THE IMPACT OF E-COMMERCE ON REAL ESTATE

A look at the forces changing the way America lives and works and the implications for the real estate industry

by John McMahan, CRE

"The world of the soft—the world of intangibles, of media, of software, and of services—will soon command the world of the hard—the world of reality, of atoms, of objects, of steel and oil, and the hard work done by the sweat of brows."

Kevin Kelly, *New Rules for the New Economy*, 1998

The real estate industry has experienced many setbacks over the years – the economic roller coaster of cyclical boom and bust, "credit crunches" when financing completely dries up, sudden changes in government land use or tax policy, and physical destruction as a result of wars or natural disasters.

But never in its history has the real estate industry faced a threat to its fundamental role in society – providing physical space for people and firms to perform their day-to-day activities. It is only in the last few years, as the use of the Internet has spread and been adapted to commercial transactions that the true nature of this threat has begun to emerge.[1]

This manuscript explores the e-commerce phenomenon and why it is so appealing to business firms and consumers. It then examines the nature of the threat to real estate and speculates on the magnitude of the impact on each property type.

WHAT IS E-COMMERCE?

Electronic business (e-business) is the use of the Internet and other electronic devices to operate and manage businesses.[2] Electronic commerce (e-commerce) is e-business involving a purchase or sale transaction that occurs electronically.

Electronic transactions involving the sale of products or services to retail customers are referred to as "Business to Consumer" or B2C.

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Transactions conducted *between* business firms are called "Business to Business" or B2B. *Figure 1* illustrates the process by which both B2C and B2B activities occur.

B2C activities, including payment for goods or services, are conducted through the Internet directly with the consumer. The delivery of the goods or service ("fulfillment") may be handled directly by the e-firm or by contracting with a logistics firm (e.g. UPS, FedEx, etc.). This interface is generally facilitated by the use of an "extranet," a dedicated portion of the Internet that connects an e-firm with its suppliers and customers. Either the logistics firm or the e-firm may operate the extranet.

The e-firm also may use the web[3] to assist in producing and distributing goods or services. In the case of a manufacturer, this may involve an "intranet" connection within the firm with employees (and computers) involved in the marketing, production, and distribution process. Since many firms are outsourcing many of their non-core activities, the process also may involve an extranet connection with sub-contractors and suppliers.

WHY IS E-COMMERCE SO APPEALING TO BUSINESS FIRMS?

Most people think of e-commerce in terms of B2C transactions, largely because of the intense media scrutiny and the large ad budgets of the B2C firms. As indicated in *Figure 2*, however, 80 percent of e-commerce is currently B2B and its relative position is expected to increase over the next five years.

Improves Operating Efficiency

The rapid growth in B2B is due largely to a significant increase in firm operating efficiency made possible by the web. There are many reasons for this—shorter production cycles, higher employee productivity, better inventory management, and more direct control over distribution channels.

Many large firms such as GE, Ford, and General Motors are rapidly transforming their entire operations into Internet companies in which the web controls or influences virtually all aspects of their operations.

Lowers Investment Costs

Another major attraction of being an e-firm is the role of the web in dramatically lowering the amount of investment capital required to produce a given dollar amount of revenue. This is achieved by substituting the virtually zero cost (at the margin) of the web for the marginal cost of new physical factory and equipment. This produces a significant increase in the return on net assets (RONA). To illustrate, *Figure 3* compares the RONA of *Amazon.com* with Barnes & Nobles' non-web, bricks and mortar operation.

Accelerates Market Share Capture

A web-based firm also can capture market share much more quickly ("scalability") than a non-web firm that must invest in the time-consuming process of financing and constructing buildings and other physical infrastructure. This is particularly important to start up firms or those wishing to introduce new business lines or products.

WHAT ATTRACTS CONSUMERS?

Pricing Not the Magnet

Another public perception is that lower prices are the major reason for shopping on the web. In fact, the web is often *more* expensive than discount bricks and mortar stores. In a recent cost comparison study covering food, stationary, housekeeping, health/beauty, toys, and paint/hardware, only paint/hardware was cheaper on the web.[4]

A price advantage that e-commerce firms *do* enjoy is the fact that they do not have to charge sales tax as a result of a government moratorium. Given the rapid growth of e-commerce, however, and the resultant increasing diversion of sales tax revenue from state and local governments, this pricing advantage ultimately may disappear.

