INFORMATION TECHNOLOGY:
A COMPETITIVE TOOL IN REAL ESTATE DEVELOPMENT?

by

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ABSTRACT

An exploratory study was carried out on the use of information technology (IT) for competitive advantage in real estate development. The author surveyed senior mangers in Boston area real estate development firms and analyzed the results using a conceptual model of competitive advantage.

Three issues were addressed:

- o the extent to which the real estate development industry was using IT;
- o opportunities for use of information technology for competitive advantage in real estate development; and
- o reasons why a gap existed between the actual and potential use.

The author suggests explanations for the gap, including:

- o developers do not perceive themselves to be operating in a competitive environment;
- o developers do not plan strategically;
- o IT may not be the optimum tool for gaining competitive advantage, and its benefits to developers may not justify the costs; and
- o decision-makers' attitudes about IT may be an obstacle.

Use of IT in real estate development is expected to expand as firms become more national in scope, and technology is expected to play a role in establishing competitive advantage. The attitude of senior management will determine how quickly and successfully IT will be integrated into real estate development firms.

Thesis Supervisor: Dr. Gloria Schuck
Title: Professor, Sloan School of Management

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CHAPTER 1

INTRODUCTION

> The information revolution is sweeping through our economy. No company can escape its effects ... it creates competitive advantage by giving companies new ways to outperform their rivals. (Porter, 1985. p. 149-150).

Information technology (IT) encompasses more than just computers. IT refers to hardware, from facsimile machines and personal computers (PCs) to networks of PCs and mainframe computers; IT refers to software from word processing and spread sheets to artificial intelligence; and, IT includes the information itself and how that information is stored in data bases and used within an organization. Today, most organizations have implemented IT in some form. In many cases, IT has changed organizations substantially. People have learned new, more productive ways of working, using electronic communication, file-sharing, and innovative, tailored software. Integrated databases have expanded the information available to some organizations' decision-makers, thereby enhancing those organizations' ability to compete in their markets.

However, in the real estate development industry, implementation of IT has been slow. Surprisingly, this multi-billion dollar industry runs on comparatively

unsophisticated IT. Real estate development firms typically rely on stand-alone computers for word-processing and accounting applications, and for preparing pro formas. Users are seldom able to communicate electronically; information is not shared.

This thesis has three goals. First, it examines the extent to which the real estate development industry is currently using IT. Second, it suggests some ways in which IT could be a potential source of competitive advantage to real estate development firms. Third, it explores the reasons that a gap exists between actual and potential use of IT in real estate development.

METHODOLOGY

The research for this thesis involved several steps, including a review of literature, telephone interviews with CEOs in development firms, and additional interviews to confirm certain issues.

The literature review included articles that fell into three general categories: use of IT for competitive advantage, management of IT within an organization, and speculation about the organizational impacts of implementing IT. There were very few articles on the use of IT in the

real estate development industry. No authors were found who had examined IT use for competitive advantage in real estate.

A questionnaire was developed to explore issues raised by the review of the literature. The questions were designed to (1) obtain factual information about the use of IT in the industry, and (2) explore the perception of IT's strategic importance for real estate. (The questionnaire is included in the Appendix).

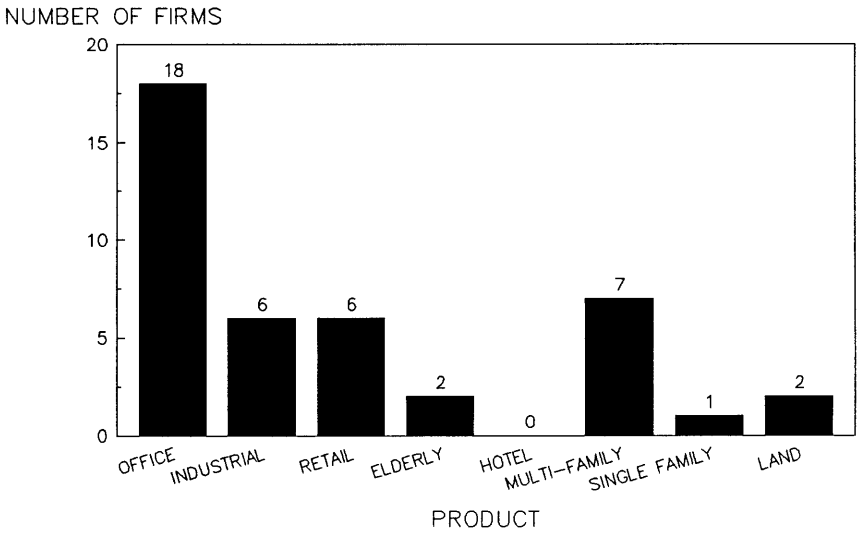
The questionnaire was administered to senior executives rather than computer specialists. Senior executives were deemed the best sources for a study of perceptions of IT's strategic importance. Telephone interviews were chosen as the medium most likely to yield enough data to suggest trends, given the short period of time for research. Financial constraints required limiting the geographic coverage to the Boston area.

There is some question as to whether these findings can be generalized to the real estate development industry nationwide. Boston's prominence as a high technology center may suggest that survey respondents have a higher degree of technology awareness than their counterparts in some other areas of the country.

Because the use of IT for competitive advantage in real estate is an unexamined topic, and because the sample of questionnaire respondents was small, this thesis is presented as an exploratory study. The final chapter suggests areas for further research.

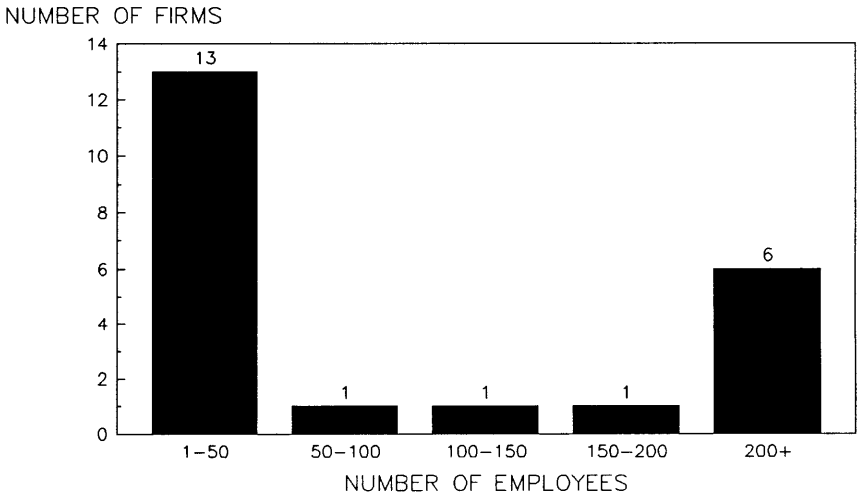
The firms surveyed were identified through (1) membership in MIT's Center for Real Estate Development, (2) The Directory of Developers, (3) The National Real Estate Investor "1988 Top Developer Survey," and (4) personal contacts. All of the firms had their headquarters in Boston and were actively involved in real estate development. Most were office developers, but developers of industrial, retail, and housing (single family, multifamily, and elderly) product were included. Figure 1 shows the distribution of firms by product type. Most of the firms managed properties.

