

Switches and Mortar in the Internet's Shadow:
A Study of the Effects of Technology on Competitive Strategy for the
Internet's Landlords

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Submitted to the Department of Architecture in Partial Fulfillment of the Requirements for the
Degree of Master of Science in Real Estate Development

at the

Massachusetts Institute of Technology

September 2000

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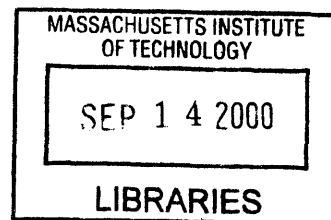
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Abstract

Communications technology has experienced a period of explosive growth, driven by a confluence of legal, political and technical factors including the following: the 1968 Carter Phone and 1980's competitive carrier decisions, the 1984 divestiture of AT&T, the Telecommunications Act of 1996, the development and standardization of new technologies, and the proliferation of the Internet and World Wide Web. This thesis asks the fundamental questions: How has the rapid growth of the Internet and other communications technologies changed the competitive strategy of commercial tenants, and how have these changes affected commercial real estate developers? This study proposes that developers and landlords need to use more forward-looking theories of competitive strategy in order to understand the current and future real estate needs of technology-driven commercial tenants.

Telecommunications deregulation and the growth of the Internet led to the creation of a new and rapidly growing high technology industry and commercial tenancy. Deregulation and the Internet also transformed the way traditional commercial real estate uses information technology, encouraged the forging of partnerships between commercial real estate professionals and "last mile" information technology contractors, and resulted in the creation of a new commercial real estate product—the telecom hotel.¹ Current literature suggests traditional commercial tenants might differ from Internet-based business tenants in four general areas of the development process: feasibility, site selection, design and building operations.

The proliferation of the Internet as a catalyst for new real estate products, commercial tenants and partnerships, and the observed differences in development practices between traditional and commercial tenants are both clues to fundamental differences between these two tenants' competitive strategies. It is possible to understand these clues to tenant behavior by taking an in-depth look at how these two tenants compete in their respective industries. Traditional commercial business tenants appear to conform to Michael Porter's theories on competitive strategy and advantage. High-tech tenant's competitive strategies seem to be more accurately reflected by Gary Hamel and C.K. Prahalad's model of competition for the future. These two theories, and the industries they represent, differ in four dimensions: Future versus Past/Present orientation, technology use, rate of growth, and resource use.

In comparing three case studies on these four strategic dimensions, this thesis concludes that Porter's more stable, efficiency-oriented model does explain the strategy of Northwestern Mutual, a large insurance organization. Hamel and Prahalad's model better explains the hectic, high growth, future orientation of Akamai and YankeeTek Incubator as well as Teleplace, a telecom hotel service company. Hamel and Prahalad and Porter's frameworks explain significant discrepancies between predicted development practices based on current industry thinking, and observed development practices based on these in depth case studies. This thesis thus verifies a need by real estate developers and landlords to use forward-looking theories of competitive strategy when examining the current and future needs of high-tech tenants.

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¹ For a definition of telecom hotel and other terms, see Glossary in Appendix D.

Acknowledgements

This thesis would not be complete without expressing our gratitude to so many people who helped and supported us during this rite of passage. First, we would like to thank our thesis advisor Dr. Gloria Schuck for the guidance, insights, and faith she so willingly gave us throughout the intensive research and writing process. She truly helped make this normally tedious process an exciting, mind-opening experience for us both.

We would also like to thank Mr. William Hegge, whose tireless efforts to coordinate interviews and information made the study of Northwestern possible, and Mr. Armin Gumerman, who provided unique insights into Northwestern's strategic use of technology. Dan Brophy, Tom Esau and Mike Skorsted also deserve praise for their technical support of the Northwestern case, as does Donald O'dell for his strategic real estate management insights.

We are also indebted to Victor LaSala, James Gusso and Meg Walsh, each of whom provided invaluable insights into the technical, legal and business concerns of the telecommunications industry as these concerns relate to real estate. Richard Kennedy helped leaven the market statistics in this study with real world examples from the New York City Market. We must also thank Jim Young, James Goldenberg and Young Park for their views on technology's impact on commercial real estate.

Howard Anderson's views on strategy, technology and real estate were both humorous and invaluable. Jerry Nadeau is to be praised for his breathtaking view of the pace of real estate and employment growth at Akamai. Tracey Nicolson and Jack Deary also need to be thanked for their support.

We would also like to thank Richard Berglund, Lenny Chesal, Scott Haugland, Scott Lehman, and Stephen Saldanha of TelePlace, Inc. The time, knowledge, and trust they so freely shared allowed us to increase our exposure and understanding of the fascinating history and exciting future of telecom hotels. This thesis would have been impossible without their invaluable help.

Finally, we would like to thank our families for the roles they played throughout this process. We must express our gratitude to our parents and grandparents for planting within us our interest in real estate and technology and who acted as our strongest critics and biggest fans. We acknowledge that William Morgan's thirty years of telecommunications expertise and unflagging support have added immeasurably to the quality of this study. Finally, we would like to express our gratitude and love for our wives Jeanne Morgan and Molly Pettigrew, whose unwavering support and selfless devotion imbued us with much-needed stability and comfort during the past three hectic months.

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Introduction

For roughly half a decade, an increasingly “e-phoric” United States has been experiencing a period of unprecedented economic prosperity and technological advancement that has been described by many as a Second Industrial Revolution. Spawnd by the advent of the Internet and the deregulation of the U.S. telecommunications industry in 1996, this Second Industrial Revolution has the potential to dwarf its eighteenth-century counterpart in both speed and influence.² According to a study conducted by the University of Texas at Austin’s Center for Research in Electronic Commerce, it took the U.S. Internet Economy—defined as “companies directly generating all or some part of their revenues from the Internet or Internet-related products and services”—just three years after the 1995 birth of the World Wide Web to generate \$322 billion in revenue. This amount exceeded the revenues generated by the energy and telecommunications sectors.³ In 1999, the U.S. Internet Economy surpassed another century-old industry, the U.S. automobile industry, growing 62 percent to reach \$523 billion in revenues. This figure is expected to exceed \$850 billion by 2000.⁴ The seemingly omnipresent “dot-com” phenomenon, which includes a small but rising number of real-estate related Internet startups such as Redbricks.com and EquityCity.com, receives much of the credit for this astronomical growth. Yet, lying in the Internet’s shadow is the commercial real estate industry, which despite its slothfulness has also contributed to and benefited from the Internet’s commercialization.⁵

From providing high-tech “smart-office” space to developing telecom hotels, landlords and developers everywhere are quietly embracing the “New Economy” to become landlords to the Internet.⁶ Describing the potential for real estate professionals to benefit from the Internet, Peter Rummel, chairman and CEO of the St. Joe Company, at a conference of the Urban Land Institute stated:

The world is going to be different, particularly in the way real estate and technology interface. There's a lot of opportunity out there. It's not a question of if—or whether—it's going to happen, but how.⁷

The real estate markets have already provided two answers to this question of “how” differently real estate and technology will interact.⁸ For the human factor of the Internet, landlords are offering technology startups flexible lease terms, reasonable rent rates, and options for expansion

² University of Texas at Austin’s Center for Research in Electronic Commerce, Measuring the Internet Economy, 6 June 2000, 7.

³ UT Austin CREC, 76.

⁴ UT Austin CREC,” 2, 5. For figures on the energy, telecommunications, and automobile industries, see Forbes, 10 June 1999.

⁵ The definition of “commercial real estate,” like most real estate terms, can vary from market to market or even submarket to submarket. In this work, “commercial real estate” shall include retail, office, and industrial properties and exclude all single-family and multi-family properties.

⁶ For definitions of “New Economy” and other terms, see Glossary in Appendix D.

⁷ Charles Lockwood, “Muddy Waters: How can real estate and technology interface?,” Urban Land, May, 2000, 66-99.

⁸ For the purpose of this thesis, the normally inclusive term “technology” will refer only to high and information technologies such as the Internet.

in exchange for stock in what they hope will become the next Amazon.com.⁹ On the Internet's hardware side, developers are rushing to take advantage of the opportunity for "hefty returns [that] are virtually guaranteed" for telecom space by redeveloping warehouse and office space into telecom hotels for the housing of switches, routers, and servers that help power and direct Internet traffic.¹⁰ Thus, opportunities abound for the real estate professional with a vision of how real estate will be impacted by technology and an ability to capitalize on the power of the Internet.

For the shortsighted, however, the opportunities the Internet provides could lead to the landlords and developers' downfall. These rewards for providing startups office space and for developing telecom hotels are not without their risks. According to the Gartner Group and other research companies, as many as 95 to 98 percent of dot-com companies will fail by 2002. The ever-evolving nature of the prototype for telecom hotels also promises to undermine a building's value over time.¹¹ Most ominous of all, real estate professionals should never forget the propensity of real estate developers to overbuild....¹² These factors, combined with the complexity and volatility of high technology, foretell a bleaker future for the Internet's landlords than the exponentially-growing economy implies.

Despite the gloom the images of a mass failure of dot-coms and an overbuilding of telecom space evoke, the Internet's landlords are not without hope. The Internet and its double-edged power to both create and destroy are here to stay. Opportunities will always exist for real estate firms that know how to find or, better yet, create them.¹³ Finding and creating such opportunities in the high-tech real estate sector requires most fundamentally a competitive strategy that will help landlords and developers align themselves more closely to the more future-oriented strategies of the technology and telecommunications industries they hope to serve. Without such future-oriented competitive strategies, those dollar signs that are calling entrepreneurs to develop telecom hotels and smart office space might reveal themselves to be only the alluring singing of modern Sirens, calling all but the most forward-looking developers to their deaths as they and, consequently, the market crash upon the rocks of mismatched supply and demand.

Because their competitive strategies are simply derivatives of their tenants' competitive strategies and mentalities, landlords and developers hoping to avoid such an ill fate must adapt or reinvent their competitive strategies by developing, in terms of both present and future needs, a sound understanding of their current and prospective technology-driven telecom and Internet tenants. Such an understanding of future-oriented high-tech tenants might only be obtainable by landlords using frameworks based in more forward-looking theories of competitive strategy than those to which developers and the real estate industry in general are accustomed. Thus, it is the

⁹ Jason Krause, "Even Landlords Want to Be VC's," The Standard: Intelligence for the Internet Economy, October 18, 1999. <<http://www.thestandard.com/article/display/0,1151,6973,00.html>> (February 19, 2000).

¹⁰ Joseph Gose, "When Data Checks In," The Standard: Intelligence for the Internet Economy, July 17, 2000. <<http://www.thestandard.com/article/display/0,1151,16774-0,00.html>> (July 17, 2000).

¹¹ Scott Lehman, Vice President of Business Development for TelePlace, Inc, interview by Benjamin Pettigrew, July 20, 2000.

¹² "Stormy Seas Ahead for Struggling Dotcoms," Nua Internet Surveys, April 13, 2000, <http://www.nua.com/surveys/index.cgi?f=VS&art_id=905355716&rel=true> (June 3, 2000). Joseph Gose, "When Data Checks In," July 17, 1999.

¹³ Kara Swisher, "Old Economy Concerns Need to Play Catch-Up," The Wall Street Journal, July 10, 2000.

purpose of this thesis to explore the possibility of a need for the Internet's landlords to use more forward-looking theories of competitive strategy to understand and meet the current and, most importantly, the future demands of their tenants.

In order to test this hypothesis, this study will begin with a brief explanation of its methodology and logic. Next, Chapter 2 will provide an overview of the history of communications technology and its impacts on commercial development. In Chapter 3, this thesis will continue with a discussion of how developers have addressed the needs of high-tech tenants. Following this discussion of technological and development issues, this thesis will move on to Chapter 4, where two of several theories of competitive strategy will be described and chosen to evaluate traditional and high-tech commercial tenants. The frameworks from these theories will then be applied in the three case studies located in Chapter 5. Finally, this thesis will conclude with an analytical summary of the case studies and a verdict on the effectiveness of these frameworks in understanding and predicting the real estate needs of the three tenants.

Chapter One – Methodology

Before this study can begin, however, a methodology must be developed. This study will address the questions of if and how technology has changed the way real estate and development should be managed. The first question is whether this thesis should be quantitative, qualitative, or some combination of the two. In industries where decisions are made by how they will impact the “bottom line” or how they will be perceived or impacted by Wall Street, preference is generally given to quantitative methods. This is often the case for the finance-intensive commercial real estate industry. Quantitative analysis can be effective when reliable data exists in abundance. Given that much of the change in the real estate industry has occurred in the last few years, sufficient data may not be available, and its quality may be questionable. In a world where patents and intellectual property law offer little or no protection for either established technology leaders or would-be high-tech entrepreneurs, privately held companies have little or no incentive to open up their doors and books even for the “seekers of truth and beauty” known as academics.¹⁴ Furthermore, as the line between industry and academia becomes increasingly blurred with the courting of professors by startups to consult or act as board members, many adherents to Andrew Grove’s well-known philosophy “Only the paranoid survive” have become even more deeply entrenched in their fears.¹⁵ This general feeling of distrust towards outsiders implies increased difficulty for outsiders, including academics, who try to access these companies’ data and other resources.

Of course, collecting or accessing collected data from companies is not an impossible task. Universities, non-profit organizations, and even corporations often conduct studies in areas of interest. Data, however, are only as good as the organization and manipulation. As mentioned previously, there is little consensus on the definitions of terms such as “telecom hotels,” “smart office,” and even “e-commerce.”¹⁶ Research groups such as Forrester Research, Jupiter Communications, and The University of Texas at Austin’s Center for Research in Electronic Commerce have attempted to estimate and project the size of the Internet in terms of direct and indirect revenues and employment. These figures have varied widely, in part because of different assumptions and definitions. Even the best analyses of future (and even past) performance of the Internet as a whole remain intelligent guesses at best. For these reasons, this thesis will be more qualitative in focus.

The questions industry leaders ask most frequently attempt to make sense of new phenomena and serve as groundwork for further speculation on the direction their industries might be taking. These questions are difficult to answer and nearly impossible to quantify accurately. Yet, how these questions are answered may be critical to the success or failure of a business. Equity Office Properties, Allied Riser, LoopNet, and other real estate or real estate related companies

¹⁴ The phrase “seekers of truth and beauty” is a favorite phrase used by Professor Timothy Riddiough of the Massachusetts Institute of Technology to describe academics.

¹⁵ Andrew S. Grove, *Only the Paranoid Survive: How to Exploit the Crisis Points that Challenge Every Company and Career* (New York: Random House, Inc., March 1999). This paranoia has been observed by the authors on many occasion in their attempts to interview companies as potential case studies.

¹⁶ The difficulty of defining these terms can be illustrated in the discrepancy between the findings that appear in the studies conducted by Forrester Research, Jupiter Communications, The University of Texas at Austin’s Center for Research in Electronic Commerce, and other research groups.

are placing large bets on their beliefs in the changing roles of information technology in real estate demand. This thesis will attempt to explain these changing roles.

Having established the need for non-quantitative procedures, this thesis must then provide sufficient evidence to support the hypothesis that different management theories are needed to effectively compare and contrast the strategic objectives and real estate needs of Old- and New-Economy commercial tenants. The evidence required to demonstrate the applicability or inapplicability of those theories and their frameworks must focus on the extent to which technology has impacted this study's two most pertinent parties—the tenants and their landlords. Both the readers and the authors should also understand the major drivers of change and be familiar with any relevant trends. This overview of technological and development issues must be firmly supported by a wide range of authoritative sources including technology professionals, business managers, and academic and business literature. A summary of current real estate development practices for both traditional and high-tech tenants must then be compiled in order to provide this thesis with points of comparison for the case studies that are detailed in Chapter 5. Furthermore, only after providing a detailed, analytical synopsis of the major technology issues affecting tenants and their landlords can appropriate frameworks be selected for the prospective tenants.