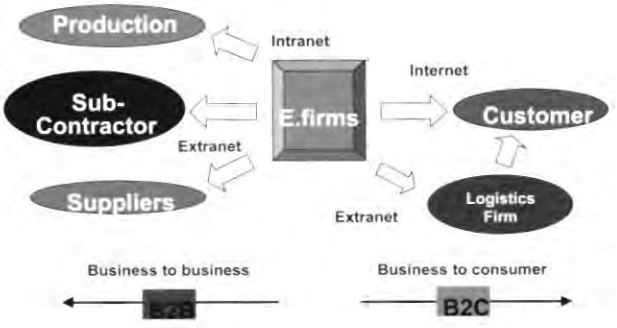
If price is not the major attraction for B2C e-commerce, what is? As indicated in *Figure 4*, Americans have been working longer hours and relaxing less. Many are "time poor" and will trade price for the convenience of ordering products and services at a convenient time (anytime) and in a convenient location (anywhere). For certain products, such as toys, the web also avoids a potentially traumatic in-store experience that most shoppers prefer to escape.

A New Value Chain

Figure 5 illustrates how e-commerce has created a new value chain between producers and consumers. It begins with a significantly different value proposition than that of the traditional retailer. Product/service selection is massive and centralized as opposed to what is available only in a physical store. Customer service is targeted and personal rather than constrained by the local labor

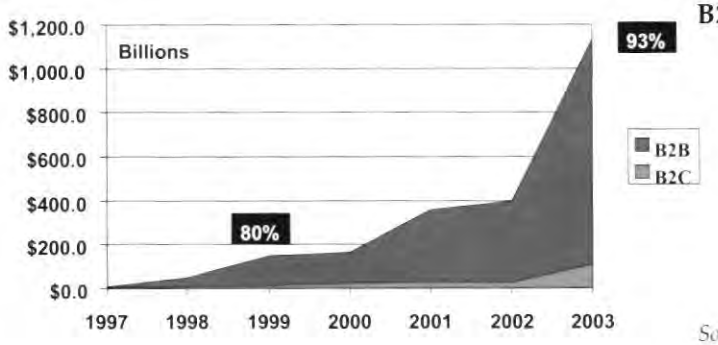
Figures 1 - 4

Figure 1
The E-Commerce Process



Source: The McMahan Group

Figure 2
B2B Dominates E-Commerce



Source: Fisher Center for Real Estate and Urban Economics, 1999

Figure 3
The Web Can Significantly Improve RONA

All $ in millions	Amazon.com	Barnes & Noble*
Sales CY 1999	$1,300	$3,404
Mature margin	11%	10%
Operating profit (potential)	$143.1	$340.0
Net assets employed	$102	$1,238
RONA	140.3%	27.5%