Figure 1
Product of Firms Surveyed



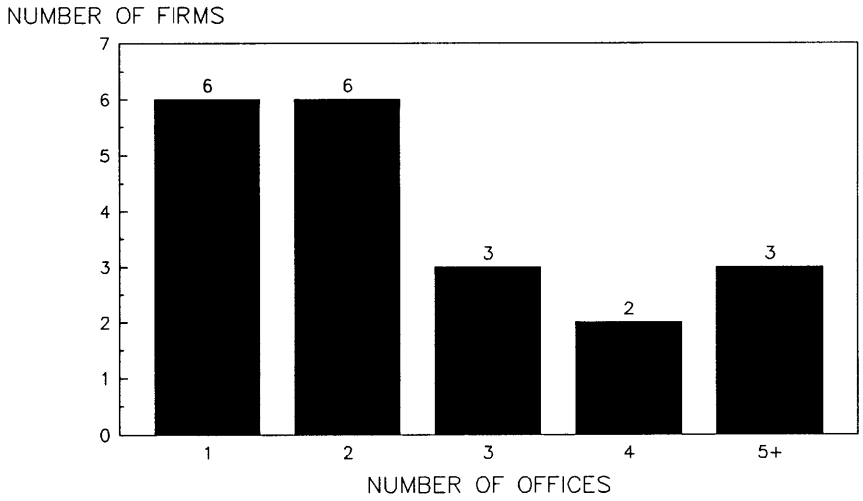
Most had fewer than 50 employees; the largest firm had approximately 500 employees (see Figure 2).

Figure 2
Number of Employees



Of the twenty-one firms surveyed, nine were serving a national market, while the remainder were working exclusively in New England. Most had one or two offices (see Figure 3). Financial data on the companies were unavailable.

Figure 3
Number of Offices



In May, 1989, requests for a telephone interview were sent to 29 executives. Eight declined to participate or were unable to schedule an interview. Telephone interviews of approximately 15 minutes duration were completed with twenty-one executives between May 15 and July 15, 1989. In most cases, the CEO or president was interviewed; when that person could not be reached another senior manager (a vice president) was contacted. Details of the specific computers

and software used were confirmed by an office manager, vice president of finance, or in the case of the largest firms, a person specifically assigned to manage computer activities.

In order to examine opportunities for the use of IT in real estate development, the author applied Michael Porter's (1985) value chain model to real estate development. Additional interviews were conducted with faculty members at MIT and selected developers to confirm the application of the model.

CHAPTER 2

DEVELOPERS' USE OF INFORMATION TECHNOLOGY

This section will provide an overview of IT use by the twenty-one developers surveyed. In discussing the developers' use of IT, several questions will be addressed. Do developers consider IT an area of strategic importance? What applications have developers found for IT? What configurations of IT are being used to perform those applications? And, finally, what motivates developers' use of IT?

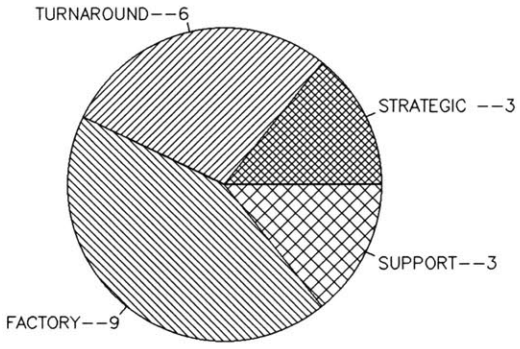
STRATEGIC IMPORTANCE

In Corporate Information Systems Management, Cash (1988) categorizes firms according to their use of IT:

- o strategic--IT is critical to the daily operation;
- o turnaround--the IT applications under development are vital for the firm to reach its strategic objectives;
- o factory--the firm is heavily dependent on cost-effective, totally reliable IT support, but the applications are not fundamental to the firm's ability to compete; and
- o support--the firm is not operationally dependent on IT. (p. 23-24)

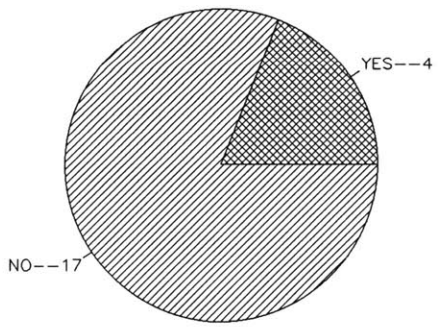
Figure 4 shows how the developers surveyed fit into these categories.

Figure 4
Which Best Describes Your Use of IT?



Most developers saw IT as a "factory application" and often described computers as "a tool for doing business." Only three executives indicated that IT was critical to daily operation, or "strategic." However, even when IT was considered strategic, its importance was described as "speeding up the processing." Four developers reported investing in IT to gain strategic advantage (see Figure 5).

Figure 5
Have You Invested in IT to Gain Strategic Advantage?

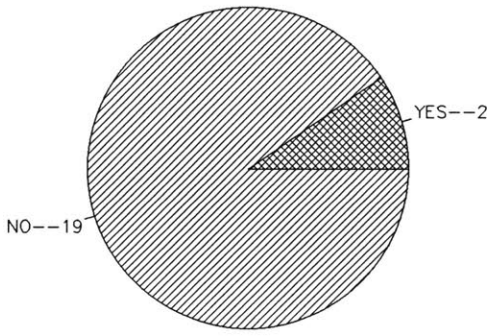


The advantage described focused on cost savings. For example, a developer, who reported investing for advantage, said:

> Our computers replace pencils, we rely on them 100 percent to process information more quickly.

Most of the firms surveyed were not planning for the management of IT. IT was not reflected in business plans (see Figure 6), and budgeting for IT was "on the fly."

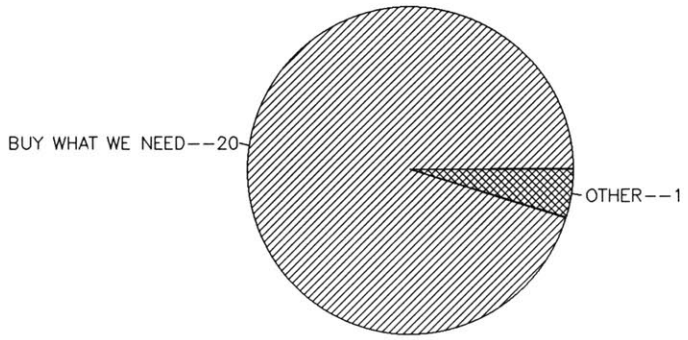
Figure 6
Does Your Business Plan Mention IT?



In many industries, the annual budgeting process provides a forum for planning IT use (Cash, 1988). Budgeting forces the negotiation of spending for service, training, hardware and software. Also, budgeting establishes a planning process for goals for IT use. The real estate development firms were not budgeting for IT--twenty of twenty-one firms reported that they "bought what they needed." The remaining

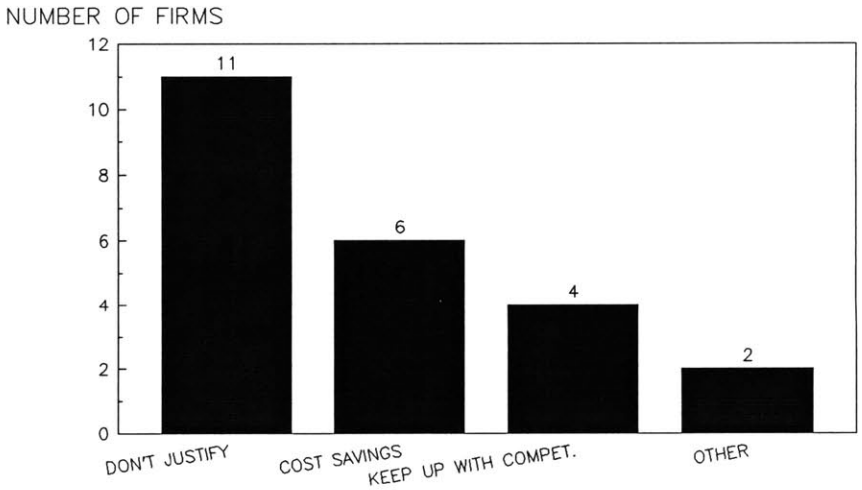
firm reported budgeting a year in advance for IT with a line item in the budget (see Figure 7).

