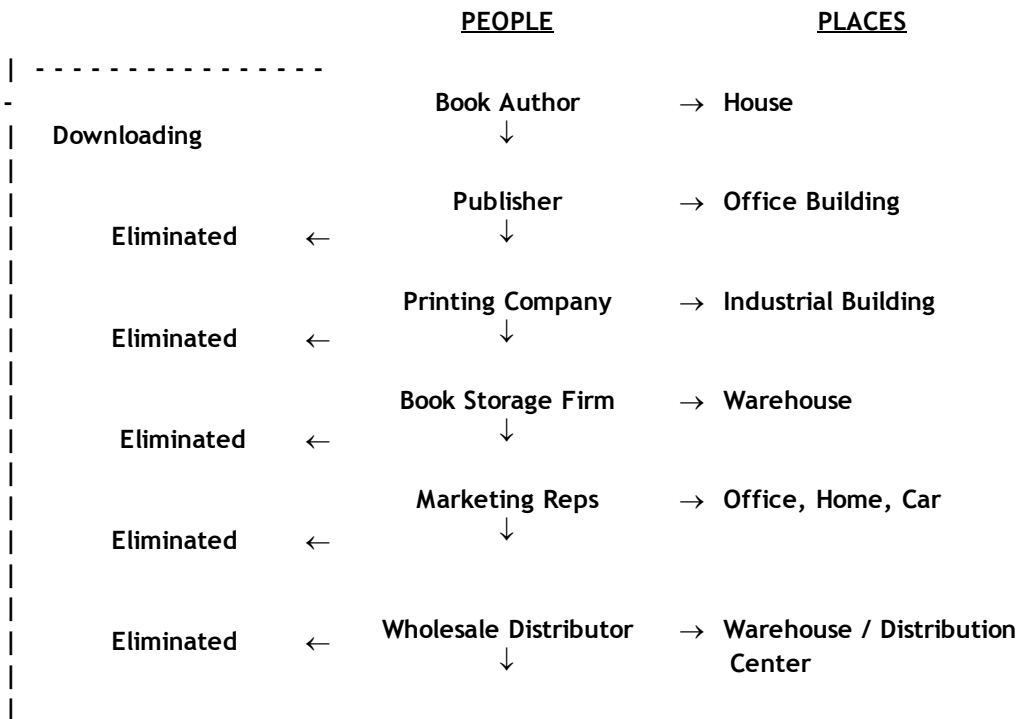


Table 5: The Ultimate Elimination or Reduced Demand / Value Implications of Various Land Uses (Places), Employment (People), and “Value Added” / Cost (Functions) Due to Efficiencies Gained Through Technology
 By John S. Baen and Stephen Roulac