* Non-web operations
Source: Thomas Weisel Partners, LLC

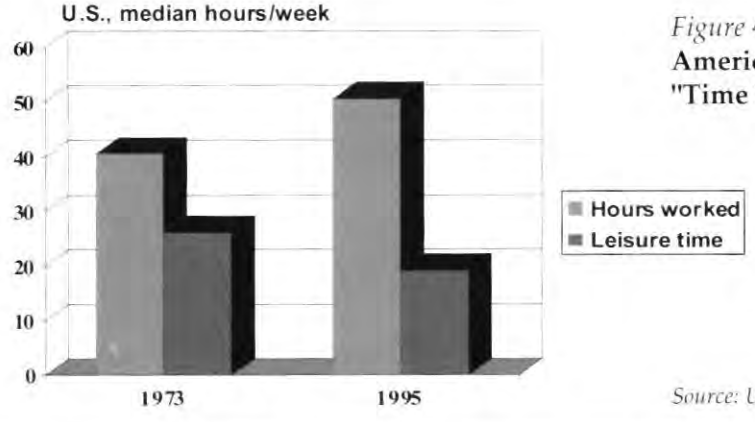
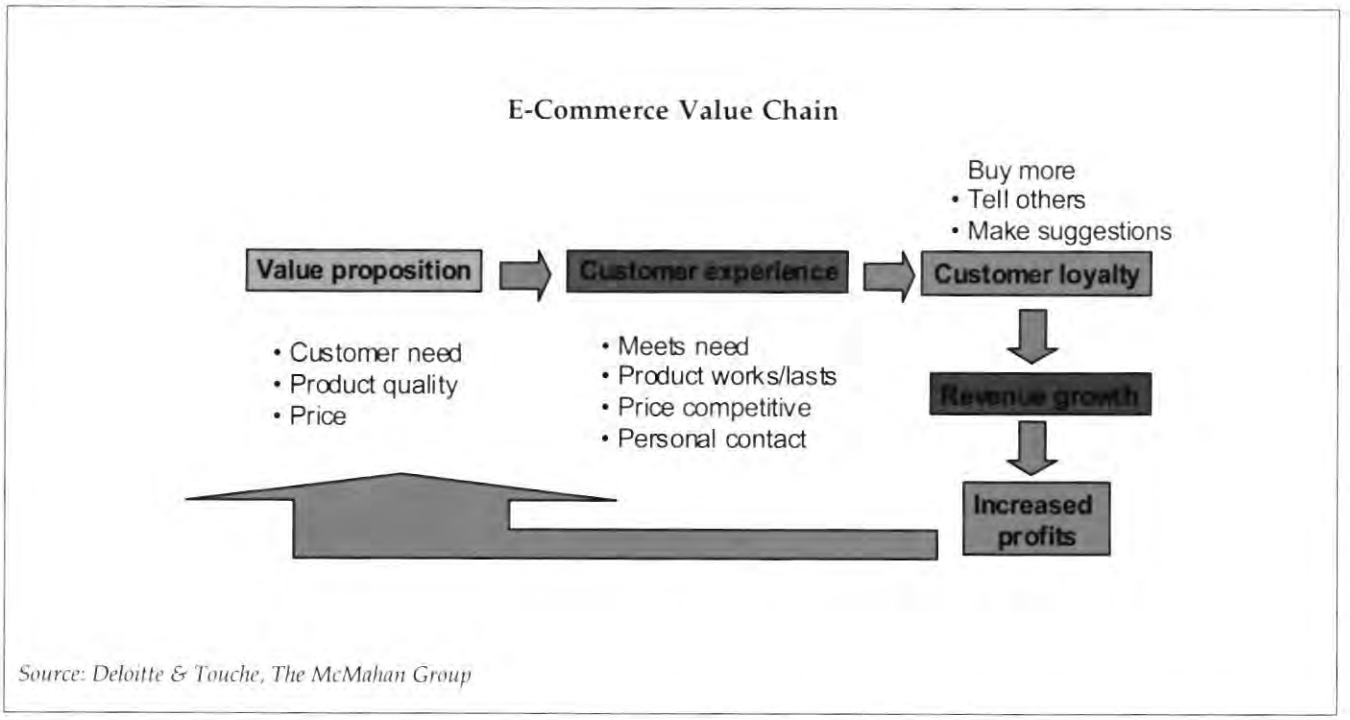


Figure 4
Americans Are "Time Poor"

Source: U.S. Bureau of Labor Statistics

Figure 5



Source: Deloitte & Touche, The McMahan Group

market. Timing convenience is significantly better: 24 hours a day, seven days a week (24/7) as opposed to when a physical store is open. The extensive resources of the web also allow the e-tailer to provide consumer education and offer solutions to customer problems. Finally, web products and services compete globally on price, not just against the merchant down the street.

If the e-tailer's value proposition is fulfilled, the customer's experience is positive and a bond of loyalty can begin to evolve. The web firm benefits from this loyalty as the customer buys more, tells others about his/her positive experiences, and makes suggestions to the firm for further improvements. This leads to revenue growth and, at some point, increased profits, a portion of which can be plowed back into enhancing and reinforcing the value proposition.

Fulfillment Still a Big Hurdle

Successful fulfillment continues to be a major problem facing e-tailers. The front end marketing and advertising is of little value if the delivery of the product or service ("the last mile") cannot be completed in a timely and hassle-free manner. Consumer satisfaction levels decline when orders become "out-of-stock" or require too long a delivery time. On average, half of disappointed back-ordered customers cancel their purchases.[5] Many e-tailers are just beginning to understand the overall magnitude and complexity of the fulfillment problem, particularly in times of rapid increases in sales activity.