Figure 7
How Do You Budget for IT?



Most firms did not go through a budget justification process for IT (see Figure 8).

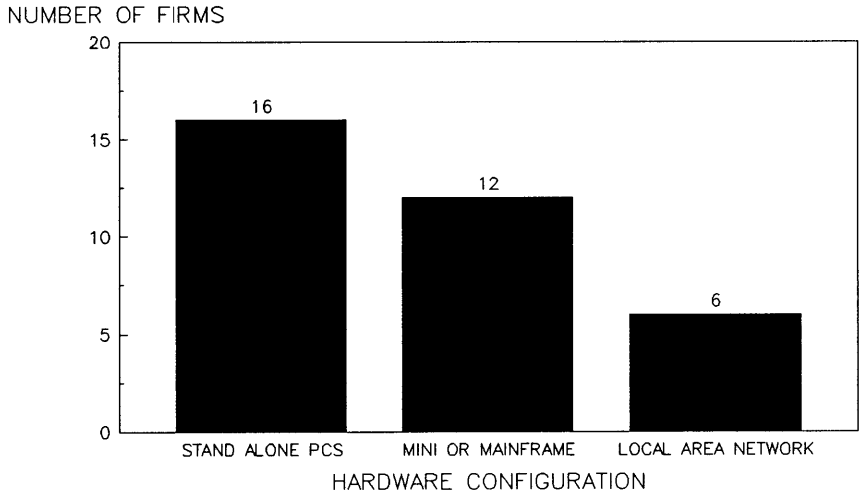
Figure 8
How Do You Justify Investment in IT?



APPLICATIONS AND CONFIGURATIONS

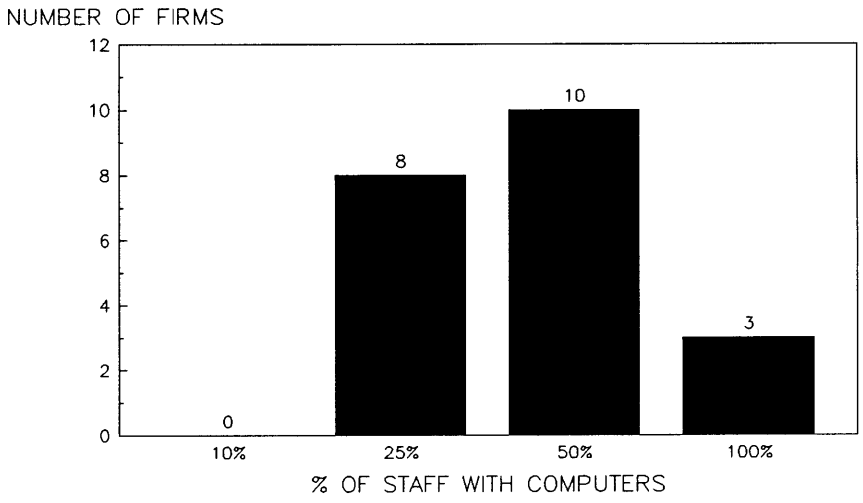
The hardware and software chosen determine how effectively a developer uses IT. For example, use of networks provides the ability to share information. Many firms in the survey, particularly the smaller firms, were using stand-alone personal computers (see Figure 9).

Figure 9
Summary of Hardware Configuration



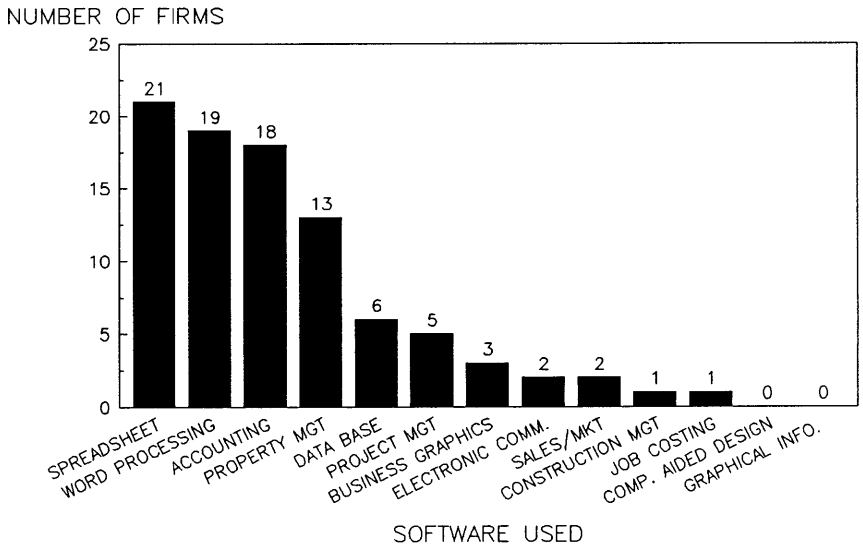
The larger firms had invested in mini- or mainframe computers. Most firms reported that half of the staff had a personal computer or terminal (see Figure 10).

Figure 10
Percentage of Staff with Computers



Dame (1989) reported that most developers were using computers for creating pro formas and for tracking costs and revenues in relationship to budgets. The survey undertaken for this thesis confirmed Dame's findings. The surveyed firms were most often using traditional financial analysis software--spreadsheet and accounting--and word processing software. However, a number of firms had invested in property management software to track leases, especially expiration dates (see Figure 11).

Figure 11
Summary of Sofware Usage



Some developers reported using industry-specific software for accounting and property management. The packages mentioned most often were Tenant Management from Timberline Software Corporation of Beaverton, Oregon and Landmark from Landmark Software Systems of Somerville, New Jersey. (A directory of real estate software, listing more than 100 vendors in the United States, is available for $75 from Kenneth Leventhal & Company of Los Angeles.)

Although some firms had developed their own software, the software tended to offer basically the same applications as the off-the-shelf software purchased by other firms.

The computers and software were most often used by

financial and clerical staff. One CEO expressed concern about the changing role for real estate project managers:

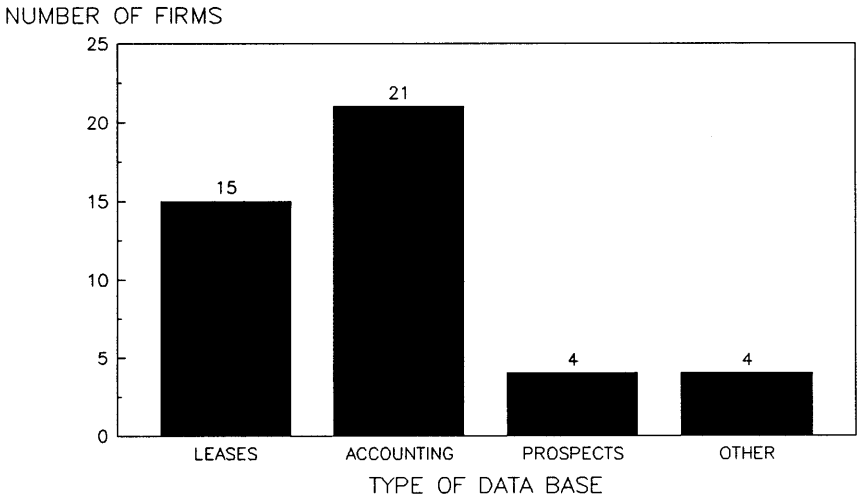
> It's the financial people who can run the computers. They do the analysis for the project managers, and project managers are gradually losing some areas of responsibility.