After having selected and justified appropriate frameworks for both the traditional and high-tech real estate products and tenants, the hypothesis that an increasingly technology-oriented economy has changed management strategies for real estate developers and landlords cannot be accepted without being tested. In this study, traditional and non-traditional frameworks will be applied in three case studies. The first examines a traditional office tenant and landlord. The second case study looks at a “smart office” tenant and landlord. The third analyzes a telecom hotel tenant and landlord. By examining how well (or poorly) the frameworks fit these cases and by comparing the expected development practices (based on the summary of current practices) with observed development practices in the case studies, the thesis will demonstrate significant evidence for or against the need for adopting a new set of frameworks and management practices for some tenants in the increasingly technology-dependent real estate industry.

To illustrate the need for a shift in frameworks, these case studies will also require a significant amount of data, consisting mostly of interviews, to be collected from both the traditional and high-tech areas of real estate. The interviewees selected include, among others, representatives of both the tenant and landlord. These interviewees were selected by their ability to speak—by experience and/or by position—authoritatively on the strategic, technological, operational, or development decisions (whichever appropriate) that played a role in the creation of their sites. The interviews were conducted “face-to-face” whenever possible. Telephone or Internet interviews will be done if necessary. In addition, the topics of conversation in these interviews included a mixture of standardized, individualized, and impromptu questions directed towards understanding each company's business strategy and their real estate and technology needs. By conducting the interviews in this manner, the landlords and tenants reveal implicitly or explicitly their strategies, frustrations, and needs that would allow prospective developers and landlords learn from the successes and shortcomings of other landlords.

Only by gaining an understanding of the changing needs and profiles of “typical” tenants—that cannot be or are inadequately addressed by more traditional frameworks—can the need for another theory explaining high-tech demand drivers be established. This paper will conclude by comparing the three cases using the summary development practices in Chapter 3 and the framework comparison criteria selected in Chapter 4. By following this structured analytical approach to the case studies, this study should reveal clearly how they the selected firms fit and do not fit the theoretical frameworks as seen in the literature review. This discussion will lead to some speculation on how commercial real estate demand may be changing and what implications these changes may have for developers of commercial space in the future.

Chapter Two – Fiber Optics to the "Last Mile": A Discussion of Communication Technology Proliferation

Some of the examples of an industry's birth, rebirth, or death can be found in the rapid legal and technological changes in communications technology. The following section discusses some of the technological and legal changes in the communications industry and how they have transformed the competitive environment for both the traditional financial, insurance, and real estate (FIRE) tenants and Internet firms. This discussion is not, by any means, a complete survey of information technology, its growth or its changes. Instead, this discussion gives evidence of the nature of information technology as a catalyst for the creation of new industries, technologies, real estate prototypes, and real estate-technology partnerships. This overview will reveal a turbulent and rapidly changing world of communication technologies in order to provide a context for discussing the differing competitive strategies of FIRE and Internet tenants.

Figure 1 illustrates the logical flow in this section's discussion of technology. The story begins with the emergence of the Internet, the basis of a great deal of growth in U.S. commercial real estate demand. The section then discusses telecommunications deregulation over the past 38 years and its role in the growth of communications industry competition. Given these two trends, the study then traces the growth of new industries, starting with one of the first byproducts of deregulation, private telephone switching, which has saved building owners countless billions of dollars in phone company tolls over the last two decades. Switches are then viewed as pieces of a vast telephone network where boundaries between phone companies and between Internet service providers are drawn as "points of presence" (POPs), switches that connect disparate phone company networks and Internet networks. Telecom hotels are a product of the demand for added network switching and points of presence. This section then covers the growth in choices of communication media, digital transmission services and emerging technologies in pursuit of a market of consumers that constantly demand more bandwidth and more convenience. This section closes with a discussion from these choices of some of the real estate implications of this technology, embodied in the emergence of the "smart office" and the "last-mile" technology contractor.

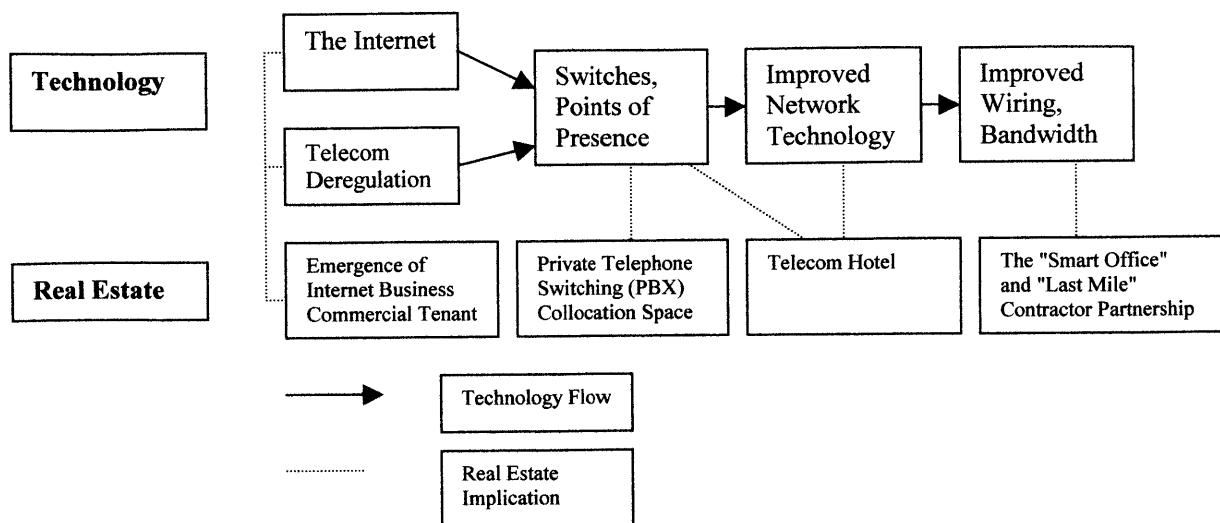


Figure 1: Communications Technology Development and its Real Estate Implications

The figure above shows the flow of the discussion in this section, progressing from left to right. Communications technology trends progress from the proliferation of the Internet through technological changes, such as improved wiring and bandwidth. Real estate practice is changed or improved from these technological advances, as shown in the lower part of the diagram.

The Internet: Prolific Growth of a New Economy

Knowledge of the history of the Internet and its growth is a key component in understanding the technological changes affecting commercial real estate as shown in the diagram above.

Although most Americans would consider the Internet a phenomenon of the 1990's, the Internet was actually born in 1969 with the creation of ARPANET, the Advanced Research Projects Network of the Department of Defense.¹⁷ This network of four hosts grew to include several universities and Department of Defense sites whose researchers wanted a simple means of transferring data efficiently between various computers. These researchers also took advantage of lessons taught by and technology invented for mainframe computer data communications systems, of the University of Hawaii's ALOHANET, and of the microprocessor-based communications capabilities that were sold by Datapoint Corporation. By the late seventies, ARPANET had expanded to just over 100 machines. This fledgling Internet used teletype-emulation communications to send ASCII characters as a means of mainly transferring what would be described today as e-mail.¹⁸ The Internet grew slowly until 1995, when Netscape

¹⁷ Newton, 9. Al Gore, the self-delusioned "Father of the Internet," was 21 years old and studying law at Vanderbilt University.

¹⁸ Please see the Glossary of Terms for a listing of some of the technical terms most often used in this thesis.

ushered in the World Wide Web with the first, commercially successful, modern web browser.¹⁹ This adoption of technology ultimately led to the creation of an industry that boasts 47 million computers with Internet connections in the U.S. and Canada, a number that is expected to triple by 2004.²⁰

The Internet industry is such a new phenomenon that the Bureau of Labor Statistics has yet to compile standard industrial codes to measure the size of the business. However, the University of Texas' Center for Electronic Commerce has attempted to measure this growth with a study which breaks down the industry into four layers, with the first layer representing businesses that build the infrastructure (servers, routers and other technology) of the Internet. The second and third layers relate to Application Service Providers and content providers who support Web businesses through improved routing technology, software, business applications and general systems support. The fourth layer represents the e-commerce sites such as eToys and Amazon.com (the Business to Consumer or "B2C" sites) as well as various Business-to-Business (B2B) users. All told, the four layers of this industry have grown to support an astounding 2.54 million workers, an employment greater than the entire insurance industry and greater than the employment of the federal government, less postal workers. And employment is growing. In 1998, employment grew 36% across the four layers. The Internet is clearly an industry in the midst of tremendous growth and change.²¹ This growth represents the most obvious component of change affecting commercial real estate's changes in tenancy, technology, and property use. A less obvious, but equally important second component is telecommunications deregulation.

Divestiture: The Breakup of "Ma Bell" and the Beginning of True Competition

Knowledge of telecommunications deregulation is equal in importance to knowledge of proliferation of the Internet in understanding how technology has affected commercial real estate. Despite the existence of other so-called independent carriers, AT&T and the Bell System it controlled set communications standards and were the overwhelming providers of local and long distance telephone services throughout the United States until the 1960's. From even before the Communications Act of 1934 until the late 1960's and continuing in a lessening fashion even today, the phone system was treated as a public utility. While its rates were regulated by the Federal Communications Commission and state public utilities commissions, AT&T still had monopoly pricing power in its control of local phone service as well as over international and national long distance calls between its 22 local Bell Operating Companies.²²

This monopoly power was first challenged by the federal government in its 1949 antitrust suit against AT&T. This suit was settled by a consent decree in 1956. In the 1960's, several manufacturers wanted to attach their equipment to the Bell System. AT&T would not allow this attachment, claiming that only they had the right to allow interconnection. In 1968, the CarterPhone decision allowed non-telephone company manufactured equipment to be installed on the public telephone network. Also, in the 1960's, the newly formed MCI (Microwave Communications, Inc.) built long distance networks using microwave technology between large,

¹⁹ Newton, 12.

²⁰ Gary Lenz, Arthur Margon, "Internet Ready," Urban Land, May 2000, 65-90.

²¹ Center for Research in Electronic Commerce, "Key Findings," The Internet Economy Indicators, 17 June, 2000, <http://www.internetindicators.com/key_findings_june_00.html> (17 June, 2000).

²² Anabel Z. Dodd, The Essential Guide to Telecommunications (New Jersey: Prentice Hall, 1998), 62.

private clients' locations, which wanted to save money on long distance calls.²³ In a 1969-1970 decision, MCI was allowed to provide long distance service in competition with AT&T. AT&T, however, still maintained control of their phone lines, while the FCC limited that control by ruling that MCI and other communications companies had the right to attach devices to AT&T's wiring as long as the network was unharmed.²⁴ The CarterPhone and MCI decisions also encouraged competition in the Customer Premise Equipment (CPE) market. Companies such as ROLM could now sell advanced equipment in competition with CPE Customer Premise Equipment sold by the Bell Operating Companies.²⁵

By the 1970's, AT&T's hold over U.S. telecommunications weakened further as CPE providers, complaining that AT&T was not providing connections for their equipment, took up their grievances with the Justice Department. In 1974, the Department of Justice filed another antitrust suit. Judge Harold Greene settled this suit between 1982 and 1984, when AT&T agreed to break up the company. Judge Greene accepted AT&T's reorganization in 1983 in a document called the Modification to Final Judgment (MFJ), because it modified the 1956 consent decree. Not only AT&T, but also GTE and McCaw Cellular were also subject to this consent decree. The MFJ and divestiture became effective January, 1984.

AT&T became an "Inter Exchange Carrier" (IEX), selling long distance in competition with MCI and Sprint and others. These IEXs could only carry calls that crossed over established Local Access Transportation Areas (LATAs). LATAs are geographic areas where the federal government allowed local carriers to operate exclusively, that is, without going through a long distance carrier. The 22 Bell Operating companies were grouped into seven Regional Bell Operating Companies (RBOCs). RBOCs could sell only local service (intra-LATA). RBOCs could also sell the yellow and white pages, but they were no longer allowed to sell telephone equipment.²⁶ Long distance carriers could only operate between LATAs, connecting each party via local RBOCs. Thus, consumers were given a choice between competing long distance carriers and different providers of phone switches and equipment. The race to compete for long distance service and building switches led to rapidly falling telephone charges and increased competition. This, however, was only the beginning. The 1984 divestiture and deregulation of the Bell Operating Companies would pave the way for further deregulation through the Telecommunications Act of 1996

The Telecommunications Act of 1996 established a process for RBOCs to compete in the future in the long distance market and to manufacture equipment. In exchange for these additional freedoms, cable companies, IEXs, electric utilities and other competitive access providers are allowed to compete in the local toll market.²⁷ Additionally, cellular companies provide wireless access to local and long distance calling. As a result of these changes, competition between companies has become increasingly fierce, resulting in falling local phone rates and a broad range of customer telecommunications choices. Now, many commercial offices use the services of multiple competing local carriers, called Competitive Local Exchange Carriers (CLECs). The

²³ Dodd, 68.

²⁴ Dodd, 79.

²⁵ Dodd, 79.

²⁶ Dodd, 64.

²⁷ Dodd, 79.

creation of CLECs has helped fuel the growth in tenancy for carrier hotels and has led to the need for collocation space within buildings, where multiple local carriers may compete for individual tenants within a building or campus.

The viability of these new CLECs as carrier hotel tenants remains to be seen. RBOCs have started to re-consolidate, and the impact of this consolidation on competition is, as of yet, also unclear.²⁸

Interstate and Intra-Company Connectivity: Switches, POPs and Networks

The divestiture of the Bell System and the deregulation of telecommunications has spurred the industry into innovation. New technologies have produced complicated new system architectures to handle information technology needs. Today, the commercial tenant has the choice of a variety of local and long distance carriers for video, voice, and data. This section discusses voice and data switches and Points of Presence (POPs) that connect voice and data networks.²⁹ A basic understanding of switching and Points of Presence (POPs) is important to understanding how the telephone system and Internet operate, why telecom hotels exist and how building owners try to maximize the cost effectiveness of their buildings

What is a switch? A switch is a mechanical, electrical or electronic device, which controls and establishes paths between voice or data calls, completing a circuit to a destination based on the incoming call's data.³⁰ Routers, on the other hand, are special purpose computers that are designed for data communications' packet networks. Their intelligence in the Internet controls (routes) traffic to their respective domains and networks and hence to individual equipment throughout the information superhighway.³¹ The industry is now anticipating the merging of switching and routing into a combined function from one system; technology trials of this merged technology are underway. The rapidly increasing demand for bandwidth has fueled an equally explosive demand for advanced switching and routing technology.

Organizations can own their own telephone switch, called a Private Branch Exchange (PBX), to save money on local calls, such as between buildings, using enterprise-owned intermachine facilities.³² Phone companies have long recognized the need to compete with such equipment by offering Centrex systems (mainly off-premise but sometimes locating its switching equipment in the customer location) that provide users many of the same functions and, sometimes, savings of a customer-owned PBX without the necessity of the customer managing and maintaining the equipment and software and without the risk of obsolescence associated with purchased equipment. Divestiture and the proliferation of PBXs and other competitive equipment were followed by additional deregulation in the Telecommunications Deregulation Act of 1996.³³

The Telecommunications Act of 1996 allowed long distance carriers to compete in the local carrier market via resellers. Some companies, called aggregators, are also grouping smaller

²⁸ Dodd, 61.