HY IS REAL ESTATE THREATENED BY -COMMERCE?

oth B2B and B2C e-commerce threaten real estate, lthough in different ways. This is due to some undamental propositions:

he Internet represents revolutionary change in he way virtually everything will be done in our ociety.[6]

he Internet is based on the use of cyberspace, hich is basically non-physical space.

eal estate, in contrast, is physical space.

very transaction that occurs on the Internet is a ransaction that will not occur in physical space.

ver time, this substitution can result in less ggregate demand for physical space, all other hings being equal.

ven if aggregate demand for a particular property type is not affected, the Internet may require ifferent building configurations and locations, hereby rendering many existing buildings obsolete.

ome may quarrel with the degree or timing of these actors, or parse words as to their meaning, but they re so fundamental that it seems much more productive for real estate people to discuss how to deal ith the problem than to assume it doesn't exist.

observes, the impact of technological change is usually overestimated in the short run and underestimated in the long run.[7]

WHAT IS THE NATURE OF THE THREAT?

The threat to real estate is twofold: 1). a direct reduction in the aggregate demand for physical space; and 2). a reduction in the functions currently associated with the use of these assets, indirectly resulting in reduced demand for affected properties.

Direct Reduction in Aggregate Physical Space Demand

A direct reduction in the aggregate demand for real estate assets may occur because:

Physical space is no longer required: As noted, demand for retail and service space is reduced when transactions occur over the Internet rather than in a store or office. The more sales or service volume handled over the web, the less demand for physical space. Space devoted to commodity-like goods and services is most impacted by this phenomenon.

The acceleration of inventory turnover: Demand for storage space is lower when average inventory turnover is reduced. Reduction in the turnover rate of business firms has been declining for some time as a result of "just in time" scheduling, the extensive use of bar coding, and the growth of logistic firms to distribute goods to the consumer.

These developments have provided the foundation for the Internet to emerge as an integrating and unifying force that will dramatically improve the efficiency of goods movement. As an example, when Dell Computer converted to an Internet purchasing format, it reportedly reduced its average inventory turnover period from 56 days to six.

Reduction or Elimination of Functions Occurring in Physical Space

The second type of impact is created by the disintermediation of a function or activity, generally in the services area. Every business transaction that is performed over the web ultimately reduces the demand for physical space to perform the same transaction.

There are many traditional intermediary roles that are impacted:

- Insurance agents
- Mortgage brokers
- Real estate brokers
- Bank employees
- Stock brokers
- Travel agents
- Automobile salespeople

This is largely due to the significant cost savings that the web can generate in service transactions, as indicated in *Figure 6*.

No doubt there are other activities that will be impacted over time. People made redundant will be forced to retire or seek employment in other areas. Unfortunately, the new jobs in the Internet industry often require different skill sets than those of many redundant employee. This is reinforced by the general tendency of businesses to lay off older employees and hire younger ones.

WHAT IS THE MAGNITUDE OF THE IMPACT?

The magnitude of e-commerce's impact on real estate will vary by property type, location, and physical configuration of the asset.

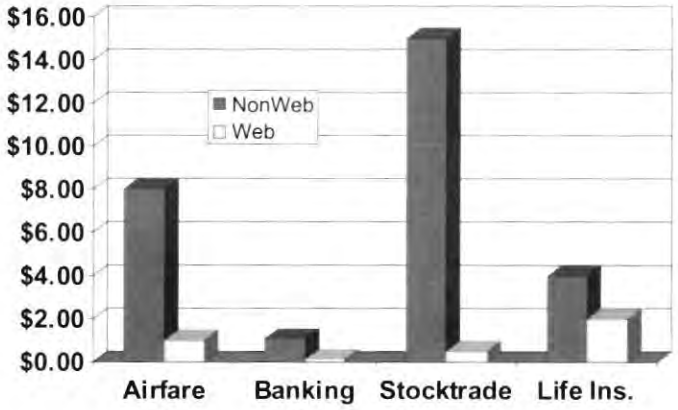
Retail Properties

The web will have the greatest negative impact on the aggregate demand for retail properties. To understand this better, it is important to distinguish between the economic health of the retailer and the demand for physical retail space. Much has been written about the ongoing battle between traditional and web retailers. While the "clicks and mortar" retailers may ultimately prevail over those that are "born on the web," this is not necessarily good for real estate because the demand for physical space is still reduced.