Thoughtful development of information data bases can be critical to effective use of IT. Shoshanna Zuboff (1985) of the Harvard Business School stresses the importance of data bases. IT, she writes:

> ... generates new streams of data that provide an opportunity to develop an even more penetrating understanding of the operation....The same systems...create an overview of organizational functioning and coordinate many levels of data, which are then available for tracking, reporting, and analysis. (p. 8)

The firms surveyed were making limited use of IT's data base capability (see Figure 12). (Specific data base uses are described in Chapter 3.)

Figure 12
Electronic Data Bases



WHAT IS DRIVING THE IMPLEMENTATION?

Developers consistently mentioned the role of the lending community in driving IT use. Lenders are requiring that deals be analyzed in many ways and that many scenarios be tested. Typical developer comments include:

> If the banks start using computers differently, we will too.

****

> Information and analysis has become so sophisticated, and the relationship with lenders has changed. Lenders analyze in more detail; that's created a whole new level of responsibility, and you have to have the ability to analyze situations.

****

> Because of our IT use, we have an improved relationship with our lenders. When they see our capabilities for reporting, they feel more comfortable.

CONCLUSION

The survey found a few firms that were truly exploring IT's potential. Often the larger firms were more advanced, but a few small firms were leaders. However, several general statements can be made about the majority of the firms:

1) Developers usually perceive computing as a "tool for doing business" rather than an area of strategic importance.

2) Real estate developers tend to automate existing functions, employing computers for specific applications, such as spreadsheets, accounting, and word processing.

3) Real estate developers, for the most part, are not using sophisticated networks. At smaller firms, computer users typically employ stand-alone PCs and are unable to share data among themselves. At larger firms, mainframes are used to support multiple users. However, the mainframes provide "number-crunching" services rather than integrated data bases or electronic mail.

4) Use of IT is being driven by the relationships with lenders.

The next chapter addresses how developers might apply IT for competitive advantage.

CHAPTER 3

INFORMATION TECHNOLOGY FOR COMPETITIVE ADVANTAGE

Many business analysts have suggested that IT is an important component of competitive advantage. A recent study of American productivity (Dertouzos, 1989) identified six common attributes of America's most competitive companies; one is the effective use of technology:

> Our industry studies revealed a trait common to the firms.... they have integrated technology choices into the rest of their business planning.... (p. 110)

Michael E. Porter of the Harvard Business School has addressed the concept of competitive advantage. According to Porter and Millar (1985): "...information technology has acquired strategic significance and...it is affecting all businesses." (p. 150)

What is competitive advantage? Competitive advantage refers to a company's ability to outperform its rivals. It includes any aspect of products, services, or operations that allows a company to position itself successfully against competitors in its market.

Could real estate developers use IT as a source of competitive advantage? This chapter addresses this question. The chapter: 1) reviews a model for exploring a

company's opportunities for gaining competitive advantage; 2) applies that model to real estate development; and 3) analyzes opportunities for IT use in each part of the model.

Porter (1985) provides a model, the "value chain," for analyzing an organization's opportunities for gaining competitive advantage. This model breaks a firm down into its business functions, providing a bird's-eye look at opportunities for gaining competitive advantage. The value chain model is employed in this chapter to help identify opportunities for IT-based competitive advantage strategies in real estate development.

To apply the model, the author has created a sample real estate development firm. The firm's characteristics are typical of the actual firms whose executives were surveyed for this thesis. The firm is of medium size, and it concentrates on developing office properties with the support of outside investors. It relies on outside consultants for architectural, engineering, construction, and leasing services, but it manages its own properties.

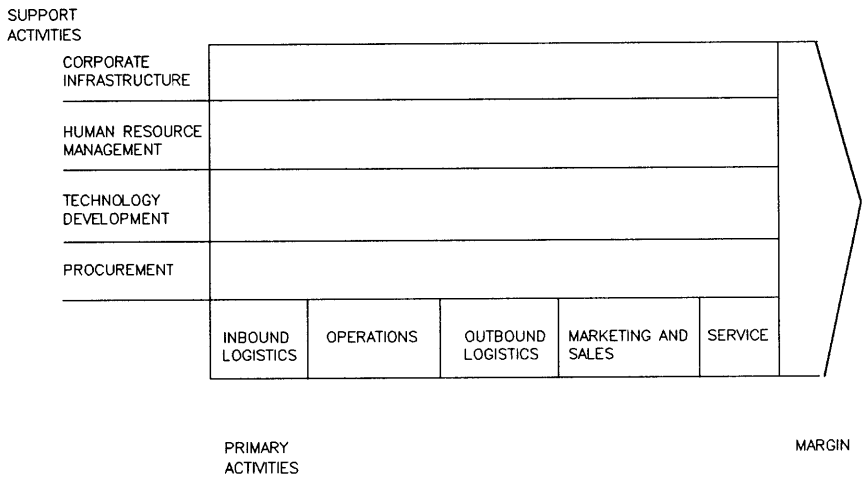
HOW THE MODEL WORKS

Porter's value chain model separates a company's business into functions, or "value-generating activities." The value itself is measured by the price that buyers are

willing to pay for the product or service. Businesses are profitable when the value they create exceeds the cost of creation.

The model provides a microscope through which to examine a company's functions individually, and to study how those functions interact to produce a product or service that has a determinable value in the marketplace. Figure 13 shows a schematic representation of Porter's value chain model.

Figure 13
Value Chain



A company's primary activities occur in chronological order. "Inbound logistics" refers to the arrival of raw materials. "Operations" refers to the conversion of raw materials into a product. "Outbound logistics" is the shipment and distribution of product; "Marketing and Sales" involves a company's identification and courtship of its customer base,

and "Service" refers to its efforts to maintain relationships with established customers. Each of these activities is described below.

Support activities are those that allow a firm's primary activities to take place. General management, strategic planning, finance, accounting, and legal work form what Porter terms "corporate infrastructure." "Human resource management" includes all personnel-related activities, from recruiting through hiring, training, and staff development. "Technology development" refers to the ongoing pursuit of product and process improvements. Finally, "Procurement" includes the general purchasing function.

APPLYING THE MODEL TO REAL ESTATE DEVELOPMENT

Although Porter's model is geared toward a manufacturing process, where raw materials are converted into a finished product, it can provide unique insights when applied to real estate development. As in manufacturing, real estate development involves a tangible finished product: space available for sale or lease. Even more than a typical manufacturing process, real estate development requires raw materials that are intangible: information from a variety of sources. For example, information from architectural, environmental, and legal consultants may be necessary to prepare a proposal for a specific property.

Although manufacturing requires the manipulation of physical materials, in real estate development the physical materials needed to create or transform a building are handled by outside contractors. The real estate developer's role is to coordinate all of the activities that result in the building being available for sale or rent. Real estate development requires constant movement of information, along the entire value chain. The importance of information is corroborated by our survey respondents. One senior manager said: "This is a strange business...we manage information."