²⁹ Newton, 92,

³⁰ Newton, 793.

³¹ Newton, 713

³² Newton, 658.

³³ Newton, 163.

customers to take advantage of economies of scale.³⁴ Hence, the building owner is faced with a wide variety of telephone network switching options since the deregulation of telecommunications.

Deregulation has also generated additional data network switching options. Some organizations have traditionally leased lines from telephone companies and carriers to connect their data networks between buildings, rather than trenching and installing their own facilities. Advanced communications services, such as Frame Relay, Asynchronous Transfer Mode, and SONET standards allow local area networks, managed by the local and long distance telephone companies, to link more than multiple buildings on a local site. Now, sites may be linked to networks that are national or even international. Frame Relay cuts down on the number of lines required to connect, for example, a headquarters with its sub-sites due to added data transmission efficiency. As an example, Frame Relay reduces the number of dedicated outside lines a traditional data system needs to link disparate networks.³⁵ Internet connections are now beginning to replace much of the traffic that was being routed over the Frame Relay network. As the demand for high-speed access to the Internet backbone is skyrocketing, the uses of these advanced technologies continue to increase.

The uses of switches and routers demand that they be connected in a network of voice and data lines. Points of Presence (POPs) and their electronics connect networks of disparate telephone carriers and networks of disparate computer systems.

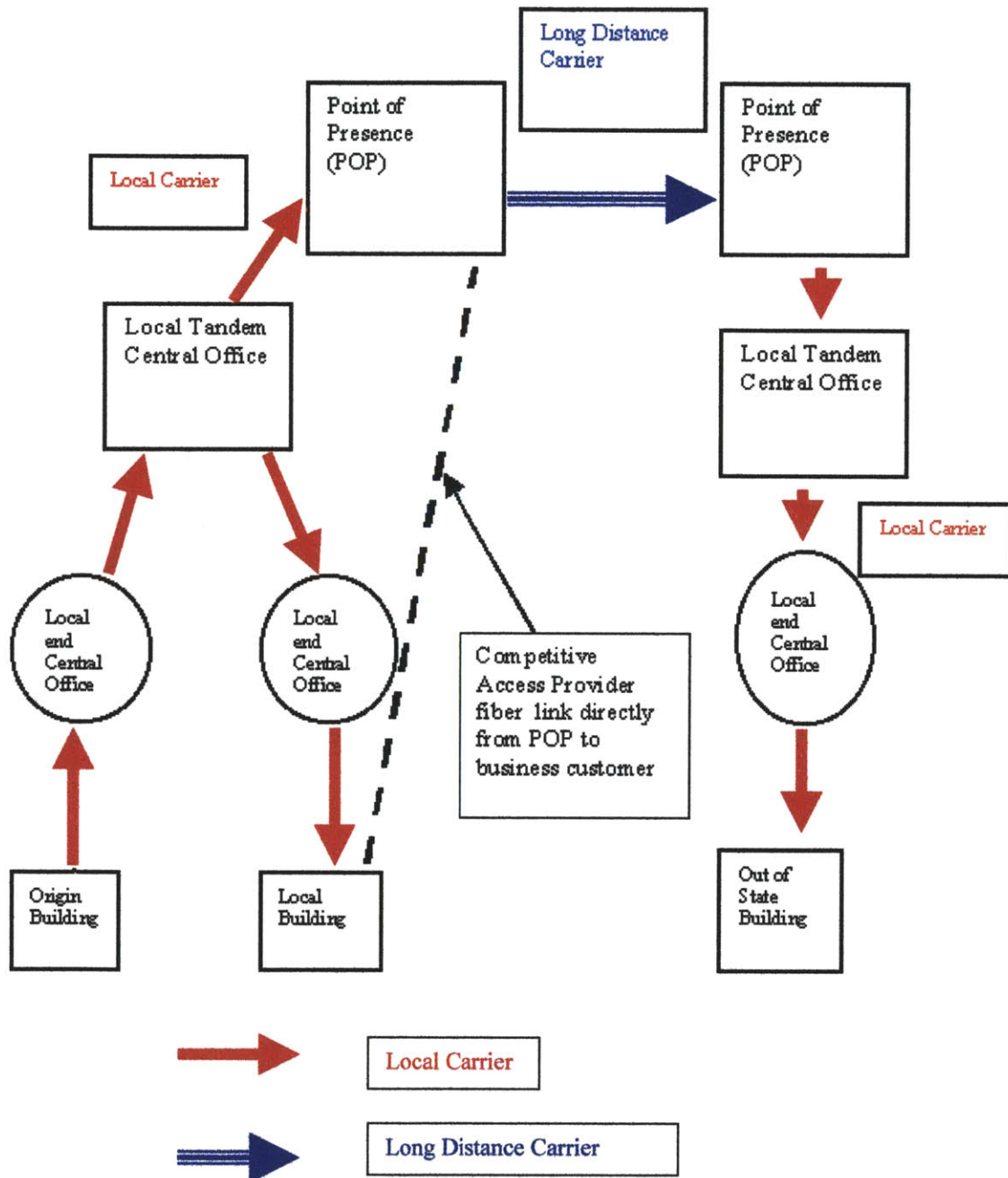
Deregulation meant that long distance carriers and local carriers had to maintain separate lines and separate switches between the lines. As Figure 2 illustrates, calls to or from outside offices within the local area can be routed via the local telephone company's "central offices." Calls outside the local calling area are routed through a long distance carrier via a common switch. This switch, located at a Point of Presence, is the point where calls are passed from the local carrier to the long distance carrier's lines. The calls are then switched to another local area, where they pass through the Point of Presence of another local carrier to the receiving party.³⁶ For example, if a real estate broker makes a call from her office in Boston to a client in San Francisco, the call goes first through local lines owned by Bell Atlantic to a point of presence, where the call is shifted to long distance phone lines owned by AT&T. AT&T then carries the call through to another point of presence to another local carrier, Pacific Bell, where the call is then connected to the client. Figure 2 illustrates this process and is shown on the following page:

³⁴ Dodd, P. 73

³⁵ Dodd, 155; Newton, 350.

³⁶ Dodd, P. 72

Figure 2: Points of Presence in a Long Distance Call Connection³⁷



³⁷ Dodd, 72.

Each long distance company is charged uniform tolls by the local exchange carrier from the Point of Presence to the destination building. As a result of deregulation, some competitive access providers compete with local operating companies by bypassing local switches and wiring high volume users directly to the long distance carriers via the Points of Presence. New carriers are also achieving faster transmission rates via more efficient fiber optic links to the interexchange carrier network. Other carriers are able to deploy services very rapidly using Wireless Local Loops (i.e., radio transmission) to provide competing services. CATV companies are now also carrying data and voice communications over their hybrid fiber and coaxial cable systems. As a modification of the previous example, if the Boston broker called the client using Sprint local service as its Competitive Access Provider (CAP), Sprint might route the call directly to a long distance point of presence. This competitive access provider might use the same point of presence to access long distance as Bell Atlantic, but bypass a lot of local switches and tolls, thereby saving money on the call to San Francisco.

Points of presence, like switches, are slightly different for voice than for data systems. For the Internet, "Points of Presence" are the common connections along the Internet that link Internet Service Providers (ISPs). Here, POPs contain routers connecting the ISPs to route e-mail and other Internet queries to their respective host servers.³⁸ For example, if a student uses America Online to e mail her sister, who uses Yahoo.com for e-mail, that student's message is sent via a local America Online server, and routed to a Yahoo.com POP, using the e-mail's domain name which is then saved on a Yahoo server. Later, the student's sister reads her e-mail by accessing the World Wide Web on a remote computer, connected to a server, which accesses Yahoo.com's POP by typing Yahoo.com's Universal Resource Locator (URL) into her Web browser, perhaps after she has finished shopping another e-commerce Web site.

The growing use of the Internet and, with it, the growing demand by e-commerce companies, ISPs and other businesses is for additional POPs, servers, and routers. These are the key factors propelling increased telecom hotel development. Cisco, Lucent Technologies and Nortel are the heavy hitters in the Internet equipment market. Cisco, for example, has achieved revenue growth of approximately 10% per quarter, or over 40% per year through 1997 and 1998.³⁹ This growing number of routers and servers implies a growing need for space in which to operate switches. Thus, the telecom hotel has to feed, from the pressing need for more switches, routers and POPs, an ever-expanding data and telephone network.

The Telecom Hotel

The explosive growth of the Internet and telecommunications has generated a demand for space to house POPs and their switches, routers and servers. This need has given rise to a new real estate product—the telecom hotel.

³⁸ Newton, 713

³⁹ Cisco Systems. "1999 and 1998 Financial Statements," Investor Relations, Cisco Systems, 27 July 2000. <http://investor.cisco.com/media_files/nsd/cscoc/excel/IS1998rcwsplit.xls> (27 July 2000).

Because of its recent emergence and due to the constant technological change occurring within the New Economy⁴⁰, telecom hotels have no standard prototype. Some telecom hotels focus exclusively on collocation for Internet companies that want to place their servers in an optional geographic location and secure environment. Still, others market themselves to growing local exchange carriers and interexchange carriers. Others serve primarily as data centers for companies that have high data storage demands. There are telecom hotels whose tenants are a mixture of two or three of the tenant types. Regardless of their tenant mix, telecom hotels do have certain features in common that distinguish them from other commercial property types: they are data-centric, rather than people-centric. These are facilities that house routers, switches, servers, and other equipment dedicated to telephone switching, data storage, collocation, and cable management systems. Entrepreneurs were either smart enough or lucky enough have recognized the need to build properties with the structure, power and bandwidth to house the U.S.'s growing demand for additional servers, routers and switches.

Telecom hotels can be generally broken down into those serving telephone carriers, e-commerce, or data storage. In many cases, the telecom hotel contains a mixture of servers and phone switches. Collocation spaces house many carriers or servers in cabinets that can be separated for small bandwidth users and individually locked. Other buildings that are primarily office space also have collocation spaces. These spaces are similar to telecom hotels because they allow tenants to be serviced individually by different telephone service carriers. In many cases, a real estate developer will purchase and develop the property. A tenant, such as Level 3 Communications or Teleplace, will hold a master lease and then rent out bandwidth and memory to various Internet companies and businesses. The few human tenants in the building are typically system administrators who service and maintain the endless rows of servers in the system. Players, such as Level 3, have emerged to meet this demand. They are expected by some to grow 70 to 100% per year.⁴¹

Wiring and Bandwidth

Having seen how the demand for switching and POPs fostered the creation of telecom hotels, this section now focuses on information technology development in wiring and bandwidth improvements. This discussion gives a context for understanding the rapid improvements in information technology, the complexity of information system choices, and the reason for the emerging partnership of information technology contractors with real estate owners.

All communications networks and switches are connected via media such as copper cabling and fiber systems. The capacity of networks and switches is measured by bandwidth. The type of medium and the way the signal is transmitted determine the volume of traffic a

⁴⁰ The terms "Old Economy" and "New Economy" are used throughout the thesis to refer to traditional businesses versus other businesses that have emerged as a result of the Internet, World Wide Web or other communications technology growth.

⁴¹ Young Park, Berkeley Investments, Interview by Geoffrey Morgan, Boston, MA, 8 June 2000; Gusso, James, Victor LaSalla, owners of LaSalla & Associates L.L.P and James & Leonard, P.C. Engineering Consultants, Interviewed by Geoffrey Morgan, 5 June 2000. For a listing of some of the competitive players in Telecom Hotel Operation and development, please see Appendix B.

telecommunications system can support.⁴² Generally, there are three "media" or types of wiring used to transmit information. The most common wire type is twisted-pair copper. Despite its reputation of limited capacity for anything other than voice transmissions, technological innovations have steadily improved copper wire as telecommunications requirements have become more sophisticated. For example, Category 3 cable is able only to carry voice and slow speed data transmissions. Category 5 wiring is able to handle data at much higher information bandwidths as required for high-speed data transmission services.⁴³ The second form of media is copper coaxial cable, which is a larger shielded copper wire commonly used for cable TV and other video transmissions. Coaxial cable is used by cable television (CATV) cable modems. Due to marketing decisions, the CATV industry is only commonly deploying this technology in homes and not into businesses. Coaxial-based systems are still commonly used in business, university, and school campuses.⁴⁴

Optical fiber, the final cable type and most ideal medium, has two basic types—single mode and multi-mode. Single-mode fiber core is the lesser diameter of the two fiber types, allowing light a much more direct path with less signal attenuation. It is used in long distance communications ("long haul" fiber) and high data transmission, whereas the less expensive multi-mode fiber is mostly used within buildings.⁴⁵

New and increasingly efficient transmission has made it possible for optical fiber to carry enormously increased bandwidth. There seems to be no end in sight to the bandwidth that can be provided to meet a seemingly unquenchable demand. SONET (Synchronous Optical Network) networks are commonly operated today at rates of 10 to 80 billion bits per second. 160 billion bps systems are in field trials. Today, optical communications manufacturers are even experimenting with "terabit" fibers, able to handle one trillion bits per second, or approximately 14 million simultaneous phone conversations.⁴⁶ This phenomenal growth in transmission capacity underscores the need for buildings to have data systems that will not become obsolete as new technology allows for ever-greater bandwidth.⁴⁷

There are a variety of services and protocols for voice, video and data transmission over copper and fiber media. The table below outlines some of the various methods of transmitting digital information, the media over which these services and protocols are used, and the typical customers who use these protocols/services.

⁴² For information on how networks achieve faster speeds, please see the notes on Multiplexing and Compression in Appendix A.

⁴³ Dodd, 50.

⁴⁴ Dodd, 179. William A. Morgan, Managing Partner, W&J Partnership telecommunications consultants. Telephone interview conducted by Geoffrey Morgan, 15 July 2000.

⁴⁵ Dodd, 53.

⁴⁶ Victor Lasala, Engineer and Telecommunications Wiring Consultant, Telephone Interview with Geoffrey Morgan, 5 June 2000. For additional information on specialized digital network services, see Appendix A.

⁴⁷ For additional notes on SONET networks and wiring, see Appendix A.

Table 1: Overview of Specialized Digital Network Services⁴⁸

Technology	Number of channels/lines, speed	Media over which signals travel	How Used
T-1	24 channels/lines 1.544 Mbps	fiber optics, copper, Coax. cable, microwave, IR	Med to Large Organizations
Partial T-1	up to 24 channels/lines	fiber optics, copper, Coax. cable, microwave, IR	Med Organizations
T-3	672 channels/lines 44.736 Mbps	fiber optics, copper, Coax. cable, microwave, IR	Large organizations, ISPs, telephone companies
Basic Rate ISDN	2 voice + 1 signal 144 kbps	copper	High-end residential, organizations
Primary Rate ISDN	23 voice + 1 signal (up to 1.54 mbps)	copper	ISPs, PBXs, automatic call distributions (ACD)
DSL (Digital Subscriber Line)	(up to 6.14mbps downstream rate, ADSL)	copper	Telecommute, corp., ISPs, high-end residential
Frame Relay	handles up to T-3 lines in speed (44mbps) . Interface between Local Area Networks in over 4 bldgs.	copper/fiber	Medium-to-large commercial
ATM	622 mbps	Fiber	Telcos, ISPs, Frame Relay nets, large orgs. such as universities.
SONET	Up to 129,000 channels/lines 10,000 Mbps	Fiber	Telcos, carriers, Large Enterprises

T-1, Integrated Services Digital Network (ISDN), and Digital Subscriber Lines (DSL) are examples of services that can be fed directly from the building riser⁴⁹ to the end user's computer terminal or telephone. T-1 is a standard in many new building constructions because of its relatively high bandwidth and flexibility. T-1 systems can be built using fiber all the way to the

⁴⁸ Dodd, 138-161.