Retail Assets Weakening: Retail has been a depressed property type for many years. The annual growth in shopping center real retail sales per square foot has been negative or neutral for most of the last 20 years. This lack of growth, coupled with an emerging concern about the impact of e-commerce, has led to lower investor expectations for the future appreciation for regional malls, as indicated in *Figure 7*. In the public market, mall retail REITs are currently priced at a 30 percent discount to Net Asset Value (NAV), the steepest discount of any major property type.[8] This, despite the fact that 1999 was one of the best years for retail sales ever!

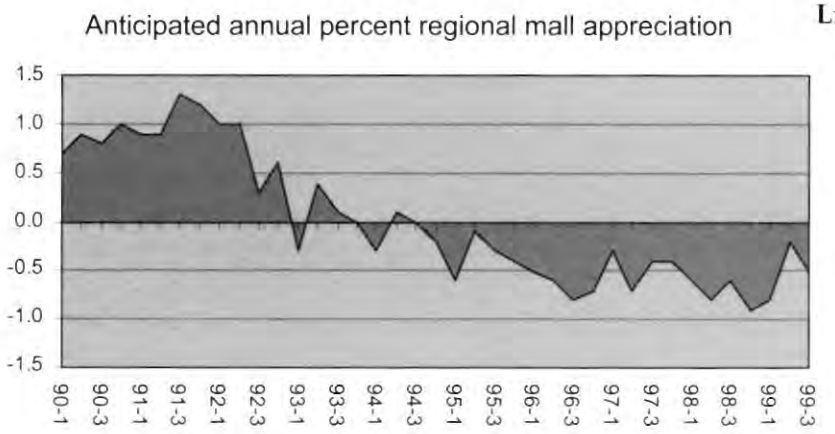
Shopping center space also is rapidly aging—almost three-fourths of U.S. space is over 10 years and almost half is over 20 years. Older centers

Figure 6
Lower Cost of Services



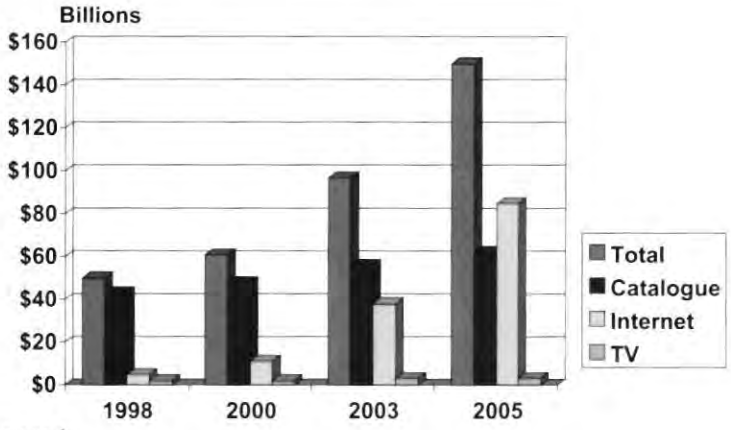
Source: Booz Allen & Hamilton, The McMahan Group

Figure 7
Investors Expect Little Mall Appreciation



Source: RERC, The McMahan Group

Figure 8
Projected Non-Store GAFO* Sales



* General merchandise, apparel, furniture, and other goods

Source: Clarion Partners, The McMahan Group

may not have the location, design, parking, or tenants to compete in an increasingly turbulent retail market.

Non-store Sales Growing Rapidly: Non-store retail sales have been rapidly increasing, although still a relatively small percentage of total retail sales. Catalogues continue to be the dominant format for non-store retail sales although Internet sales have been responsible for the bulk of the growth over the last few years and are growing at a faster rate.

Between 1996 and 1998, virtually all of the growth in non-store sales was over the Internet. The growth in catalogue sales was about the same as 1992 – 1996, while TV sales growth was static.