Of course, each real estate development firm will have a unique value chain, depending on its business configuration. Again, for the purpose of applying the model, a sample real estate development firm is used reflecting the firms surveyed for this thesis.

TABLE 1 shows the application of the value chain model to the sample real estate development firm. Following the table, the components of the real estate development value chain are analyzed, in terms of their potential use of IT.

TABLE 1

Application of Value Chain to Real Estate Development

Activity	Definition	Real Estate Development
PRIMARY ACTIVITIES		
Inbound Logistics	o Materials receiving, storing and distribution to site	o Acquisition of Land
		o Financing
		o Permitting
		o Determination of market requirements
		o Receipt of bids from architects, general contractor, engineers, and consultants
Operations	o Transforming inputs into finished products	o Management of development process through scheduling and change management
		o Coordination of all participants in project
Outbound Logistics	o Storage and distribution of products	o Not applicable to real estate
Marketing and Sales	o Promotion and sales	o Promotion and sales
		o Coordination with brokers for leasing or sale of building
		o Re-leasing space

Service	o Service to maintain or enhance product value	o Management of building o Reporting to investors o Provision of service to tenants
SUPPORT ACTIVITIES		
Corporate Infrastructure	o Support of entire value chain, such as general management, planning, finance, accounting, legal	o Support of entire value chain, such as general management, planning, finance, accounting, legal o Coordination with regional offices
Human Resource Management	o Recruiting, hiring, training, and development	o Recruiting, hiring, training, and development
Technology Development	o Improving product and manufacturing process	o Improving product and development process
Procurement	o Purchasing input	o Purchasing services and supplies for project and general office support

The following section suggests IT uses for each of the pieces of the real estate value chain.

OPPORTUNITIES FOR INFORMATION TECHNOLOGY

What are the uses for hardware, software, and information in real estate development? Given that IT has earned its place as a tool for competitive advantage in many industries, how might IT be used as a tool for competitive

advantage in real estate development? The value chain, applied to real estate development, illuminates many opportunities for using IT in the development process to gain competitive advantage. The following section explores ways IT might be used to exploit those opportunities, in each of Porter's value-generating activities. The survey of developers described previously provided some excellent examples of IT use. Those examples are incorporated into the following sections.

Inbound Logistics

The developer puts together the "raw materials" of the development including land, market information, financing, and contracts with the architect and general contractor. The collection and analysis of information is a major function of inbound logistics, so IT can play a role.

Analysis of market opportunities is an important part of inbound logistics. While all developers in this survey used spreadsheets for analyzing individual deals, some of the largest have also established in-house research and economic staffs to track market changes. Computer models could be employed for market analysis incorporating demographic information, macro- and micro-economic trends, and information on competitive products. The developers

surveyed reported no use of modeling to predict or plan for changes in market trends.

Few developers surveyed were using IT to access publicly available electronic data bases. One large developer used the Dow Jones News Service to provide data on prospective tenants. Other data bases that might be of interest to developers, currently used by architects and contractors, include the following.

- The Means Unit Cost Price Files, available from R.S. Means Company on disk, could provide developers the ability to roughly estimate building costs. Prices for building components with location adjustments are available.
- The Sweets Electronic Catalogue of building materials, available on disk from McGraw Hill, Inc., could be used by developers to review purchase options.
- The Dodge Data Line of construction starts, available by dialing into the F.W. Dodge data base, could be used to track competitive activity. Dodge also provides its Real Estate Analysis and Planning Service (REAP) on disk. REAP is a quarterly analysis of the supply and demand for building space for six structure types in 50 metropolitan areas. REAP is based on national, regional, and local economic forecasts and

could help developers analyze supply and demand for space.

Operations

At the operations stage, developers take the "raw materials" and manage the production of the building. Coordination, communication, and schedule management are critical.

The survey showed that today's widespread use of facsimile has touched the development industry and enlightened some developers about opportunities in communications:

> Fax machines have changed the business, the ability to communicate instantly is staggering.

However, most developers surveyed had not installed an IT-based communication system.

Although communication can happen in traditional ways, such as meetings and phone calls, the people involved in a project are often too busy to identify and find the others who could benefit from information they have. For example, an architect and a leasing broker might benefit from having access to the same information, but typically they are not connected on any kind of communications system. One developer surveyed described a situation where a broker brought a tenant to inspect a nearly finished space, only to

find that the architect had not addressed the tenant's specifications. Because the tenant's corrections did not reach the architect in time to halt the installation, the developer had to refit the building, paying out-of-pocket costs.

If a developer were to provide all project participants with electronic mail, the ability of all to do their jobs in a more informed manner would be enhanced. Within an organization which has implemented IT as a communications network, personnel working on related tasks need not be isolated from what the others are doing. When IT also offers a system for sharing integrated data across functional lines, identical data is available to decision-makers at every stage of operations.

Today's networks need not be contained within the walls of a single company. A real estate developer has critical connections with the architect, general contractor, a myriad of consultants, the brokerage community, and lenders and investors. The developer acts as the coordinator of all of the activities. The better the developer can coordinate the activities both inside and outside the firm, the better his or her ability to manage risk. As "operations" proceeds, he or she is assured that every person has up-to-date information. For example, electronic mail can be used to

transmit design iterations from the architect to all other parties--the marketing consultant, general contractor, etc.--for quick review.

A typical development project involves a multimillion dollar investment, many individuals each providing discrete services or labor, and literally thousands of tasks, some of which can be completed independently, but many of which must proceed in a clearly defined sequence. Project management software that summarizes and monitors schedules, costs, and labor allocation is appropriate during this stage of a project. The PROMIS software package from Strategic Software Planning Corp. is an example of this type of software. PROMIS is able to take information about resource availability and job costs and produce a variety of reports including traditional critical path management (CPM) schedules.

While the jobs that the operations portion of the model requires are diverse, the people performing them must function as a team. Little research exists on how groups function, and MIT's Center for Information Systems Research is studying the emerging IT tools that support work groups. A new category of software referred to as "groupware" may play an important role in future project management in

industries including real estate development. According to Gelder (1989), groupware software is designed to:

> ...help groups form, focus group attention, assign tasks, structure those tasks, and record progress. (p. 70)

Marketing and Sales

Developers' marketing and sales efforts involve targeting a market, developing promotions, and communicating with investors, brokers, and occasionally directly with tenants. This area of the model has many potential applications for IT in the form of desktop publishing, graphic presentations, data bases, and a new concept--electronic marketplaces. Each of these applications is described below.

Desktop publishing allows the preparation of high quality printed material, often combining text and graphics. One of the most popular software packages in this area is Pagemaker, available from the Aldus Corporation. Developers could use desktop publishing to prepare brochures for investors or leasing brokers, newsletters for tenants, or even the firm's annual report. Since desktop publishing applications are typically implemented on a stand-alone personal computer and a high quality printer, no elaborate or expensive hardware is required.

Similarly, computer graphic presentations could be used in sales and marketing efforts. A stand-alone personal computer installed with graphics software, such as Freelance Plus from Lotus Development Corporation, can produce slides or overheads to support sales and marketing presentations. A developer could also use a system to produce presentations of space for lease or sale, creating a model of how available space would look after it was tailored for a potential tenant. Weyerhaueser's DesignCenter allows the creation of three-dimensional renderings of home improvements. Integrating a system like DesignCenter with the architect's CAD (Computer-Aided Design) system could lead to some very sophisticated presentations.