⁴⁹ A riser is defined by Newton (p. 705) as "The conduit or path between floors of a building into which telephone and other utility cables are placed to bring service from one floor to another."

office equipment. DSL is used in many older buildings with existing copper lines when the buildings are retrofitted for higher bandwidth.⁵⁰

SONET (Synchronous Optical Network) is a standard way carriers, telcos, and very large enterprises connect high-speed traffic from multiple locations and vendors. SONET rings in a large building or network of buildings carry traffic in two directions simultaneously, around a loop. By using this high-speed service, building owners will not lose voice or data service if one fiber is cut: traffic is automatically routed to another end point. With SONET, it is also quite easy to engineer the use of multiple carriers. If one carrier is unavailable, then the second carrier can provide duplicate connectivity and services or at least emergency services. Physical redundancy, called "diversity routing," is considered an industry standard by many telecommunications professionals.⁵¹ SONET links can carry ATM traffic as well as all other protocols, such as Frame Relay, T-1 circuits, and T-3 multiplexed services.⁵²

Today, the building owner is faced with a tremendous number of choices in the types of wiring and services she will use to maximize efficiency. The three basic media of communications, copper, coaxial cable and fiber optics, support a wide array of services that can improve their data transmission capacity. More options include wireless technology via cellular phone antennas and Low Earth Orbiting satellites. These also pose new opportunities and challenges in communications design.⁵³ Clearly, design of communications systems to maximize a building's value is a daunting prospect. It is no wonder that many real estate professionals are turning to engineers and other professionals to navigate through the sea of choices available.

The "Smart Office" and the "Last Mile" Contractor

In evaluating the tremendous number of choices of technology for commercial building, three things become abundantly clear. The first idea relates to what is called the "smart office." During the energy crisis in the 1970's, "smart office" implied a building with computerized energy management systems. Today, the "smart office" implies, to many professionals interviewed in the market, a building with flexible information technology that is scalable for future growth.⁵⁴ Thus, the definition of "smart office" is a subject of debate because the technology is complex and varied. The discussion above is but a fleeting glance at a vast and evolving sub-sector of office buildings.

Secondly, there is tremendous opportunity for both increasing a building's bandwidth and for generating cost savings. Savings can be achieved through a combination of increased speed and efficiency. Improved telecommunications service provider contracts and/or the ownership of

⁵⁰ William A. Morgan, W and J Partnership. Telephone interview by Geoffrey Morgan, 18 July 2000. For additional discussion of specialized digital network services, please see Appendix A.

⁵¹ William A Morgan, W and J Partnership, a consulting firm that pioneered this type of design, including for Northwestern Mutual Life; Telephone interview by Geoffrey Morgan, 18 July 2000. James Gusso, Victor LasSalla, owners of LaSalla & Associates L.L.P and James & Leonard, P.C. Engineering Consultants, Interviewed by Geoffrey Morgan, 5 June 2000.

⁵² Dodd, 161.

⁵³ For a more detailed discussion of emerging technologies, please see Appendix A.

⁵⁴ Interview, Meg Walsh. Interview, Richard Kennedy, Managing Director, Cushman Wakefield, New York City, 6 June 2000.

information technology hardware can also lower costs. The litany of choices shows that there is not a "one size fits all" solution. Each business must individually maximize its use of information technology. Most developers simply do not have the expertise to evaluate which information technology design will be best for their buildings. This need has led to the emergence of the "last mile" contractor. The "last mile" includes a building's entire information technology infrastructure, starting from the main telephone switch and ending with the phones and computers in each tenant's space.⁵⁵ Last mile contractors, such as Allied Riser and Cypress Communications, use their relationships with equipment vendors and telephone companies to maximize the efficiency and profitability of a building's information technology infrastructure, billing tenants for the use of their equipment and services and passing on part of the revenues to the landlord. "Last mile" contractors are one way for building owners to take advantage of faster, more efficient information technology.⁵⁶

Finally, technology is changing rapidly in ways that are difficult to predict. Hence, it is not surprising that over 900 million square feet, said to represent up to 20% of commercial office space, is being recabled, and that large commercial real estate owners are pairing up with "last mile" contractors to develop strategies to address the use of this emerging technology.⁵⁷

Summary

The advent of the Internet and telecommunications deregulation has spawned the creation of new industries and the transformation of old ones. This section has traced these two developments through a discussion of switches and points of presence in voice and data networks to illustrate the origins of the telecom hotel. The discussion then continued by showing how the vast number of choices in communication media and services have resulted in the notion of the "smart office" and the creation of technology partnerships between "last mile" contractors and real estate development companies across the U.S. This section's purpose was not to provide a detailed discussion of technology, but instead, to show how information technology growth has been a catalyst of change causing "New Economy" e-commerce commercial tenants' explosive growth, and changing the way "Old Economy" commercial tenants do business.

⁵⁵ It should be noted that to telephone, long distance, and cable and data communications industry personnel, the "last mile" refers strictly to the service that connects a building's minimum point of entry (i.e., "demarc") to the Central office or equivalent and does not include infrastructure or services that are inside a building or campus real estate.

⁵⁶ "Allied Riser Communications (ARC) Signs Agreement to Serve Customers of Tishman Speyer Properties; Agreement Expands ARC's Global Presence; Further Enhances ARC's Internet Leadership in New York City" PR Newswire Association, Inc. 13 December, 1999.

⁵⁷ "Real Estate & the Internet: Opportunity and Threat" a special report by Cohen & Steers Capital Management, Inc., November 1999, 9. "Allied Riser Communications (ARC) Signs Agreement to Serve Customers of Tishman Speyer Properties; Agreement Expands ARC's Global Presence; Further Enhances ARC's Internet Leadership in New York City" PR Newswire Association, Inc. 13 December, 1999.

Chapter Three - Development Issues

Chapter Two illustrated how the Internet and telecommunications deregulation have helped to create a new and rapidly growing industry and new commercial tenants. New commercial real estate products have been conceived. This has transformed the way traditional commercial real estate uses information technology. The Internet and deregulation have also encouraged the forging of partnerships between commercial real estate professionals and "last mile" information technology contractors. This chapter explores the differences in development practices by real estate professionals attempting to serve either the Internet-based or FIRE-based commercial firms. This study is not meant to be a treatise that seeks a right and a wrong way to develop property for each commercial segment. Instead, like the last chapter, this exploration seeks to discover some evidence of differences between practices based on a review of current literature and interviews with real estate professionals in order to give clues about the difference in strategic outlooks between Internet and Fire tenants.

This chapter's structure closely follows the real estate development process: feasibility, site selection, design and operations. For example, real estate professionals might start by assessing the feasibility of a development serving the Internet companies. They would consider how these tenants' risk profiles and development time frames differ from more traditional tenants. The discussion then moves to the next step in the process, taking a look at how some real estate development professionals view the differences in site selection criteria for traditional FIRE office tenants, smart office tenants, and telecom hotels. These three tenants are then contrasted based on their differing design needs. The discussion then turns to how the operational priorities of these three tenants differ. This chapter will conclude with a summary table listing the observed differences between FIRE and Internet Tenants based on this review. This standard format will then be used as a basis of comparison of development solutions for each case study in the thesis. The basic layout of this chapter is seen in the Table 2.

Table 2: Comparison of Development Characteristics of Three Commercial Tenants

	FIRE Tenants	Internet Tenant	Telecom Hotel
Feasibility Development Timing Business Risk			
Site Selection Criteria Type of Workforce Access to High Speed Fiber Access to Power			
Design Aesthetic of Floor Plate Flexibility of architecture to reconfigure Information Technology Design Structural requirements Amenities			
Operations Use of Technology Power/IT Outages Technology Provider Business Relationship			

Feasibility

The first issue facing the landlord/developer of commercial property is project feasibility. Feasibility varies based on the timeframe the developer has to complete a project and the perceived credit risk of the tenant. FIRE and Internet-based commercial tenants are perceived by industry as having fundamental differences in development timing and business risk.

Risk

The traditional FIRE tenant is, generally, a somewhat stable tenant, especially when compared to an Internet Tenant. First of all, most FIRE businesses, especially banking, have been established industries for hundreds, or even thousands, of years. The Insurance Industry, for example, is over three hundred years old.⁵⁸ On the other hand, developers must assess the risks of e-businesses in an industry that was born, for all practical purposes, after the development of the World Wide Web, less than five years Ago.⁵⁹ Furthermore, landlords cannot be encouraged when

⁵⁸ Lloyds of London, "What is Lloyds, Heritage: A brief History of Lloyds, updated July, 2000" <http://www.lloydsolondon.co.uk/entrypoints/her_index_gi.htm>, July 18, 2000.

⁵⁹ Newton, 11.

persons such as Gartner Group CEO Michael Fleisher predict that 95 to 98 percent of all dot com companies will fail within the next 2 years.⁶⁰

Despite these risks, however, real estate professionals are beginning to recognize that even the risky business-to-consumer startups are often backed by large sums of venture capital. Developers have begun to realize that part of this funding could be used to pay a risk premium to the landlord in order to secure space in Silicon Valley, Cambridge and other highly supply constrained markets. Developers have compensated for Internet companies' business risk in a number of ways, including the request for stock options and advanced rental payments (sometimes up to five years of total rent).⁶¹

Speed of Delivery

Another consideration for the feasibility of space is the length of time tenants are willing to wait for space delivery. The faster and more unpredictable the growth, the shorter the time tenants will be able to wait for space. Many real estate industry leaders met in an Urban Land Institute meeting to discuss the role the Internet plays in commercial Real Estate. These members agreed that FIRE and Internet tenants have far different expectations about the speed of delivery of space. Where a traditional office development may take up to five years to complete, some Internet companies are looking for product delivery in six months or less.⁶² This is a fundamental difference in the two kinds of tenants. For Internet companies in a growth phase, time is of the essence. Their projected long-term needs might be six months, a time period that many slow-moving developers would view as short-term. This mismatched view between high-tech tenants and developers could make it difficult for high-tech tenants to keep up with their industries.⁶³ In the "Tech Trends" May 2000 issue of *Urban Land*, one real estate professional contrasted his view of the differences between real estate professionals and high technology companies in this way:

Real estate thinks in the long term because of the development process, which typically lasts several years or more from conception to completion, and which often envisions several decades in terms of ownership and investment. That is the opposite of high-tech's view of the world.⁶⁴

Telecom hotels are an extreme example of the Internet tenant's demand for speedy delivery of space, because of their unprecedented growth. Developers, such as Cabot Cabot & Forbes and Cathartes Investments, are anticipating telecom hotel demand through speculative developing, betting on high returns from telecom hotel tenants who would like to be up and running in new space immediately or within a few months. Layer Two companies, also known as applications service providers or content providers, such as Level 3 Communications, are much more concerned about meeting demand immediately or within a matter of months than they are in the

⁶⁰ Forrester Research, "Stormy Seas Ahead for Struggling Dotcoms." *Forrester Research*. 13 April 2000, <<http://www.forrester.com/ER/Press/Release/0,1769,270,FF.html>>, 27 July 2000.

⁶¹ Jack Deary, Development Manager for 400 Technology Square, Beacon Capital Partners, Interview by Geoffrey Morgan, Cambridge, MA July 10, 2000

⁶² Charles Lockwood, "Muddy Waters" *Urban Land*, May, 2000, 92.

⁶³ Lockwood, 94.

⁶⁴ Charles Lockwood, "Muddy Waters: How can real estate and technology interface?" *Urban Land*, May, 2000. 94.

amount of the rent.⁶⁵ The market, it seems, has adjusted to add value to properties able to meet this growing demand for telecom hotels. One investor interviewed cited a decrepit commercial space, which was originally selling in the Boston MSA at \$10 per square foot that now commands \$40 per square foot because of the property's new use as a telecom hotel space.⁶⁶ In order to achieve this speed, owners usually have to pay a premium to accelerate a project's completion because of the added costs of expediting materials, overtime hours and other costs. This cost potential affects the feasibility of any project. So far, many developers have been well rewarded for their speed of development delivery.

Site Selection

Selection of a site varies based on the property type. Real estate economists often argue that office selection, in its simplest form, is based on the wages, commuting costs and availability of trained workforce.⁶⁷ These criteria lead to a more specific demand analysis of a market, which would include such factors as absorption rate, comparable property rents, the existing regulatory/zoning environment, potential tenants, the site's "sense of place", proximity to highways/traffic service levels, and environmental conditions.⁶⁸ From a review of the literature and in interviews, it appears that Internet companies differ in their site preferences from FIRE tenants in their workforce needs, and in their need for fiber optics and power.

Workforce

Internet Tenants are especially sensitive to the workforce supply of an area. For example, according to the Urban Land Institute, over 700 high technology firms are located around the Boston area because of the area's proximity to a highly skilled pool of potential employees from MIT, Harvard and other schools. Palo Alto and San Francisco are also magnets of high tech industry for the same reason. This becomes especially critical to start up firms trying to attract the best entrepreneurial talent.⁶⁹ FIRE businesses, on the other hand, can recruit from a larger cross section of schools within many local markets, such as Milwaukee, Wisconsin, the home of Northwestern Mutual, or San Antonio, Texas, the home of USAA Insurance.

Access to Fiber and Power

In addition other traditional site selection/market criteria, Internet businesses are extremely concerned with very stable access to high speed, high bandwidth voice and data communications. FIRE tenants and Internet tenants both need constant, uninterrupted telephone service. After all, telecommunications is an important factor of production. For an insurance company, a break in communications is costly, resulting in delayed service or missed sales.

⁶⁵ Paul Query, Senior Vice President, Cabot, Cabot & Forbes of New England, Inc., Interview by Geoffrey Morgan, Boston, MA, 6 June, 2000.

⁶⁶ Young Park, Berkeley Investments, Interview by Geoffrey Morgan, Boston, MA, 8 June 2000.

⁶⁷ Denise DiPasquale, William C. Wheaton, Urban Economics and Real Estate Markets (Englewood Cliffs, NJ: Prentice Hall, 1996). 40.

⁶⁸ Richard B. Peiser, Dean Schwanke, Professional Real Estate Development (United States: Urban Land Institute, 1992.) 272.

⁶⁹ William J. Roache, "Corporate Appeal," Urban Land, May 2000, 46.

Richard Kennedy, a managing director of commercial real estate in New York City said that many traditional office tenants are beginning to expect high-speed access. However, this service is still considered an amenity by many traditional FIRE tenants.⁷⁰

Internet based businesses, such as Oracle, see access to fiber optics as a critical site selection criterion. Oracle, for example, downloads its development teams' programming work in Massachusetts to a headquarters facility in California, where modules are connected. Furthermore, the staff count has been radically reduced in each office based on managers' ability to access financial data and human resources material online. Oracle has tried to make itself a model for other offices by showing how its database software allows the company to flatten the organizational structure. In essence, the Internet is its business, and access to high-speed fiber is a critical component of that model.⁷¹ Logically, it is difficult to imagine an applications service provider such as Oracle functioning without the ability to easily manage their Internet-based product and without high-speed access to the web. For e-commerce businesses, transactions would cease without the Internet.