Figure 8 projects non-store retail sales of general merchandise, apparel, furniture, and other goods (GAFO) — those considered to be most likely to occur in shopping and power centers. The analysis assumes that catalogue and TV sales will continue at 1992 – 98 growth rates. Internet sales were projected at the mean of two sets of industry projections. Based on this analysis, Internet sales should become the dominant form of non-store GAFO sales by 2005.

Impact on GAFO space: *Figure 9* translates the projections in *Figure 8* into square footage of shopping center and power center space. The $50 billion in existing non-store sales was deducted from 2005 sales in order to focus only on incremental sales. This generally assumes the impact of existing non-store sales has already occurred.

Sales per square foot are based on 1998 sales of shopping centers, 10 years or older, and power centers. GAFO space in 2005 assumes that the rate of space inventory growth over the last 10 years will continue. All projections assume a three percent annual rate of inflation.

This analysis indicates that the demand for physical space devoted to GAFO sales could drop by as much as 15 percent - 17 percent over the next seven years.

Neighborhood Centers: To date, most observers have assumed that the web will have little impact on neighborhood centers because of the high percentage of food and beverage items. This is further demonstrated in the marketplace where neighborhood center REITs are discounted at the second lowest rate (19 percent) of any major property type.

The amount of money and talent being expended on online grocery operations such as Webvan and Streamline, however, may ultimately pose a threat to traditional supermarket chains that operate on very low margins. Webvan in particular is focusing on reinventing the supermarket distribution system and, if it succeeds, all grocery store metrics may change.

Industrial Properties

While the impact on retail will most likely involve a reduction in the amount of space required, aggregate demand for industrial space

Figure 9

Incremental Impact of Non-Store GAFO Sales on Shopping and Power Centers by 2005

2005 GAFO sales diverted	$100 billion
Sales per SF*	$192.00
GAFO space reduction	520 MSF
Percent of 2005 GAFO space	15% - 17%

* Space currently over 10 years old + power centers

Source: Clarion Partners, ULI, ICSC, The McMahan Group

may actually increase. The location and design of new industrial buildings, however, will be considerably different than today.

Aggregate demand: At this point, the aggregate demand issue is difficult to gauge. A strong argument can be made that industrial demand will be lower in the future as a result of the decline in average turnover, made possible by the increasing use of the web for inventory management.

There are, however, many positive forces shaping industrial space demand. Increasingly, traditional office users are shifting to industrial facilities. As an example, pension advisor Kennedy Associates has developed 24 facilities over the last two years, utilizing industrial construction techniques to create more cost efficient office space. Most tenants are large, blue chip companies, utilizing the space largely for office-type operations.

The operations of web firms also are having a positive impact on industrial demand. Initially, this occurred through the development of space for independent call centers taking online orders and logistic firms delivering products to the customer.

Increasingly, however, web firms are taking direct control of the ordering and fulfillment process. As an example, *Amazon.com* is developing millions of square feet of regional distribution centers within a day's truck drive of many American markets. Webvan has executed a contract with the Bechtel Group to develop highly automated, mega-warehouses in 26 cities across the nation.[9]

Metro Area Location: Thus far, web building site selection has emphasized being at or near the delivery capabilities of major logistical firms such as FedEx and UPS. This has meant increased demand for industrial facilities at or near major airports, particularly in hubs such as Memphis and Louisville.

As more web firms decide to manage their own fulfillment, expect expansion of demand in other major regional distribution centers such as Atlanta, Dallas, Los Angeles, Chicago, and Northern New Jersey. These markets are also attractive because the host city is usually a large market in itself, allowing rapid distribution to customers in the immediate area. The result could be a negative impact on industrial demand in second tier distribution cities.

Airport Locations: Whether or not this new demand will favor airport locations within these metro areas is not clear. AMB Property Corp., a large industrial REIT, is developing new warehouse facilities "on the tarmac" of airports throughout the nation and, potentially, overseas. Other observers point to the necessity of being located near regional and local ground distribution systems.