An important aspect of IT is data collection and making optimal use of the information. Data bases of sales prospects, market activity, and broker backgrounds were used by four innovative developers surveyed. One apartment developer who employed an in-house leasing force gathered information at every open house on how prospective tenants had heard about the property. The developer believed this information would help him to target his marketing efforts. Another residential developer personally monitored market activity by driving past competitors' properties and reading trade publications for sales information. The developer

then used a data base to record and analyze the observations.

A large commercial developer was creating a data base of the largest 1,000 tenants in the downtown area. A telephone survey provided information about tenant plans to move, and the data was used to focus the efforts of the in-house brokers. Another commercial developer maintained a data base of outside brokers, including the firm's history with each broker and his or her area of interest. This information was used to identify brokers that might be most interested in particular space for lease.

Electronic marketplaces are one aspect of IT that could be used in real estate development. Today's networks allow buying and selling via computer. The location of buyers and sellers is irrelevant. Malone (1987) of MIT writes:

> New information technologies are allowing closer integration of adjacent steps on the value-added chain through the development of electronic markets and electronic hierarchies. (p. 484)

The most often cited examples of these electronic marketplaces are American Hospital Supply Company and American Airlines (Harris, 1985). American Hospital saw its market share soar in the 1970s after it established computer links to its customers and suppliers. The technology helped the company cut inventories, improve customer service, and obtain better financial terms. Even more important, it

often locked out rival distributors. American Airlines provides its Sabre reservation system, which lists for travel agents the flight schedules of every major airline in the world. Travel agents pay American for every reservation made via Sabre on any carrier.

The real estate development industry is beginning to see similar electronic links (Coffer, 1989). The Investment Network of America, headquartered in Boston, has been established to electronically match investors with investment opportunities nationwide. Buyers and sellers have access via electronic mail to investment property information in condensed reports; investors can compare a number of properties. By expanding the pool of investors the electronic marketplace expands the opportunities for developers--more investors learn about their properties sooner. This suggests that real estate developers may need to become more competitive with one another. Institutional investors will have the opportunity to acquire and dispose of major properties in a highly market-efficient and cost-effective manner.

Service

For our sample real estate developer, providing service means managing the building and ongoing relationships with tenants and investors.

The real estate developer must provide investors with regular, detailed reports on the status of their investments. One developer surveyed had implemented a sophisticated reporting system and believed the results offered a major advantage to the firm. In fact, the developer reported that an insurance company had offered favorable terms, based on the professionalism of the developer's reports.

Ever-increasing pressure from institutional lenders was forcing the largest developer surveyed to consider installing compatible software in order to facilitate transferring data electronically. The developer planned to reconfigure his firm's system to support data exchange with the four to five software packages likely to be used by institutional lenders. The ability to connect electronically was perceived to offer an advantage in establishing relationships with the large lenders.

In Boston's increasingly competitive real estate market, developers must take seriously the need to retain tenants. Some developers surveyed had ideas for using IT to provide tenants with responsive service. A major multifamily developer offered a scenario where IT could be beneficial in managing the tenant relationship:

> This is a people-oriented business; if you have better information, you can provide better service and may save some money. For example, if a tenant wants an appliance replaced but your data base shows the appliance to be a year or two old, the tenant might be happy with a parts replacement, and you look professional.

Another developer pointed out that the firm did not have CAD files of the tenant space. Such files contain all of the information that would traditionally be found on a blueprint of the space, but are accessible from a computer terminal. If architects are using CAD, the ability to transfer CAD files into the developer's IT environment would save steps in serving client needs; using CAD could facilitate rapid changes or buildout for the next tenant.

In another application of IT in providing service, one retail developer introduced a new clause in all leases, requiring that tenants grant permission to electronically attach rent payments. The developer can instruct a tenant's bank to transfer rent payment automatically to the developer's account; however, the developer has not yet enforced this arrangement as all tenants were paying promptly.

Corporate Infrastructure

The corporate infrastructure portion of the value chain describes the framework that supports all of a firm's activities. Financial, administrative, legal, general

management and planning activities fall under this category. As mentioned in the previous chapter, developers have made extensive use of accounting software and are making increasing use of property management software. Communication systems such as electronic mail exist to allow remote offices to participate fully in corporate infrastructure, offering firms opportunities for smoother, more timely coordination of activities. However, only one developer surveyed was using electronic mail extensively.

Accounting software especially designed for the real estate industry is now available. For example, Landmark Software from Landmark Software of Somerville, New Jersey provides one software package for general ledger, financial reporting and planning, as well as job costing to handle work in progress. The vendor sells three add-on software packages: (1) residential property accounting, (2) commercial property accounting, and (3) facilities management. The add-on modules track rents, vacancies, and allocation of tenant charges.

Real estate development firms, especially small firms, often rely on outside consultants for accounting, legal and other services. In such cases, electronic mail could help the corporate infrastructure function in an integrated manner. One developer surveyed had established electronic

mail links with a business partner, an attorney, and an outside accounting firm so that business could be transacted regularly and expeditiously, avoiding excessive meetings.

Real estate development firms are expected to move toward national and international scope (Katley, 1988). While many real estate firms would like to expand geographically through regional offices, management is concerned about the problems of managing the size and complexity of their organizations. Technology, particularly when applied to communication, can increase a company's ability to coordinate its activities regionally, nationally, and globally. Those firms that are able to exploit IT to expand geographically may achieve a competitive advantage. For example, a CEO surveyed was considering IT as a way to establish a cost-effective regional office. The CEO would use electronic mail to allow the regional office to share corporate resources and as a way to allow corporate management to stay in close contact with the region.

However, as Porter (1985) observes, IT will be useful only if the hardware, software and information are compatible, ie., users can easily exchange information:

> The benefits of scope (and the achievement of linkages), however, can accrue only when the information technology spread throughout the organization can communicate. Completely decentralized organizational information technology will thwart these possibilities, because the information technology introduced in various parts of a company will not be compatible. (p. 157)

Human Resource Management

IT can enhance the smooth operation of the human resource function in the value chain, although perhaps to a lesser degree than other functions in the model. Even for small firms, IT can aid in training and compensation planning. For example, data on how projects have been implemented in the past can be used in preparation of training materials for new personnel; it can also acquaint them with the methods and procedures used in a firm. Bruns and McFarlan (1987) suggest use of IT in compensation planning:

> Technology can help managers create more effective incentive systems--from corporate profit-sharing plans that eliminate internal rivalries to schemes that automatically pay factory workers bonuses for meeting deadlines. (p. 94)

This may have some application in real estate firms since employees work on a project basis; however, the organizational effects must be considered carefully.

Technology Development

Technology development refers to all of a company's efforts to improve the process by which it develops product. The typical development firm generally allocates time and resources to product development. However, the firm that also attends to the process it uses to develop

properties--analyzing areas of efficiency, productivity, and waste--might seize competitive advantage. One example of IT employed to improve product and process alike is project management software, which some developers surveyed have used. Project management software tracks the flow of a project, giving a real estate development firm a bank of data that can be used to improve how things are done in virtually every area of the development process.

Procurement

Developers procure products and services during development as well as in managing properties. IT can be a tool for easing procurement processes. Porter (1985) writes:

> The technology is creating new linkages between activities, and companies can now coordinate their actions more closely with those of their buyers and suppliers. (p. 152)

Close electronic links, whether by facsimile machine or direct computer connections through electronic mail, with outside vendors and consultants can speed the flow of communication during a proposal process. Electronic links enable personnel at two remote sites--such as the real estate development office and an outside architecture firm--to work jointly on proposals, completing them much faster than is possible using telephones and mail service.