In his book *e-topia*, William Mitchell discusses how cities may grow around optical fiber routes, information nodes, in the same way towns have traditionally formed around transportation hubs at railheads and along highways.⁷² Because of the high cost (commonly \$50 per linear foot) of trenching and laying fiber, it is critical that a building be near (typically within half a mile) a fiber backbone. Typically, developers may not have to pay the cost of running fiber to the building. For example, AT&T and local carriers may run a market feasibility study or "business case" to determine if potential revenues justify the cost of running fiber to a building.⁷³ This implies, however, that if the building location and voice/data/video traffic do not justify the cost of installation by phone companies, the developer may have to pay all or a portion of the installation costs for a particular site.

Proximity to high-speed fiber optic networks is only one of the selection criteria that are changing commercial office and telecom hotel development. Power requirements are also increasing. In many facilities the power requirements for a typical cubicle have doubled over the past three years.⁷⁴ Telecom hotels require up to eight times the power of a standard office building.⁷⁵ This is why developers often choose old industrial sites with existing power. Inadequate existing power may necessitate the construction of a new substation with all its

⁷⁰ Richard Kennedy, Managing director, Cushman Wakefield, New York City, Telephone Interview by Geoffrey Morgan, 22 June 2000.

⁷¹ Jose Sanchez, Financial Analyst and Joe Meeks, Product Manager, Oracle, Interview by Geoffrey Morgan, Nashua, N.H. 6 July 2000.

⁷² William J. Mitchell, *e-topia* (Cambridge, MA: MIT Press, 2000), 24.

⁷³ James Gusso, Victor LaSalla, owners of LaSalla & Associates L.L.P and James & Leonard, P.C. Engineering Consultants, Interviewed by Geoffrey Morgan, 5 June 2000.

⁷⁴ William A. Morgan, W and J Partnership, Telecommunications Consultants and Designers, Telephone Interview by Geoffrey Morgan, 18 July 2000.

⁷⁵ James Gusso, Victor LasSalla, owners of LaSalla & Associates L.L.P and James & Leonard, P.C. Engineering Consultants, Interviewed by Geoffrey Morgan, 5 June 2000.

attendant costs and permitting/PUC approval delays. Adequate power supply is a critical component in the success of telecom hotel development.⁷⁶

Site selection for telecom hotels is further complicated by the lack of human tenants. The developer must decide if the cost savings of land outside an MSA outweighs additional costs for providing power and fiber access.⁷⁷

Design

Office design also differs between FIRE and Internet tenants. This section shows examples of how developers have adapted floor configurations, amenities and even construction specifications to meet the needs of new economy tenants.

Floor Plate Aesthetics and Flexibility

DGEW has completed a series of essays on the evolution of traditional office space. In their book, *Design for Change*, they include a series of architectural studies which compare the nature of change (low to high) with the nature of work (routine to non routine) to rate the types of businesses and to compare the work and rates of change for new and old firms, as shown below.⁷⁸

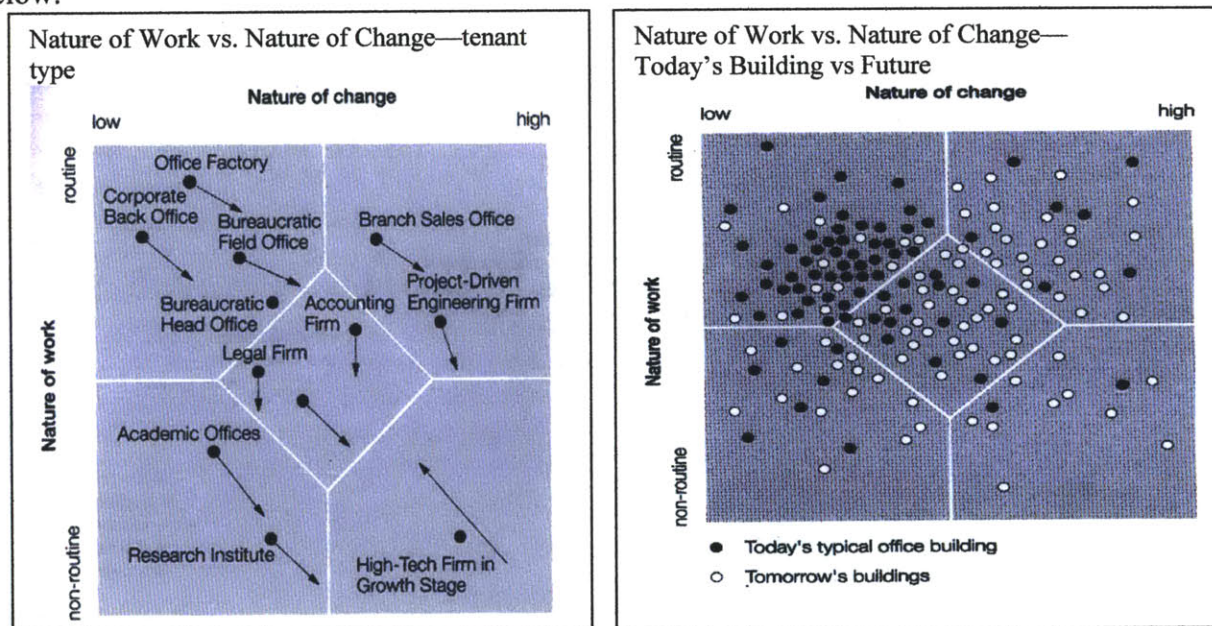


Figure 3: Comparison of Work and Change by Type of Firm and by Present vs. Future

⁷⁶ Paul Query, Senior Vice President of Cabot, Cabot & Forbes of New England, Inc., Interview by Geoffrey Morgan, 6 June 2000.

⁷⁷ Jay Doherty, President, Cabot, Cabot & Forbes of New England, Inc., Interview by Geoffrey Morgan, 9 June 2000.

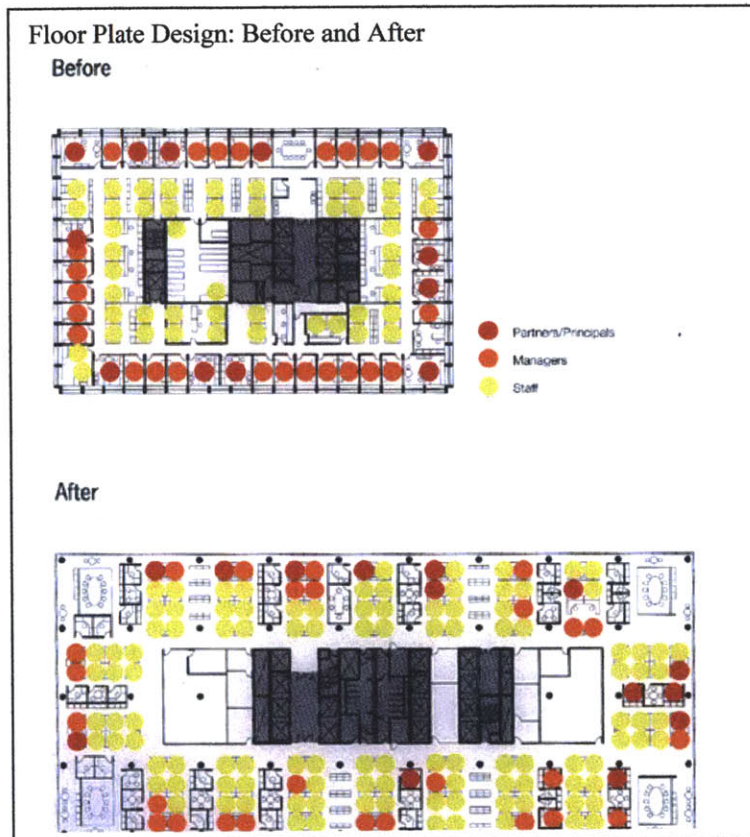
⁷⁸ Francis Duffy, *Design for Change: The Architecture of the DGEW* (Berlin: Birkhauser Verlag, 1998) 21.

In this report, given by Francis Duffy, Principal of DGEW to the Royal Institute of British architects, Duffy shows how high technology firms in the growth stage do work which is non-routine and is in a constant state of change, as opposed to accounting firms which tend to have much more routine, much less changing work patterns. Duffy then goes on to show how tomorrow's offices will have much less routine work in an environment of great change. The implications of this model are clear: Offices of the future will have to be more flexible, and "high technology" firms will need the most adaptive offices of all.

DGEW tends to focus its efforts on large corporate firms and government entities. Figure 4 on the next page shows a redesign of Andersen Consulting's floor plates in its Brussels office.⁷⁹

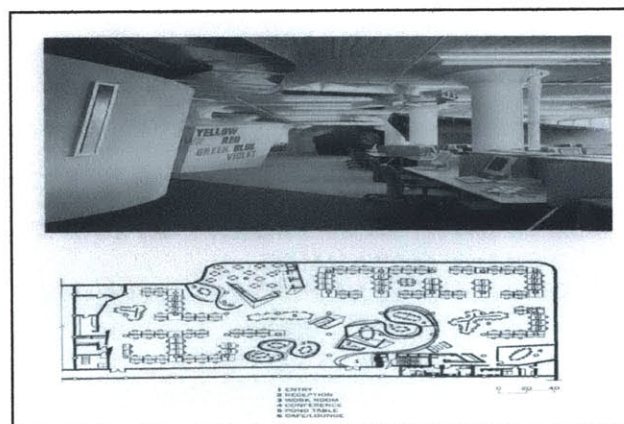
Figure 4: Andersen Headquarters Floor Plate Design, Before and After

This is a renovation done for an existing organization. Notice that the space allocated to common areas and views has increased while the number of window offices has decreased in the new model. Still, the design is a standard office floor plate, approximately 120 feet wide, including the elevator core, with approximately a 40 to 50 foot maximum distance from a work area to a window. This is still the highly efficient, classic office layout.



Compare Arthur Anderson's Headquarters to the New York offices of Media Madness, an Internet media content provider.⁸⁰

Figure 5: Media Madness Floor Plate & Design



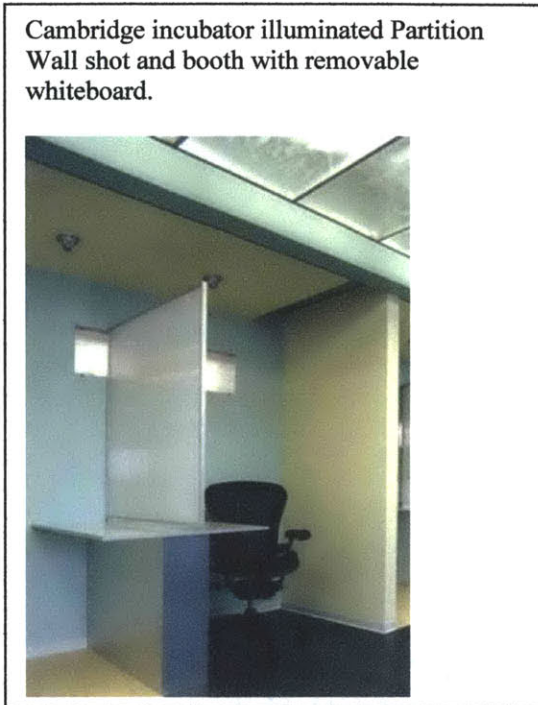
⁷⁹ Duffy, 89.

⁸⁰ Edie Cohen, "Media madness," *Interior Design*, (Volume 71, Issue 3), March 2000, 166-173.

This layout, although a less "efficient" shape, has a great deal of visual excitement. There is no clear hierarchy in the design.

Cambridge Incubator carries this concept further. All of the partitions are easily moved to accommodate additional tenants or the additional space requirements of existing tenants who are expanding. The incubator has small workstations along the walls. Each partition has a removable divider, which allows the creation of an impromptu workspace, as shown here.⁸¹

Figure 6: Cambridge Incubator Flexible Partitioning with a Removable Whiteboard



Amenities

Walls are not the only part of office design that is changing. There is a trend toward "live-work" architecture in which homes are more like offices. William Mitchell talks about this blending of uses when he describes a Palo Alto incubator where employees sleep upstairs above the office on a series of futons scattered near a kitchen area.⁸² Some office developers are carrying this idea further, adding unusual amenities to make the workspace more like the places people live. They feature amenities such as pool tables, rock climbing walls, basketball rinks and video arcades.⁸³ Clearly, these models of working and living go well beyond traditional office space. These designs attempt to address the fading of the dividing line between work and recreation. They also appear to serve as a tangible reminder of the need to break through any boundaries placed upon creativity in the work place. Internet employees spend more time at work. These companies are eager to encourage not just hard work but also "thinking outside of the box" to stay creative. They want to break through any barriers to creativity that may stand in the way of innovation.

⁸¹ Cambridge Incubator, "About Us: Our Space," Cambridge Incubator, 10 June 2000.

<<http://www.cambridgeincubator.com/about/space.htm>> (10 June 2000).

⁸² William J. Mitchell, "e-Topia", Opening Address to MIT Center for Real Estate Conference, University Park Hotel, Cambridge MA, 11 May, 2000.

⁸³ James Goldenberg, Principle of Cathartes Investments, Interview by Geoffrey Morgan, Boston, MA, 7 June 2000.

Other Design Concerns

There are also design issues for both "smart office" buildings and telecom hotels. Many new developments, such as those owned by Tischman-Speyer in New York City, are being wired with fiber optics all the way to the floor, with T-3 backbones and T-1 service from the risers.⁸⁴ Some consultants see this as the most desirable communications wiring. There is no consensus on design, just as there is no consensus on the type of horizontal wire distribution (raised floors versus triple pan, or solid floors with conduit tray versus ceiling fiber distribution via trays or hangars.) System requirements vary based on the location, building type and tenancy.

Telecom Hotels, on the other hand, are fairly standard in their requirements, but not flexible in design. The ideal telecom hotel requires between 120 to 200 watts per square foot (approximately 8 to 10 times the standard office requirement), 150 PSF floor loading capacity (over two times the standard loading requirements), 14-foot high ceilings and access to multiple long distance and local telephone providers. The ideal telecom hotel is very secure, perhaps with no windows, with high levels of physical security (card entry systems, individually locked server cabinets, etc.), and Halon fire suppression systems.⁸⁵

Some development professional believe that growth in demand for telecommunications hotels will be from 76% to 120% per year for the next three years.⁸⁶ This demand is being driven by a seemingly unquenchable demand for increased bandwidth. Clearly meeting the demand for Telecom Hotels could prove very lucrative. However, there is a risk. If the market becomes overbuilt, the strict requirements for these single use developments would make converting them to other property prototypes difficult.

The rapid growth of the Internet has created new design requirements for Internet office space. These include added flexibility, amenities, and, in the case of telecom hotels, added structural capacity. Implementing these requirements will facilitate the changes in work styles from the structured work styles and architecture of the FIRE office segment.

Operations

One of the tests of the viability of a building over time is the relative ease or difficulty with which its tenants' operate in and around the structure after it is complete. Internet and FIRE tenants differ in their views of building operations. Also, traditional FIRE and high-tech tenants use information technology differently. One part of this demand is tested by the temporary removal of a tenant because of outages. Furthermore, the role of the technology contractors differs widely between FIRE and Internet commercial tenants.

⁸⁴ Meg Walsh, Telephone Interview by Geoffrey Morgan, 6 June, 2000.

⁸⁵ Scott Haughland, President, Teleplace-Americas. Telephone Interview conducted by Benjamin Pettigrew, 20 July 2000.

⁸⁶ Jay Doherty, President of Cabot, Cabot & Forbes of New England, Inc. Interview by Geoffrey Morgan, Boston, MA, 9 June 2000. Young Park, Principle, Berkeley Investments, Interviews by Geoffrey Morgan, Boston, MA, 8 June 2000.