If an airport location is desired, there is also the issue of whether to utilize an existing public passenger terminal or one of an expanding number of private freight and executive aircraft airports. Public passenger airport locations continue to have a major advantage — 40 percent or more of cargo is still carried on passenger flights.[10]

Building design: There also are major changes occurring in the design of these new buildings. The combination of a large, diverse inventory, high turnover, and a "single point" delivery promise requires a sophisticated, dependable order tracking system. A large portion of this can be automated, requiring clear-span space for installation and operation of equipment, as well as the availability of an adequate supply of dependable power. Multiple truck operations require a large number of truck bays and more land devoted to truck turning and maneuvering.

Not all fulfillment operations can be automated-larger numbers of people (for industrial buildings) are required to operate the automated system and to "hand-pick" special orders.[11] This means air-conditioning a higher percentage of building space and providing more employee parking than would be found in a traditional industrial building.

Since web-based inventory turns much faster, there are fewer inventories stored and less demand for high rack storage space. This shifts building design from a concern with cubage to one of square footage, resulting in new buildings having lower ceilings and a larger footprint. When coupled with a need for more employee parking, industrial building sites will have to be considerably larger than in the past. Amazon's new 800,000 square foot warehouse in Atlanta is a good example of this new prototype.

Public Warehouses: Industrial facilities for smaller firms are also changing. Some of AMB's new buildings, such as one under construction at DFW airport, will allow four 747-cargo airplanes to simultaneously unload directly onto the warehouse loading dock. The goods are then transferred to one or more of 46 truck loading docks situated on the other side of the building. In essence, this type of facility is not a storage building but a "through put" facility that mixes and matches

goods between air and ground transit, which, in the process, substantially reduces inventory turnover.

In summary, the impact of e-commerce on industrial properties will be both positive and negative. Generally, the positive is that many new facilities will be required in new locations. Most of these will be built from scratch due to major changes in building location and design. Also, they will be located as closely as possible to key modal interchanges in the path of goods movement, particularly at the nexus of air and ground transit.

Perhaps more far-reaching is the use of the web to change the logistic equation, requiring new buildings that facilitate air/ground transfer and have little need for storage. While this creates demand for new, specially designed space, it reduces inventory turnover and could shrink the need for pure storage space. This could have a negative impact on the demand for existing industrial properties, particularly those in older industrial areas and/or second tier cities. Over time, many of these buildings could become functionally obsolete for industrial purposes and may better serve office, residential, or other uses.

Office Properties

We have noted that many service firms will suffer disintermediation as a result of the growth of e-commerce.[12] Since many of the employees affected will not be candidates for "webifying," the odds are high that this will result in fewer employees per dollar of revenue and less demand for traditional office space.

Financial, insurance, and real estate (FIRE) services will be one of the major areas impacted. As of 1997, FIRE firms occupied approximately 30 percent of office space in the U.S.[13] Any major reduction in FIRE demand will most likely impact office space in CBDs, particularly in second tier cities and those lacking a strong high-tech labor force.[14]

Substitution Space: In some cases, lower demand for office space may be offset by demand for new space in a new location or a new configuration. It is also possible that vacated office space is reused by non-traditional users, as reflected in the growth of Internet firms in downtown San Francisco's "Media Gulch"[15] and New York's "Silicon Alley." For those firms that can successfully webify all or a portion of their operations, the new facilities are more likely to be located in industrial rather than office areas.

If the web reduces operating margins as anticipated, FIRE firms may be forced to seek lower operating cost environments.[16] In the long run, this may have even broader implications for the location of office operations and may further contribute to the shift to industrial-type facilities.

Real estate does appear to be threatened by e-commerce, although the threat is quite different for each of the major property types. For some real estate firms and individuals, e-commerce may mean an end to the way business has been conducted in the past. For others, e-commerce may represent an opportunity to grow both professionally and financially in what history will no doubt record as a defining moment for the industry.

Apartment Properties

Demographics: Multifamily residential properties are already benefiting from the positive demand impact stemming from two major traditional apartment cohorts (boomers over 50 plus echo boomers in the 18 – 25 year old category) experiencing rapid growth simultaneously.

In terms of web impact, few strong arguments can be made that it will be negative. In fact, the added convenience of web shopping could further enhance the attraction of apartment living by delivering goods and services directly to the individual unit or community pickup station. This should be particularly attractive to time-starved professionals and older residents.