Two of the twenty-one developers surveyed were beginning to use IT in procurement. The initial step was to transfer purchasing requirements from the field to a central data base; central purchasing allowed cost savings. One developer was electronically exchanging purchase orders with a vendor, but did not see that activity expanding; the company thought the paper purchase order system was adequate.

SUSTAINING COMPETITIVE ADVANTAGE

Competitors can often replicate what another firm has done with IT. But, even though competitors can purchase identical technology, they cannot easily copy innovative use of the technology. Two areas seem to hold the most potential for development firms to protect their competitive advantage: (1) management of "linkages" with brokers, lenders, buyers, vendors, etc., and (2) an emphasis on corporate data.

According to Porter (1985), management of the firm's linkages with suppliers, buyers, and distribution channels not only offers immediate advantage, but can offer opportunity for sustained advantage:

> Managing linkages ... is a more complex organizational task than managing value activities themselves. Given the difficulty of recognizing and managing linkages, the ability to do so often yields a sustainable source of competitive advantage. (p. 50)

The particular information flow that makes each linkage relationship work cannot easily be dissected by rivals and applied to their own organizations.

Shoshana Zuboff of the Harvard Business School believes that the real key to sustaining competitive advantage lies in how a firm treats information (Zuboff, 1988b). She believes that IT is typically used by an organization to automate existing functions. However, the very process of automation gathers data never before available. Zuboff (1988a) argues that IT increases the "comprehensibility" of the process that has been automated by the firm and generates a new stream of data providing an opportunity for the organization to learn how it operates and better manage its functions. According to Zuboff (1988a), there is an opportunity to:

> ...create a vast information presence that includes many data formerly lodged in people's heads, in face-to-face conversations, in discrete file drawers, and on various pieces of paper widely dispersed in time and space. (p. 8)

Organizations, Zuboff (1989) believes, must actively plan for the use of this new information:

> The real source of competitive advantage is having the organization that can exploit information to learn and to innovate more quickly and more regularly than the competitors. (p. 34)

One major Boston developer is placing increasing emphasis on the information side of IT. The firm undertook

the task of moving from stand-alone PCs to increased use of shared systems. As the manager put it:

> We found lots of information that could be useful to the corporation on those PCs... If the data are not being properly captured, we are missing opportunities. In fact, in our property management service, our ability to provide centralized information is an important selling advantage.

CONCLUSION

This chapter explored the components of Porter's value chain to illuminate opportunities for gaining competitive advantage in real estate development, specifically by using IT tools. The author does not mean to suggest that the potential uses of IT should become realities in the real estate development world. In fact, as the next chapter shows, there are many reasons why real estate development has not been the industry to showcase IT's capabilities. Chapter 4 discusses developers' perceptions of IT as a potential tool for competitive advantage and their perceptions of competitive advantage itself.

CHAPTER 4

EXPLAINING THE GAP

Many uses for IT exist in real estate development. However, as earlier chapters have shown, innovative use of IT is limited to a few companies, and for most companies is not extensive enough to provide the firms with competitive advantage in the ways outlined in the previous section. What explains this discrepancy?

DEVELOPERS DO NOT PERCEIVE COMPETITION

Is real estate development in Boston competitive? One leading Boston developer said: "I don't compete with anybody." However, it can be shown that the real estate development market is certainly competitive and growing more so. The Real Estate Research Corporation (Kateley, 1989) predicts:

> It's getting more competitive, more concentrated, and as it takes on enhanced institutional and global feature, less entrepreneurial. (p. 6)

In fact, The Real Estate Research Corporation points out that the factors that create an oversupply are no longer cyclical but chronic.

Referring specifically to the Boston market, a developer said, "Anytime you have so much money at stake, you're in a competitive situation. Just look at the vacancy rates."

The areas in which developers face the most competition, according to one survey respondent, were in acquiring land, designing the right product, and gaining the attention of brokers.

Nonetheless, many developers surveyed did not perceive their firms to be operating in a competitive situation. One explanation for the failure to perceive competition may be that the past few years have been quite profitable for Boston area developers. With good investment opportunities and responsive markets, developers have not felt the need to think competitively or to use information technology competitively. As one developer put it, "We've done so well without computers, why bother?"

DEVELOPERS DO NOT PLAN STRATEGICALLY

Another reason developers generally do not use IT competitively may be the business style common to many developers. They consider themselves to be deal-makers. They enjoy seizing opportunities, they are good at negotiating, and they may not spend alot of time planning. Several survey respondents referred to "the back of an envelope" as a typical place for a business plan. In fact, many developers surveyed did not work from a business plan of any kind. Similarly, developers are not typically

trained in strategic planning theory, and may not have a context for evaluating an issue such as how to apply IT for competitive advantage.

Style and training partly explain why many developers do not plan strategically. Practicality is another, simple reason. Smaller developers pursue one project at a time. They require the ability to react when an opportunity presents itself and may perceive planning as impossible or limiting their flexibility.

IS INFORMATION TECHNOLOGY THE OPTIMUM TOOL?

IT has had acceptance in many industries as a tool for competitive advantage. Even so, IT is not the only, and may not be the best, tool for developers to use to gain strategic advantage. According to Porter, competitive advantage is achieved by either lowering costs or producing a differentiated product for which the market will pay a higher price. In real estate development, IT may not be the best way to lower costs, nor is it necessarily a crucial tool for providing a differentiated product.

IT may not fit the real estate development business and, in fact, may have negative effects. Many developers said that real estate development is a "people business." Personal relationships are critical, and IT will never replace that part of the business. In fact, many developers

were concerned that computers were getting in the way of the business. Developers commented that there is a growing tendency to "run numbers" and forget the buildings and the people. Additionally, there was widespread concern that there was a growing overdependence on computers. Some typical comments are included below:

> Computers are replacing judgement; people use machines as a crutch. They forget the buildings and the people.
>
> ****
>
> Computer-generated models can have tremendous flaws and there is no way to check. There's less attention to double-checking, and things look so final. Do people really understand the discounted cash flows they compute?
>
> ****
>
> We rely on the spreadsheets too much; they are based on such gross assumptions.

Although many opportunities exist along the real estate development value chain to apply IT, they may not address the largest risk area. One developer pointed out that the biggest risk was market risk. Developers must be poised to adapt a project quickly to respond to changing market conditions. Changes such as a drop in interest rates or a change in a major tenant's plans require immediate adjustment. The developer believed that computers could not address this constant need to manage risk. It is clear that spreadsheet software has greatly enhanced developer's

ability to model different scenarios, and market demand models might provide even greater sophistication. Additional research is warranted in this area.

Information technology was widely perceived among survey respondents to be expensive and a cause of "information overload." In addition to the initial outlay for hardware and software, developers were wary of add-on costs such as maintenance, software upgrades, and especially training. Training was perceived as a double expenditure; in addition to paying for the training, developers would have to do without employees' services for the time required to train them. Developers said:

> Be prepared for computer shock every 3-4 years ... you have to replace your systems, and that means downtime for your company. Training and service are on-going problems.

****

> You can't overestimate the hidden cost of training ... you lose time when you pull the staff off for training, but if they aren't educated about using the computers, you are at risk.