Information Technology's Role

FIRE tenants and Internet tenants also differ in their view of Technology. For example, for Internet companies or telecom hotels, high-speed fiber optic connections and system integrity are essential to their businesses. For companies such as Level 3 Communications or Cypress, speed of Internet transmission, bandwidth, and reliability are critical components of the Internet companies' core business. Companies such as Akamai Technologies, an Internet content provider, sell system reliability and speed as their primary service on the Web. For example, Akamai was responsible for broadcasting the British Open golf tournament online. If the technology to perform streaming media coverage failed, Akamai's service would be stopped.⁸⁷

Commercial tenants will set a higher operational priority on the reliability of Information technology if they view the technology as the core product of their business rather than a tool that increases their operation's efficiency. Unlike Internet tenants, FIRE tenants seem to view technology as an amenity that adds efficiency rather than as a pivotal factor that will transform the nature of their business.

There is reason to think that the management of FIRE businesses might see the Internet as a core part of or threat to their business, given the ongoing dialog in the business community about how the Internet will disintermediate services. Trends such as "decimalization,"⁸⁸ say many telecommunications experts, will reduce bid-ask spreads, and web sites, such as E*Trade and HealthAxis.com will begin to disintermediate insurance and financial professionals.⁸⁹ Given these trends, one might think that FIRE employees would begin to flee, as they perceived the nature of their jobs or their industries change. Many traditional brokerage houses, such as Merrill Lynch, have had to assuage nervous floor traders after the companies announce the opening of their respective online trading Web sites. With the advent of online trading, the very existence of a physical, rather than a virtual, New York Stock Exchange is questioned.⁹⁰

For now, however, this highly advertised upheaval does not seem to have affected employment trends in the FIRE segment in general. As a whole, the FIRE segment continues a predictable growth trend. The Bureau of Labor Statistics has shown a moderate increase in employment of approximately 2% per year for several years through 1999 with steadily decreasing unemployment rates.⁹¹ It does not appear, for now, that the FIRE segment as a whole has experienced any significant disintermediation. However, it is uncertain that this will be the case in the future. Nevertheless, for FIRE tenants, technology continues to be treated as an amenity

⁸⁷ Akamai, "Akamai becomes exclusive video streaming provider for the official web site of the British Open." 20 July 2000. <<http://www.Akamai.com>> (27 July, 2000).

⁸⁸ The term "decimalization" refers to the stock market's transition from a pricing stocks based on fractions (i.e. "1/8" or "1/16" of a dollar) to decimals, rounded to the nearest penny. Many Wall Street traders are resisting this move to decimal pricing because fractions guaranteed a certain minimum bid-asked spread by which the floor trader could collect her fee.

⁸⁹ Meg Walsh, Telephone Interview by Geoffrey Morgan, 6 June, 2000; Richard Kennedy, Telephone Interview by Geoffrey Morgan, 22 June 2000.

⁹⁰ Greg Ip, Randall Smith. "Tense Exchange: Big Board's Members Face Off on the Issue of Automated Trading: Large Firms Demand It, But Floor Brokers Fear for their Livelihoods," The Wall Street Journal, 15 November 1999, A1.

⁹¹ U.S. Department of Labor, "Industry at a Glance; Finance, Insurance and real estate" Bureau of Labor Statistics, 26 May, 2000. <[wysiwyg://34/http://stats.bls.gov/ing/ing.fire.htm](http://stats.bls.gov/ing/ing.fire.htm)> (16 June 2000).

that adds efficiency rather than as a factor that will change the very nature of their business and employment.

FIRE tenants have rewarded the developers of bandwidth-rich commercial office space with rental premiums; nonetheless, tenants seem to see this feature as a useful amenity, rather than a necessity, for now. Currently, the premium for office space with up-to-date information infrastructure is approximately two to four dollars per square foot, according to Richard Kennedy, a Managing director of commercial real estate in New York City. However, Kennedy sees this premium dropping over the next three years, as this infrastructure becomes standard.⁹² Devin Murphy of Morgan Stanley Realty, Inc. concludes that, "In two years, giving a tenant access to broadband communications will no longer be a plus, it will be a minus if you don't have it."⁹³

New Economy firms, with higher demands for flexibility and Internet connectivity, are also willing to pay the higher rates per square foot. These firms are paying because connectivity is seen as a necessity, not as a luxury. However, in the interviews conducted with Oracle, all respondents in the organization cited broadband access as critical for Internet businesses. Logically, Amazon.com, e Toys and other e commerce businesses cease to function when the Internet fails because the Internet is the source of their billing and interaction with the customer. By definition, these businesses do not have a physical storefront, so they cease to function when the virtual storefront evaporates. Only the FIRE tenants (not Internet tenants) were waiting to implement high-speed service.⁹⁴

Technology Providers

Many developers have decided to forge partnerships with "last mile" contractors to help them sort through the technological issues of telecommunications. Together they hope to create systems that are flexible, profitable and reliable. In a real sense, these partnerships are an honest admission that developers are not information technology experts and that they do not necessarily understand the intricacies of information systems design as well as their potential partners.

⁹² Richard Kenneday, Telephone interview conducted by Geoffrey Morgan, 22 June 2000.

⁹³ Charles Lockwood, "Muddy Waters" Urban Land, May, 2000, 92.

⁹⁴ Richard Kennedy, Telephone interview conducted by Geoffrey Morgan, 22 June 2000.

Jim Young, Vice President of Asset Management, discussed how New Boston Fund approaches the business risk associated with partnerships with the "last mile" contractor in some of their commercial contracts. Several issues have emerged which confront developers in negotiations with a "last mile" contractor. These issues include:⁹⁵

- Reputation and size of the contractor
- Financial strength of the last mile contractor
- Service offerings, such as long distance/local service, internet access and flexibility, the ability to carry video or voice "over IP" (over the data lines), web hosting, video conferencing, remote access and customer service
- Ownership of the switch, conduit and fiber. (Increased ownership on the part of the "last mile" contractor might mean switching costs if the owner severs the relationship, and developer owned equipment may not be adaptable to future technology changes and servicing)
- Service support and response times
- The level of service (T-1, etc) and other technology to be installed
- Information carrying capacity of newly installed technology
- Flexibility of technology for future growth
- System redundancy and other safeguards against outages
- Access to competitive carriers
- The provision of revenue sharing and of "warrants" or partial ownership of "last mile" contractor to the developer.

The New York City developer is enjoying, according to *Crain's New York Business*, 5% of the revenues earned by the "last mile" contractor in their buildings. Some developers have also received warrants, which amount to equity ownership in the contractor. Many real estate professionals recommend that the developer should own the conduit and switch to ensure that the "last mile" contractor remains competitive.⁹⁶ There is no consensus on the exact terms of ownership.⁹⁷

⁹⁵ Correspondence from Jim Young, Vice President of Asset Management, New Boston Fund, Inc., Interview by Geoffrey Morgan, Boston, MA, 19 June 2000.

⁹⁶ James Gusso, Victor LaSalla, owners of LaSalla & Associates L.L.P and James & Leonard, P.C. Engineering Consultants, Interviewed by Geoffrey Morgan, 5 June 2000.

⁹⁷ "Telecoms get in on, and wire, the ground floor, Start-ups offer a cut of sales to landlords, beat out big players" *Crain's New York Business* January 17, 2000.

Summary

Table 3 below summarizes some of the findings of this chapter.

Table 3: Summary of Current Development Practices

	FIRE Tenants	Internet Tenant	Telecom Hotel
Feasibility Development Timing Business Risk	Moderate Low/Med.	Fast High	Fast High
Site Selection Criteria Type of Workforce Access to High Speed Fiber Access to High Volume of Power	Moderate Important Important	High Necessity Important	Low Necessity Critical
Design Aesthetic of Floor Plate Flexibility of architecture to reconfigure Information Technology Design Structural requirements Amenities	Uniform Moderate Med- Vol. Average Average	Non Uniform High High Vol. Average Live/Work	Uniform Low High Vol. High Low
Operations Use of Technology Power/IT Outages Technology Provider Business Relationship	Add Effic. Important "Last Mile"	Core Bus. Hi impact "Last Mile"	Core Bus. Hi Impact Tenant/LL

Thus, based on evidence of current business practices, the authors would predict that Internet businesses and telecom hotels are riskier and demand faster development, which means the developer should compensate with some sort of risk premium for executing these developments. Work force is a more critical site selection criterion to Internet companies than it is to traditional FIRE businesses or telecom hotels. Proximity to high speed Internet access or to fiber optic runs is critical to Internet businesses and telecom hotels, but less so to FIRE tenants. Power requirements are most important to telecom hotels in selecting a site. Our observations show that Internet companies may want a more free-flowing and flexible architecture with special amenities to support a "live-work" lifestyle than FIRE tenants or telecom hotels. Telecom hotels and Internet companies might be more concerned about information technology design than FIRE tenants, and telecom hotels would be more concerned about added structural capacity than either of the other tenants. Operationally, our observations of current practices would lead us to believe that technology is viewed more as an amenity by FIRE tenants and more as a core part of the business by Internet companies and telecom hotels. Finally, FIRE and Commercial tenants might use the Last mile contractor to support their information technology where a telecom Hotel would build out information technology infrastructure "in-house."

This chapter has reviewed how some developers and tenants have adapted the development process to take advantage of the growth of the Internet to meet the needs of both FIRE and Internet-based firms. Keep in mind that these results are not meant to be a formal treatise on "proper" development practices for FIRE, Internet and telecom hotel tenants. This chapter's purpose is to show that the real estate industry is responding differently to the changes resulting from the proliferation of commercial technology for FIRE than for Internet-based commercial tenants by adapting the development process. This chapter gives examples of some of the development practices that might be expected from an in-depth comparison of the three case studies in this thesis.

Chapter Four – Theories and Frameworks

Chapter 2 demonstrated how the proliferation of new information technologies has led to the rise of new businesses and how real estate products have been developed to respond to increasing demand for bandwidth and computing capacity. Chapter 3 illustrated that the real-estate development response to the rise of information technology has been fundamentally different for tenants in financial, insurance and real estate (FIRE) businesses than for tenants in Internet-based "high-tech" businesses. This chapter discusses various competitive management theories and their corresponding frameworks that could be used to understand the mentality and business of commercial tenants in the FIRE and Internet-related industries.

Concurrence is frequent among management theories because of academics' tendency to build upon the works of others.⁹⁸ Despite any commonalities, each theory discussed here is distinctly different for two reasons: 1). Each theory views the importance and use of technology differently, and 2). each theory places a different emphasis on either the past and present or the future. These differences comprise the primary selection criteria for selecting frameworks suitable for each type of tenant and their real estate needs.

Literature Review: Michael Porter

This endeavor to select frameworks appropriate for both FIRE and Internet-related firms begins naturally by examining the theory of one of the world's foremost experts in competitive strategy—Michael Porter. In 1980, the Harvard Business School professor published *Competitive Strategy: Techniques for Analyzing Industries and Competitors*, a volume that outlined a theory of strategy focused on the competitive environment in which companies exist.⁹⁹ This work and his subsequent work, *Competitive Advantage: Creating and Sustaining Superior Performance*, have since become standard textbooks for corporations and business schools alike and the foundation of numerous other competition-focused strategy theories.¹⁰⁰

In order to gauge their appropriateness for both traditional and non-traditional tenants, Michael Porter's theory and frameworks must be examined to determine how they view and treat technology. In general, Michael Porter views technology very practically—primarily as a "supporting" activity of a firm's value chain that augments a firm's ability to produce, market and distribute its core product.¹⁰¹ To illustrate this view, Porter describes how the advent of

⁹⁸ Not only is this tendency of academics implicit in the way that various theories address or, perhaps more importantly, do not address certain areas of importance but also in their explicit remarks expressing their indebtedness to other academics who pioneered critical thought and theory. See Hamel and Prahalad, xix.

⁹⁹ Michael E. Porter, *Competitive Strategy: Techniques for Analyzing Industries and Competitors* (New York, NY, The Free Press, 1998).

¹⁰⁰ Dennis W. Organ. "And the winners are..." *Business Horizons*, Mar/Apr, 2000, 2. This article is a survey of management theory experts that ranks Michael Porter as the sixth most influential person in 20th century management. Michael E. Porter, *Competitive Advantage: Creating and Sustaining Superior Performance* (New York: The Free Press, 1998), 37.

¹⁰¹ A value chain is framework in which one can break down a firm into a series of "discrete activities it performs in designing, procuring, marketing, and distributing its product." Porter, *Competitive Advantage*, 26, 169.

automated reservations systems and computer typesetting and printing technology have created particularly effective competitive advantages for American Airlines and *The Wall Street Journal* respectively.¹⁰² Thus, Porter's theory does not distinguish between technology as an input of a product and technology as the product itself.

Despite Porter's view of technology as an input or as a means of differentiation, Porter does acknowledge that technologies can redefine or even revolutionize industries. This is evident in the acquisitions of electronics firms made by the large diversified Gould and United Technologies.¹⁰³ He even discusses many of the strategic issues involved when focusing on emerging industries.¹⁰⁴ His views on competitive strategy, however, provide a more balanced and reserved focus on the question of technological leadership or followership than those expressed by notable players in this Internet- and telecom-driven New Economy.¹⁰⁵ These distinctions will be critical in comparing Porter's views to other theories that tend to highlight the importance of technological leadership.

Another critical point concerning Porter's theory is his emphasis on existing industry structure and markets. This bias is reflected in the language he uses when he explains that to be a competitive advantage technology must significantly affect "relative cost position or differentiation."¹⁰⁶ Both of these characteristics are dependent on existing competitors with products with which other firms can compete in pricing and features. In a Harvard Business Review article, Michael Porter explains his emphasis on existing as opposed to emerging industries when he states,

Developing a strategy in a newly emerging industry or in a business undergoing revolutionary technological change is a daunting proposition.¹⁰⁷

Porter then went on to downplay the significance of new technological developments, stating that he did not believe many industries would enter "a new era of competition" as a result of the proliferation of new information technologies.¹⁰⁸ Michael Porter is predisposed towards existing rather than emerging industries and his view of technology as an input. His theory of competitive strategy is more suitable to the mentality and nature of traditional firms rooted in the Old Economy rather than the technology-driven firms of the New Economy.

¹⁰² Michael E. Porter, *Competitive Advantage*, 166, 169, 528. Porter states on page 166 that "The basic tool for understanding the role of technology in competitive advantage is the value chain." He then defines technology in terms of an existing firm or industry structure. In effect, by defining technology in this way, Porter implies that technology is an input that is evaluated based on its impact to existing firm and industry structure, rather than a force which may create an entirely new industry.

¹⁰³ Porter, 172, 321.

¹⁰⁴ Porter, 229-231, 233.

¹⁰⁵ Porter, 177, 181. Howard Anderson, MIT Professor and Senior Managing Director of YankeeTek Incubator, interview conducted by Geoffrey Morgan and Benjamin Pettigrew, 17 July 2000.

¹⁰⁶ Porter, 169.

¹⁰⁷ Michael E. Porter, "What is Strategy?" Harvard Business Review, November-December, 1996.

¹⁰⁸ Michael E. Porter, "What is Strategy?" Harvard Business Review, November-December, 1996.