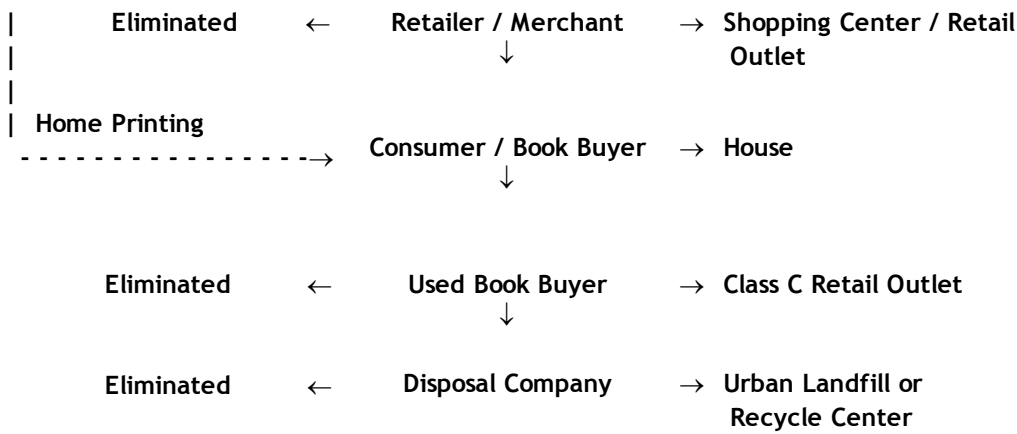


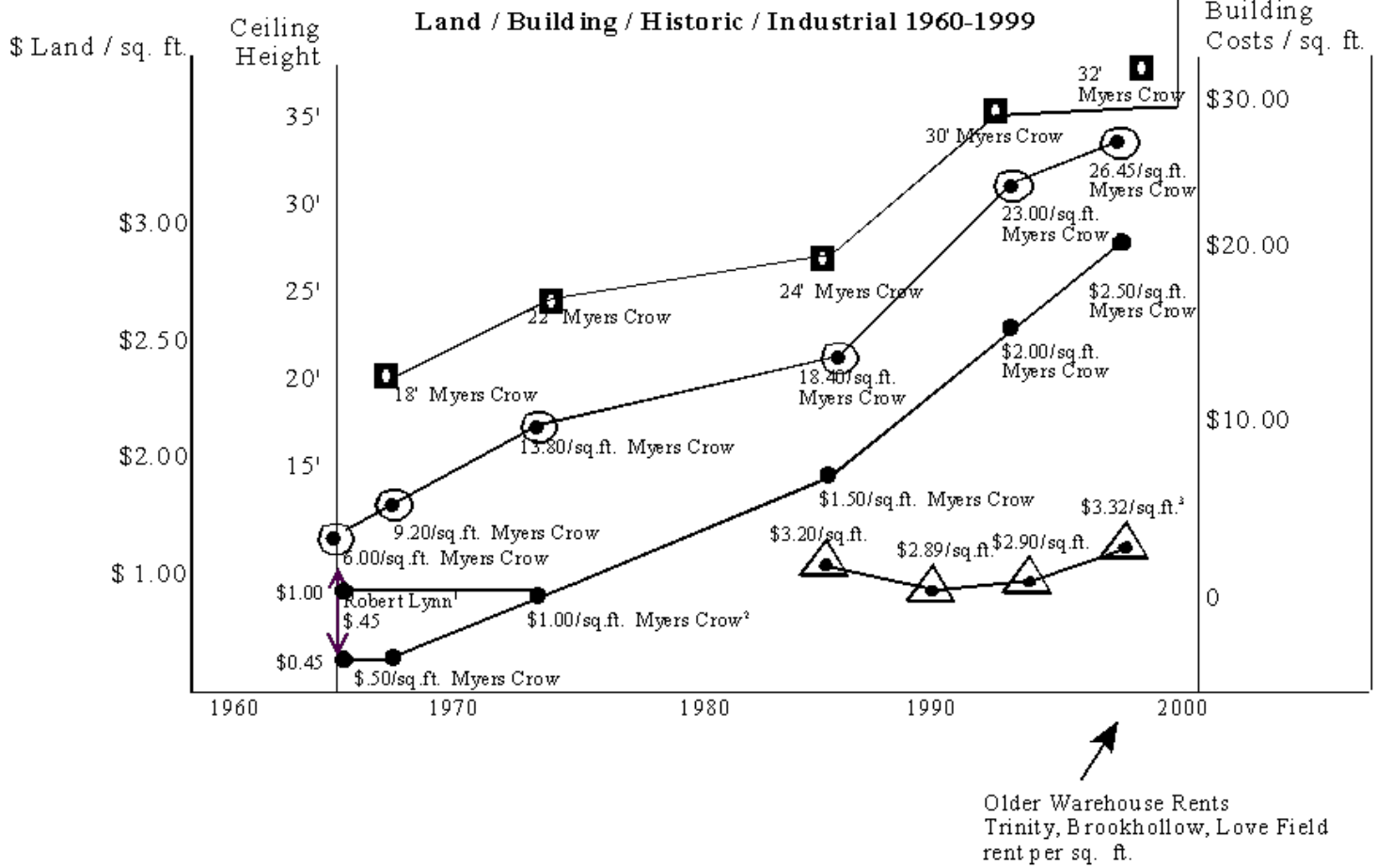
Table 6: Telecommuting / Home-to-Home (H2H) and Home-to-Office (H2O) Opportunities and Implications to Various Classes of Real Estate (Excluding Retail)
 By John S. Baen and Stephen Roulac

	OPPORTUNITIES	DEMAND FOR SPACE
Authors, Technical Writers, Etc.		Office ↓ R ↓
Musicians	←→	O ↓ R ↓
Computer Programmers		O ↓
Customer Service Reps		O ↓
Independent Insurance Agents	←→	O ↓
Travel Agents	↓	O ↓ R ↓
Health Service Providers	←→	O ↓
Mortgage Brokers		O ↓
Telecommuters (all types)	←→	O ↓
Bookkeeping		O ↓
Accountants		O ↓
Analyst		O ↓
Bill Collectors		O ↓
Secretarial Service		O ↓
Account Executives		O ↓
Financial Services Providers		O ↓
Stockbrokers	←→	O ↓
Telephone Sales		O ↓
University Students		U ↓ O ↓

Drivers / Highways / Toll Roads (less traffic)	↓	0 ↓
Title Insurance Agents	←→	0 ↓

Table 7 Growing Intensity and Technology of Warehouse Land and Buildings

98' JC Penney 3-D



□ An interesting parallel to the 24-hour use of a building in the “new economy” is that it also follows that these buildings and their systems also are “wearing-out” three times faster. Better deal for tenants and a real disadvantage to the landlord, owner, or investor!