Some writers have projected that IT may mean smaller staffs. Drucker (1988) writes:

> ...the need for service staffs--that is, for people without operating responsibilities who only advise, counsel, or coordinate--shrinks drastically. (p. 47)

However, the experience of the developers surveyed is

different. Survey respondents reported that IT implementation had caused expansion of their organizations:

> We have a person that just does computer work.
>
> ****
>
> I've hired more people to crunch numbers.
>
> ****
>
> The finance department as a percentage of the company has grown as a result of more technology.

Real estate developers surveyed joined many IT users and theorists in concern about "information overload." Drucker (1988) writes:

> As advanced technology becomes more and more prevalent, we have to engage in analysis and diagnosis ... even more intensively or risk being swamped by the data we generate. (p. 45-46)

Several real estate firms were experiencing information overload. One developer acknowledged, "The challenge is to use more of the information generated."

DECISION-MAKERS' ATTITUDES MAY BE AN OBSTACLE

Top executives' personal attitudes toward computers may hinder their organizations from applying IT. Many executives were skeptical about IT's potential to provide them with information in new, useful formats. A CEO did not see any potential for additional computer applications: "Computers have had their effect already. Software is mature; I don't see anything else that can be automated."

Another executive reported: "I like to do the analysis long hand. I use many more variables than computer programs can handle."

Some developers also showed a skepticism about the reliability of IT. A vice president of finance in a major firm had not invested in an invoicing system because he didn't trust the technology: "We would check everything so closely, it seemed easier to do it by hand."

CONCLUSION

There is a discrepancy between the opportunities for using IT to gain competitive advantage and the actual use of IT by developers. Several explanations have been identified:

- Developers do not perceive themselves to be operating in a competitive environment.
- Developers do not plan strategically.
- IT may not be the optimum tool for gaining competitive advantage, and its benefits to developers may not appear to justify the costs.
- Decision-makers' attitudes about IT may be an obstacle.

The following chapter presents the conclusions of the author about the realities and potential of IT in real estate development.

CHAPTER 5

CONCLUSION AND SUGGESTIONS FOR RESEARCH

Are developers doing what is appropriate or lagging behind? The truth seems to be somewhere in the middle.

Development firms are often small. Many of the IT uses suggested in Chapter 3 are appropriate to and cost-effective for larger companies. In fact, developers may increasingly hire consultants who use IT to automate the areas of their own expertise. For example, a small developer might hire a market consultant capable of creating computer models to estimate product demand. However, as real estate developers begin to operate on a larger scale across a larger geographical area, as many analysts believe will happen, those IT applications may be brought in-house.

The attitude of the senior managers of the firms will determine how quickly and successfully IT will be integrated into the larger firms. The survey found widespread resistance to technology among senior managers. Successful IT implementation requires the extensive involvement of senior management; otherwise a patchwork, "buy-what-we-need-today" system will result. Planning for future IT use must address the need to move beyond the pro forma to the field and to understand the source and usefulness of computer-generated analysis.

Developers will not be able to overlook certain clear contributions that IT can make toward competitive advantage. First, as lenders require more detailed analysis and reporting, those developers able to respond are more likely to strengthen their relationships with the lenders. As lenders require developers to coordinate software so data can be easily exchanged, only a few forward-looking developers may be prepared. Second, IT has the potential to generate important information for developers. Data can help developers see ways to improve the real estate development process. It can allow developers to look at and manage their portfolios and prevent a firm from becoming immersed in single-project details. Third, IT can provide a tool for cost savings, creating competitive advantage.

The senior managers surveyed have clearly seen some of the problems inherent in IT use. Their concern that IT could overshadow the real business of the firm--buildings for people--will be important to keep in mind as IT becomes more widespread.

This thesis has examined opportunities for using IT in real estate development. Porter's model of the value chain was applied to real estate development. Additional research could focus on several important areas.

First, more analysis of competitive advantage in real estate development should be undertaken. This thesis suggests a value chain for a sample development firm; future research might extend this analysis to other firm configurations, e.g., in-house vs. out-of-house brokers. Linkages of the developer's value chain with suppliers, brokers, and buyers may be critical to determining competitive advantage. Porter writes of the importance of linkages to supplier, channels, and buyers to competitive advantage. Analysis of these linkages would be useful.

Second, additional analysis of the use of IT in real estate development is needed. This thesis has been exploratory, covering a small sample in one geographic location. Future work should expand the number of firms interviewed and the geographic scope. Also, developer use of IT can be expected to grow in the future. It will be interesting to look at changes over time, particularly in light of industry changes.

Third, a broad and interesting range of articles and other professional literature is accumulating on the organizational impact of using IT. The organizational implications for the real estate development firms should be studied.

Fourth, only a cursory presentation of the issues of management of IT within a firm was undertaken here. Further analysis could expand this analysis, applying Cash's study of IT management to the real estate development industry.

Information technology is coming to real estate development, and a small percentage of developers are positioning themselves to take advantage of it. In the coming years, all developers will face an increasingly demanding lending community and an increasingly complex development environment. Those developers able to apply IT against these industry pressures stand to gain significant competitive advantage.

APPENDIX

QUESTIONNAIRE

Thanks for taking time to answer these questions. We are interested your opinion about use of information technology in real estate development. Information technology includes computers, software, and electronic information.

BACKGROUND

1. How many people in your firm?

   _____

2. Do you have any regional offices?

   a. yes, how many_____

   b. no_____

3. What percentage of your staff have computers

   a. 1 to 10 (10%)_____

   b. 1 to 4 (25%) _____

   c. 1 to 2 (50%) _____

   d. 1 to 1 (100%)_____

4. Do you have:

   a. stand alone pcs?___

   b. a mainframe_____

   c. a local area network___

5. What types of software are you currently using? Who uses each?

   1. senior management

2. accounting and finance staff

3. property management

4. project management

5. construction management

6. sales people

7. sales management

8. clerical staff

9. all staff

10. architecture staff

Software	Who?
a. spreadsheet	_____
b. word processing	_____
c. accounting	_____
d. project management/scheduling	_____
e. property management	_____
f. business graphics	_____
g. electronic communication	_____
h. computer aided design	_____
i. sales/marketing	_____
j. graphical information system	_____
k. other_____	

6. What corporate data bases do you keep and use?

a. leases_____

b. accounting_____

c. prospects_____

d. other_____

7. Do you purchase electronic information from any outside sources? If so, what kind.

a. Department of Commerce data

b. economic forecast or data

8. Do you use a computer regularly?

a. yes____

b. no_____

STRATEGY

1. Which of these best describes your company's use of information technology?

a. strategic to my business____

b. it is becoming strategic_____

c. we depend on computers being there_____

d. we use computers, but don't depend on them___

2. Have your invested in information technology to gain strategic advantage?

a. yes____

b. no_____

3. Does your business plan mention information technology?

a. yes____

b. no_____

4. How do you justify investment in computers?

a. don't do a justification_____

b. cost savings_____

c. keeping up with competition_____

d. other_____

5. How do you budget for information technology?

a. buy what we need_____

b. allocate percentage of sales to IT__

what percentage?_____

6. Do you think information technology will affect real estate development in the future?

a. yes, how_____

b. no, why not?_____

7. Do you think information technology will change industry structure?

a. yes, how_____

b. no____

8. Has information technology changed your organization?

a. yes, how_____

b. no, why not_____

9. Could you finish this sentence, when I think about information technology, I wish...

_____

10. Have staff analytical skills changed?

    a. yes, how?_____

    b. no_____

11. Is use of information technology reflected in performance evaluations?

    a. yes____

    b. no_____

12. What lessons have you learned about information technology?

_____

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