Literature Review: Larry Downes and Chunka Mui

Despite his status as one of the world's most respected authorities on competitive strategy, Porter has his share of critics. The emergence of the Internet and its disruptive power in the 1990s has convinced many academics and professionals alike of the need for a more advanced theory of competitive strategy.¹⁰⁹ In 1998, Larry Downes of Northwestern University and Chunka Mui of Diamond Technology partners co-authored the book *Unleashing of the Killer App: Digital Strategies for Market Dominance*. In this work, they discuss the effects of telecommunications deregulation, globalization, Moore's law (a law that has successfully predicted the doubling of computing capacity every 18 months), and digitalization (defined as the increase in and access of computing power). These forces, they argue, have changed technology into much more than a factor input or a problem-solving tool. "Technology," argue Downes and Mui, "isn't the solution any more, it's the problem."¹¹⁰ Technology has become a catalyst for the transformation of entire industries, and with this transformation comes opportunity for the "party of the future" and monumental challenges for the "party of the past."^{111 112}

Even the most successful companies are now learning how painfully "fleeting" their competitive advantages—those factors that give firms an edge over their competitors—really are. The Internet and telecom deregulation have magnified the pains of those companies whose competitive strategies are based in some of the more classic theories, which include Porter, that tend to place greater importance on subtle technological evolution than on technological breakthroughs.¹¹³ What Downes and Mui describe, however, is a force much more devastating than Porter could have foreseen in 1980 and 1982:

The digital age has spawned a variety of new technologies, many of them part of the exploding global network built on top of the open standards of the Internet. These new technologies, entering the market together and reaching critical mass in ever shorter cycles, are creating what venture capitalists refer to as "killer apps," applications that utterly decimate existing categories or create whole new ones.¹¹⁴

Downes and Mui continue to explain that most organizations have missed opportunities to exploit the Internet's power to develop a killer app. Now, they must defend their ground from aggressive startups armed with their own killer apps. Downes and Mui have attributed much of the failure of industry's incumbents to their conscious or subconscious subscription to outdated competitive strategies that view chief information officers as managers of cost centers and implementers of stable technologies that support the companies' existing business.¹¹⁵

¹⁰⁹ Larry Downes, Chunka Mui, "The End of Strategy" *Planning Review* (Volume 26, Issue 5), Nov/Dec 1998, 4.

¹¹⁰ Downes, Mui, 5.

¹¹¹ Ralph Waldo Emerson, quoted in Hamel, Prahalad, *Competing for the Future*, xi.

¹¹² First credited to Gordon Moore, Co-founder of Intel over 30 years ago

¹¹³ Porter, *Competitive Advantage*, 180-181.

¹¹⁴ Downes, Mui, 4.

¹¹⁵ Downes, Mui, 5

Literature Review: Clayton M. Christensen

Downes and Mui have not been the only academics to recognize the importance of developing a competitive strategy around “killer apps.” In 1997, Clayton Christensen (also of Harvard Business School) published his own theory of competitive strategy that describes what he calls “disruptive” and “sustaining” technologies. While sustaining technologies improve product performance within an existing industry, disruptive technologies are technologies that initially are neglected by market leaders because implementing these technologies “result in worse product performance.”¹¹⁶ Markets either do not exist or are significantly smaller than established markets when disruptive technologies are introduced. This leads to the new technology’s neglect by leading firms and its exploitation by smaller entrants.

Eventually, these disruptive technologies lead to the emergence of new or redefined markets that result in the *de facto* obsolescence of older technologies that once dominated their industries.¹¹⁷ As examples of disruptive technologies, Clayton Christensen cited the succession of 8-inch, 5.25-inch, and 3.5-inch disk drives. All of these technologies were inferior to their larger counterparts initially in price competitiveness, capacity, and performance.¹¹⁸ However, it was the reduced size of these new disk drives that eventually permitted the rise of Digital Equipment Corporation (DEC) and other minicomputer manufacturers, whose investment in the disruptive minicomputer significantly eroded the market demand for mainframe computers. It took years for mainframe-maker IBM to recover from its near-death experience, but when it did, IBM became a leader in the rapidly growing market for personal computers, another disruptive technology that permanently knocked the minicomputer and DEC from their pedestal.¹¹⁹ For these reasons, Christensen argues that companies that desire longevity must succeed in recognizing and exploiting disruptive forces. Otherwise, even the best-managed companies could join the ignominious ranks of IBM, DEC, Sears, Apple Computer, and Xerox.

Recognizing and capturing the disruptive power of a new technology, however, is easier said than done. It is with this end in mind that Christensen created a theory of competitive strategy that, unlike Michael Porter’s view of technology, focuses exclusively on technology leadership.¹²⁰ This theory calls for companies to give responsibility for potentially disruptive technologies to relatively small organizations that have the necessary power, resources, and ownership to remain focused on the discovery of seemingly inferior technologies.¹²¹ By watching for markets in which product performance supply exceeds performance demand and which show other signs of disruptive technologies, these organizations are able to adopt and apply those technologies quickly to gain first-mover advantages.¹²² By following this strategy theory, Christensen argues that even relatively large corporations can protect themselves from and exploit disruptive technologies.

¹¹⁶ Clayton M. Christensen, *The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail*, (New York, NY: HarperCollins Publishers, 2000), xv.

¹¹⁷ Clayton M. Christensen, *The Innovator's Dilemma*, (New York, NY: HarperCollins Publishers, 2000), 176.

¹¹⁸ Christensen, 24.

¹¹⁹ Christensen, 108-109.

¹²⁰ Christensen, 179-180, 182.

¹²¹ Christensen, 102-103, 120, 138.

¹²² Christensen, 169, 171. Porter, *Competitive Advantage*, 182, 189.

The issues of disruptive technologies are directly relevant to the tenants of the Internet's landlords. Of all technologies, disruptive technologies, by definition, are the most revolutionary and most deadly to a landlord's tenants. This is implicit in the upheaval witnessed in the economy today.¹²³ What Christensen's competitive strategy fails to address, however, are the *sustaining* technologies, which represent a majority of existing and new technologies. Landlords and developers should be especially watchful of disruptive technologies, but at the same time they must understand the sustaining technologies and forces that are acting upon their tenants. For these reasons, Christensen's theory can be effective in understanding technology-driven tenants. In the end, this theory is not sufficiently comprehensive for risk-averse landlords and developers need to remain competitive in the New Economy.

Literature Review: Philip Evans and Thomas S. Wurster

While Christensen's theory focuses on capturing the power of disruptive technologies, Philip Evans and Thomas S. Wurster of The Boston Consulting Group revisit Michael Porter's work to describe their theory of competitive strategy in the context of the "New Economics of Information Strategy." In *Blown to Bits*,¹²⁴ Evans and Wurster address how recent developments in information technology are altering the manifestation of competitive strategy and competitive advantage fundamentals. According to these two authors, the boundaries between the five forces that Porter describes in *Competitive Strategy*—rivalry among existing forces, threat of new entrants, threats from substitutes, bargaining power of buyers and suppliers—are changing.¹²⁵ What used to be just a supplier can now become a competitor and a buyer.¹²⁶ This phenomenon is especially recognizable in the deregulated telecommunications industries, where long distance phone companies like AT&T are now providing local phone service and Internet service providers such as America Online are offering long distance phone service.

Another component of Porter's model that Evans and Wurster address in the wake of the Internet is Porter's value chain analysis. The various inputs that comprise the value chain described in *Competitive Advantage* become "deconstructed."¹²⁷ For example, the horizontally- and vertically-integrated structure of newspaper companies becomes unraveled as the companies strive to compete with online journalists whose costs are minimized significantly by distributing articles through email or through a website.¹²⁸ In the new economics of information strategy, the competitive advantage determined by incumbents' value chains becomes "de-averaged" as the firms' once-hidden underperforming business units become exposed as a weakness.¹²⁹ As a result, the world sees the disintermediation of numerous industries including stock brokerage, where E*Trade, Ameritrade, and other online brokerage websites allow investors to buy and sell securities online without having to speak to a broker.¹³⁰ Although the firm as a whole may survive, the structure of the firm as well as industry is "blown to bits" under the old economics.

¹²³ Christensen, xxvi.

¹²⁴ Philip Evans, Thomas S. Wurster, *Blown To Bits* (Boston, MA: Harvard Business School Press, 2000)

¹²⁵ Porter, *Competitive Strategy*, 3-4.

¹²⁶ Evans, Wurster, 63-64.

¹²⁷ Evans, Wurster, 39.

¹²⁸ Evans, Wurster, 40-43.

¹²⁹ Evans, Wurster, 58-59.

¹³⁰ Evans, Wurster, 75-77.

As a solution to these new challenges that have emerged as shadows of the information technologies themselves, Evans and Wurster emphasize that firms pursue what the authors call “richness” (added capabilities, highly-specialized marketing and other services) and “reach” (the ability to reach numerous customers). Under the old economics of information strategy, firms had to be content to try to improve one or the other. Under the new economics, a company can expand both its richness (through increases in interactivity, bandwidth, etc.) and reach (via email or a web page) to make that company even more competitive in its markets.

Despite its enlightened arguments, Evans and Wurster's work is simply an attempt by the two authors to bring Porter's theory into the twenty-first century. Like Porter, Evans and Wurster tend to focus on the effects of technology in the *current* markets and industries, which limits their frameworks' usefulness for forward-looking New Economy tenants. Furthermore, this “neoclassical” model grounded in Porter may not match the “mentality” of more traditional tenants for which such a model would be most useful. In the end, these factors significantly limit this theory's usefulness as an overarching framework to evaluate tenant strategy for both the Old and the New Economies.

Literature Review: Gary Hamel and C.K. Prahalad

The final work to be reviewed in this section is that of Gary Hamel of the London Business School and C.K. Prahalad of the University of Michigan. In their 1994 work entitled *Competing for the Future*, Hamel and Prahalad introduces a competitive strategy focused specifically on how a company can develop a vision of the future and then make it a reality.¹³¹ In their theory, Hamel and Prahalad concern themselves not only with technology but also with the resources and core competencies that must be well leveraged in order to create the markets of tomorrow.¹³² To help companies achieve this end, the authors include a framework that facilitates the process of strategy regeneration to industry reinvention.

Like Christensen and Downes/Mui, Hamel and Prahalad discuss the ongoing quest of companies to reinvent themselves and their industries. However, Hamel and Prahalad's theory of competitive strategy does not limit itself to “disruptive technologies” or “killer apps.” Hamel and Prahalad's theory is wide-ranging in its emphasis on the importance of any technology type, disruptive or sustaining, that may help a firm realize the vision it has created.

Hamel and Prahalad also differ from Porter and Evans/Wurster's theories of competitive strategy. The theory outlined in *Competing for the Future* views technology not as a factor input or as means to an end. Rather, Hamel and Prahalad see technology as a means to a *future* of endless innovation, market creation, and industry reinvention.¹³³ Thus, in their emphasis on future markets, Hamel and Prahalad also distinguish themselves from their existing-market focused cohorts. Of traditional frameworks such as Porter's, Hamel and Prahalad wrote:

¹³¹ Gary Hamel, C.K. Prahalad, *Competing for the Future* (United States: Harvard Business School Press, 1994), 24-26.

¹³² Hamel and Prahalad, 21.

¹³³ Hamel, Prahalad, 21, 23.

Pick up a strategy textbook or marketing handbook and the focus will almost certainly be on competition within extant markets. The tools of segmentation analysis, industry structure analysis, and value chain analysis are eminently useful in the context of a clearly defined market, but what help are they when the market doesn't yet exist?¹³⁴

When, as is the case for technology-driven companies in general, it is the future and not the present that counts, as Hamel and Prahalad believe, Porter's current- or past-focused frameworks are of little use.¹³⁵ Landlords, thus, must use a more forward-looking framework if they hope to understand the needs that their tenants foresee or do not foresee.

In summary, of all the theories reviewed, Porter and Hamel/Prahalad seem to provide the best frameworks for analyzing strategic management issues, business planning, and technology roles for traditional and technology-oriented tenants, respectively. As the reader has observed, the differences between the theories are subtle, and none of the theories, including the chosen two, are perfect. However, Porter and Hamel/Prahalad each appear to be well suited for their respective tenant types. The strength of Porter's theory lies in its time-tested theoretical frameworks for stable growth industries and the more current- or backward-looking mentality of financial services, insurance, and real estate industries (FIRE). Hamel/Prahalad's theory, while not as structured as that of Porter, seems better able to address the needs of Internet- and telecom-based businesses that allow them to compete to redefine the future through industry reinvention and innovation. Before a final decision can be made regarding the use of these two theories in analyzing both traditional and high-tech tenants, a more thorough overview and analysis of these frameworks must be conducted. A thorough understanding of Porter and Hamel/Prahalad's work allows potential developers to understand the strategic concerns of both the more stable FIRE tenants and the anything-but-conventional Internet-driven commercial tenants.

Porter's Frameworks: A More Detailed Look

After choosing two theories—Porter and Hamel/Prahalad—from the group of five theories reviewed, it is necessary to explain in greater detail the frameworks and why they are appropriate in learning the business model and mentality of each tenant type. This section begins with Michael Porter's theory and frameworks.

Why Use Porter to Understand FIRE Tenants?

FIRE tenants, as a rule, fit into the traditional Porter model because they are an established industry segment with a steady growth rate. According to the Bureau of Labor statistics, the FIRE Segment grew from 6.6 million employees in 1992 to 7.7 million employees in 1999, with one dip in employment during the economic downturn in 1991-92. This employment growth

¹³⁴ Gary Hamel, C.K. Prahalad, *Competing for the Future* (United States: Harvard Business School Press, 1994), 33.

¹³⁵ Scott Lehman, Vice President of Business Development for TelePlace, Inc., interview conducted by Benjamin Pettigrew, Miami, FL. 20 July 2000.

represents an annualized increase of approximately 2%. Furthermore, unemployment has steadily fallen from 5% in 1992 to almost 2% in 1999.¹³⁶ Compared with skyrocketing growth in the technology sectors, growth for FIRE has been relatively flat and, consequently, easier to forecast using past and current data.

Porter also serves as a relatively accurate tool in understanding FIRE tenants because of these firms' use of technology. Although the FIRE segment is an information-based business and is therefore heavily influenced by the use of information technology, FIRE businesses, even though they may use the Internet to sell products or services, are not typically selling technology. Thus, technology for financial services, insurance, and real estate firms is viewed as merely a factor of production. Because of this almost anachronistic (by the New Economy's standards...) view of technology, one may wonder if FIRE tenants (other than certain types of financial services firms) are being disintermediated by the advent of the Internet and the deregulation of telecommunications. So far, as has been illustrated in the Bureau of Labor Statistics previously mentioned, the FIRE industries have continued their historical growth rates, which seem to indicate that insurance and real estate services companies in general are neither benefiting nor losing from the Internet in any significant way.

Whether or not this trend to view technology as a factor of production will continue is a matter of speculation. One might also speculate if some other more technology-oriented set of frameworks (such as Hamel and Prahalad) would be a more appropriate model given its existing industry and market focus. From the tenants' perspective, using one of the more recent theories of competitive strategy even in a slow-growth industry could be wise. From the landlords and developers' points of view, such a move could be dangerous. Real estate professionals do need to understand the business model and competitive strategy taken by their tenants, but perhaps more importantly, they need to understand the mindset of their tenants. It is this mindset that, more than what in reality may be the *truly* correct move to make, determines the competitive strategy of a traditional firm.¹³⁷ Currently, it appears that FIRE tenants believe that the Internet will continue to serve as a factor of production and not as a force that will change the nature of their respective industries. Landlords should not give up in trying to foresee where the industries of their tenants are going. At the very least, they should keep in mind how their tenants are thinking. Therefore, the Porter model seems to be a logical framework for describing how these tenants consciously or subconsciously formulate their competitive strategy.