Web Initiatives: To take advantage of this, several large multifamily owners, such as BRE Properties, are experimenting with the development of a community home page from which a wide variety of shopping and other services can be provided over high capacity lines, without disrupting normal phone service. The availability of on-site apartment managers to explain services, expedite deliveries, and explore resident needs creates a powerful merchandising combination of considerable value to retailers and others seeking to expand their penetration of local consumer markets.

The apartment owner also stands to benefit handsomely. Most owners experience 50 percent or greater annual tenant turnover. To the exent that tenants evidence greater satisfaction from

Figure 10

Impact Summary

	Less net demand	Demand shift	Little or no impact
Malls/power centers	✓		
Neighborhood centers			✓
Suburban office		✓	
CBD office	✓		
Industrial		✓	
Residential			✓

Source: The McMahan Group

their living environment, they may tend to change residences less frequently. Lower turnover rates mean increased income that falls directly to the bottom line.

In addition, potential non-rental income through advertising, licensing agreements, and other arrangements with retailers may turn out to be significant, further enhancing apartments as a desirable investment opportunity in the new century.

SUMMARY

Figure 10 summarizes the anticipated impact of e-commerce on various real estate property types. Malls and power centers should experience the most direct negative impact, followed by CBD office buildings. Industrial and suburban office properties will experience a significant impact, but largely in terms of a shift in design and location. It is possible that net aggregate industrial space demand may actually increase.

Neighborhood shopping centers should feel the least impact of the retail formats, although the emergence of well financed and managed e-commerce food and beverage business models may pose a problem to low margin supermarket chains. Multifamily residential appears to be the only property type that will not experience a significant negative impact as a result of the growth of e-commerce and, in fact, may benefit, as apartment living is made more desirable.

In conclusion, real estate does appear to be threatened by e-commerce, although the threat is quite different for each of the major property types. For some real estate firms and individuals, e-commerce may mean an end to the way business has been conducted in the past. For others, e-commerce may represent an opportunity to grow both professionally and financially in what history will no doubt record as a defining moment for the industry.

The new Millennium is an excellent time to take stock and challenge traditional ways of doing things. From this re-examination of goals and circumstances, new strategies can evolve that will minimize downside risks and perhaps uncover new opportunities that were previously unknown. REI

NOTES & REFERENCES

1. The worldwide use of the Internet doubles every 100 days. The web has reached 50 million users in less than five years, significantly faster than television (13 years), the computer (16 years), or radio (38 years).
2. Examples include telephones, fax machines, computers, barcode scanners, credit cards, smart cards, telecommunications lines, hand-held devices, robots, etc.
3. The terms "web" and "Internet" are used interchangeably in this article.
4. Goldman Sachs
5. *Wall Street Journal*, November 22, 1999.

6. For a contrasting view, see Eamonn Fingleton, *In Praise of Hard Industries: Why Manufacturing, Not the Information Economy is the Key to Future Prosperity*, (Houghton Mifflin, 1999).
7. For more of Peter's insightful observations on the workings of technology and the web, click on www.pikenet.com.
8. Merrill Lynch, *Comparative Valuation of REITs*, January 6, 2000. Other property types were: Apartments: 15 percent; Neighborhood Shopping Centers: 19 percent; Hotels: 21 percent; and Office/Industrial: 22 percent.
9. Other Internet firms with plans for developing large warehouses include Barnesandnoble.com Inc., and eToys.com Inc.
10. AMB Properties, Inc.
11. In a recent survey, approximately 40 percent of E-firms reported that some "manual intervention" was required to fill orders (Source: *Wall Street Journal*, November 22, 1999).
12. Some observers expect som ething of a counter trend or re-intermediation, as experienced people are increasingly required to interpret the flood of commoditized data made possible by the Internet.
13. Institute of Real Estate Management
14. From 1997 to 1999, the annual employment growth rate in the financial services, insurance, and real estate (FIRE) industries fell from over four percent to well below two percent. During the same period, the annual employment growth rate for "New Economy" industries such as telecom, recreation services, motion pictures, and computer and data processing remained near or above six percent.
15. As an example, it was recently announced that eight floors (200,000 sq.ft) in the former Chevron building in downtown San Francisco were leased to a multi-media company.
16. Industrial space rents for $5-$6 sq.ft. versus $20-$30 for office and retail.

ABOUT THE AUTHOR

(continued from page 1)

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