Porter's Framework

Having justified our use of Michael Porter in examining the more conventional FIRE tenants, this work continues by breaking down the fundamental building blocks of Porter's strategic frameworks into four component parts. First, three generic strategies related to competitiveness will be examined. Porter's celebrated five-forces model will be the next set of frameworks to be explained. Then this section will explain the firm value chain concept and the industry value

¹³⁶ U.S. Department of Labor, "Industry at a Glance; Finance, Insurance and real estate" Bureau of Labor Statistics, 26 May, 2000. <wysiwyg://34/http://stats.bls.gov/ing/ing.fire.htm> (16 June 2000).

¹³⁷ Porter, Competitive Strategy, 61-62.

chain concept. This section concludes by examining Porter’s views on how technology affects all of these elements.

Three Generic Strategies

According to Michael Porter, an industry distinguishes itself on two basic dimensions within a particular market segment. First, a company must either compete on the basis of price or product differentiation. Second, the target market should either be narrow or broad in scope. The combination of these two, as illustrated in Figure 7 below, results in three strategies—cost leadership, differentiation, and focus. Texas Instruments, for example, is well known for its successful applications of strategies focusing on having some of the lowest costs in their industry. On the other hand, the jewelry retailer Tiffany’s attempts to appeal to customers of high socio-economic backgrounds by differentiating itself from its competitors with quality and reputation.¹³⁸ Hammermill Paper serves as an example of a differentiation-focused company that produces high-quality paper products for low-volume customers. This tool is particularly effective in distinguishing between FIRE tenants, such as real estate services companies that often appear to be more similar than they truly are.

Figure 7: Porter's Three Generic Competitive Strategies¹³⁹

		COMPETITIVE ADVANTAGE	
		Lower Cost	Differentiation
COMPETITIVE SCOPE	Broad Target	1. Cost Leadership	2. Differentiation
	Narrow Target	3A. Cost Focus	3B. Differentiation Focus

Industry Structure using the Five Forces Model

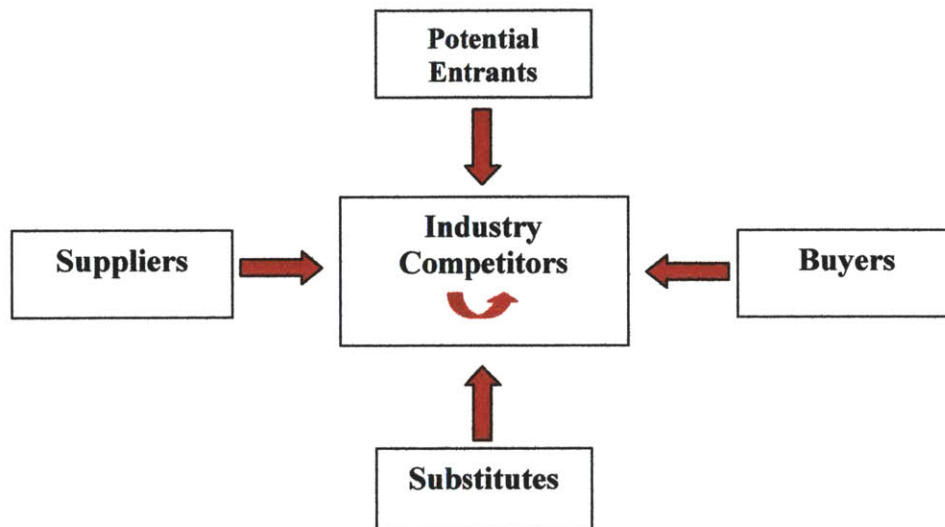
In an effort to illustrate and effectively analyze the various competitive forces acting upon a given firm in an industry, Porter devised his famous five forces model, as depicted in Figure 8. In this diagram, the firm’s industry is represented by the central box labeled “Industry

¹³⁸ Porter, Competitive Strategy, 35-39.

¹³⁹ Porter, Competitive Advantage, 12.

Competitors.” Each of the arrows, including the one within the central box, depicts a force acting on the firm within its industry.

Figure 8: Porter's Industry Structure¹⁴⁰



The force within the central box refers to the existing rivalry among firms within the industry. Factors that help determine the level of rivalry include industry growth, the value a firm adds for each unit of cost, frequency of over-capacity, product differentiation, brand identity, switching cost, barriers-to-exiting the industry, concentration, information complexity, and diversity of competition.¹⁴¹

New entrants also act upon the firm. One of the limiting factors for entrants is expected retaliation by existing players. In most industries, startups that are seeking to break into an industry must face the possible wrath of the market leaders. The number of new entrants is also limited by any barriers-to-entry, which may include economies of scale, brand identity, and capital requirements. Some of the barriers-to-entry faced by potential entrants into the insurance industry, for example, would be reputation, human resources, and high capital requirements.¹⁴²

The next of the five forces described by Porter is buyer-purchasing power. This force represents the bargaining leverage and price sensitivity of a firm's customers. Elements of buyer purchasing power include buyer-versus-firm concentration (the fewer the number of buyers, the greater the power), buyer volume, and buyer switching costs relative to firm switching costs. Price sensitivity—which encompasses price per total purchases, product differentiation, brand identity, quality/performance, and buyer profits—is also a critical issue for buyer-purchasing power.¹⁴³

¹⁴⁰ Porter, *Competitive Strategy*, 4.

¹⁴¹ Porter, *Competitive Strategy*, 17-22.

¹⁴² Porter, *Competitive Strategy*, 7-17.

¹⁴³ Porter, *Competitive Strategy*, 24-25.

Supplier-bargaining power is in many ways similar to that of buyer-purchasing power, with the firm acting as the buyer and the suppliers acting as vendors. The elements of supplier-bargaining power include differentiation of inputs, supplier and firm switching costs, supplier concentration, the importance of volume to suppliers, and the impact of inputs on cost or differentiation (competitive advantage). For the purpose of this study, this fourth force will focus on the relationship between FIRE tenants and technology vendors. This relationship is relevant because it shows how vendors interact with FIRE firms to meet their technology and real estate needs.¹⁴⁴

Finally, the threat of substitute products and services can undermine a firm's position in its markets. Financial services firms have both benefited from and been hurt by online trading and banking. With the introduction of new technologies, disintermediation becomes the extreme result of substitution. As an example, bank tellers have already been partially disintermediated by ATMs and online banking.¹⁴⁵

By analyzing these five critical forces and placing firms within the context of their industries, landlords and developers can better devise a strategy to account for the risks and opportunities that come with those FIRE industries and their existing and entering players. The strategies Porter presents to such firms include ways for the FIRE companies to position themselves within their industries, influence the balance of the industries, and exploit any changes that may occur in the five forces. Understanding these options, landlords and developers can better anticipate the current and future needs of their tenants.¹⁴⁶

The Firm Value Chain and Industry Value Chain

Another framework Porter provides is a visual and conceptual tool to analyze the value chains of firms and industries. As evident in the figure below, Porter illustrates industry value chain as a natural progression from industry structure. Each of the boxes represents the value chain of an industry player. A firm, for example, receives its goods from its suppliers and then distributes those goods to the firm's buyers through distribution channels.¹⁴⁷

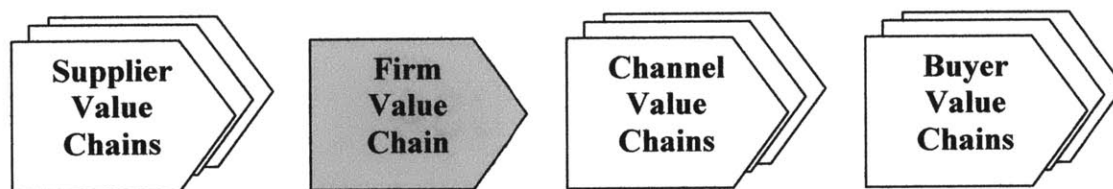


Figure 9: Industry Value Chain

Each time an interaction occurs between each of these players, the value chains of those players, as depicted in the figure above, are affected as well. Each company is then viewed through the framework of this "firm value chain."¹⁴⁸ The firm, as seen in Figure 10, consists of primary and

¹⁴⁴ Porter, *Competitive Strategy*, 27-29.

¹⁴⁵ Porter, *Competitive Strategy*, 23-24.

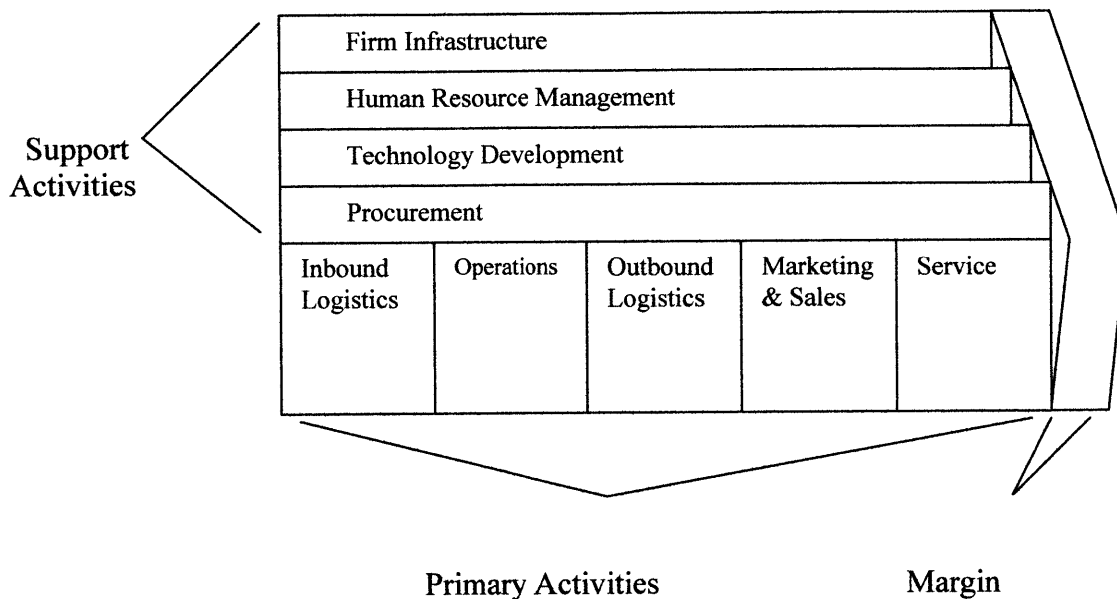
¹⁴⁶ Porter, *Competitive Strategy*, 29-31.

¹⁴⁷ Porter, *Competitive Advantage*, 35

¹⁴⁸ Porter, *Competitive Advantage*, 37

support activities. Primary activities are those that directly contribute to the inputs, production and sale of the product. Support activities, including technology, cut across all primary activities as necessary elements of the production process. The margin at the right side of the model depicts the value the firm adds in creating its product.¹⁴⁹ This in-depth look inside a FIRE tenant allows landlords and developers to see the different components and strengths along which the FIRE tenant adds value, which is reflected in the width of the margin.

Figure 10: Generic Firm Value Chain



Technology's Impact on the Firm Value Chain

Porter recognizes that his discussion of the structure of competitive strategy would not be complete without a more detailed treatment of technology. Technology, as the firm value chain illustrates, is said to affect all areas of production. Porter then expands his discussion of how technology strategies affect competitive advantage in an industry.

Porter states that desirable technologies:

- Lower cost or enhance differentiation
- Have sustainable technological leads
- Shift cost or uniqueness drivers in favor of a firm
- Give first-mover advantages besides those inherent in the technology itself if pioneering the technological change
- Improve overall industry structure¹⁵⁰

¹⁴⁹ Porter, Competitive Advantage, 33-43.

¹⁵⁰ Porter, Competitive Advantage, 171-172.

As mentioned previously, having first-mover “status,” according to Porter, can be either negative or positive, depending on the nature of the technology or the industry. Generally, if the firm is not producing the technological innovation, if the technology is easily diffused to other competitors, or if the technology does not cause significant product differentiation, it is better to be a follower than a leader.¹⁵¹ Some first mover advantages and disadvantages are listed in Table 4.¹⁵²

Table 4: Pioneering Technology, Advantages and Disadvantages¹⁵³

First Mover Advantages	First Mover Disadvantages
Reputation Preempting a position Switching costs (lock in sales for consumers if there are switching costs) Channel Selection (unique distributor access) Proprietary learning curve Favorable access to facilities/inputs or other scarce resources Definition of standards Institutional barriers (patents) Early profits	Pioneering costs Demand uncertainty Changes in buyer need Specificity of investments to early generation/factor costs (inflexible technology) Technological discontinuities Low cost imitation

FIRE tenants must weigh the advantages and disadvantages of moving into a new technology carefully. This requires an in-depth understanding of the individual tenant's business. Fortunately, Porter's framework provides the analytical tools needed to evaluate the advantages and disadvantages of new technology as a factor of a FIRE tenant's production. It is important that a landlord/developer understand how the commercial tenants view first-mover advantages. The tenants may view being a first-mover as a point of differentiation, the "cutting edge," or as a point of added cost and risk in using an untried system, the "bleeding edge" of technology.

These strategies and approaches provide a conservative, yet proven framework of analyzing traditional businesses within the context of an established market and industry. Thus, these frameworks created by Michael Porter should be adequate in examining the more traditional FIRE tenants.

¹⁵¹ Porter, *Competitive Advantage*, 180.

¹⁵² Porter, *Competitive Advantage*, 180-190.

¹⁵³ Porter, *Competitive Advantage*, 186-180.

Hamel/Prahalad's Frameworks: A More Detailed Look

Although Porter's theory of competitive strategy might be effective in analyzing traditional firms, it does not necessarily apply to the fast-growing, technology-driven, high-maintenance tenants of the Internet's landlords.¹⁵⁴ The hypothesis that this study is testing, however, is that older, more traditional frameworks, such as Michael Porter's five forces model and value chain analysis, is insufficient for landlords and developers who are seeking to meet their tenants' present and future needs better. Enter Hamel and Prahalad. These academics describe a different view of competitive strategy whose view of the importance of technology, its leadership, its application, and its role in the future seem to fit the profile of a New Economy tenant quite well.

Hamel and Prahalad take a less structured approach on competitive strategy than Porter. In *Competing for the Future*, Hamel and Prahalad argue that most company executives react to the future rather than determining their own course. Attributing such misallocation of resources to more present- and past-oriented competitive strategies, Hamel and Prahalad feel that excessive focus on the existing organization's efficiency rather than on its future opportunities could translate into a company driven less by its own vision of the future than by reaction to competitors.¹⁵⁵ This section addresses, in greater depth, why Internet tenants may fit the Hamel/Prahalad model. The section then goes on to describe Hamel/Prahalad's framework in depth.

Why Use Hamel/Prahalad to Understand Internet Tenants?

Hamel and Prahalad's model is suited to businesses driven by the Internet for exactly the opposite reason that FIRE tenants fit into Porter's model. First, Internet businesses are experiencing phenomenal growth. For example, in a study conducted by the University of Texas' Center for Research in Electronic Commerce, Internet-related employment grew 36% from 1998 to 1999. As of June 2000, the Internet now directly supports 2.476 million workers, more than the entire Federal government, excluding postal workers, and more than the insurance industry (2.405 million workers).¹⁵⁶ This growth indicates that the Internet is an industry in its growth phase and in the midst of continuous change. Hamel and Prahalad's model address the kinds of issues Internet and other technology-driven companies might face. These issues include not trying to streamline past practice but gearing the company for future growth opportunities.

¹⁵⁴ The phrase "high maintenance" is used here not in its literal sense but in its colloquial sense. This implies that high-tech tenants are more demanding in their request for building features and services, such as Internet connectivity and redundancy, that are critical to their business.

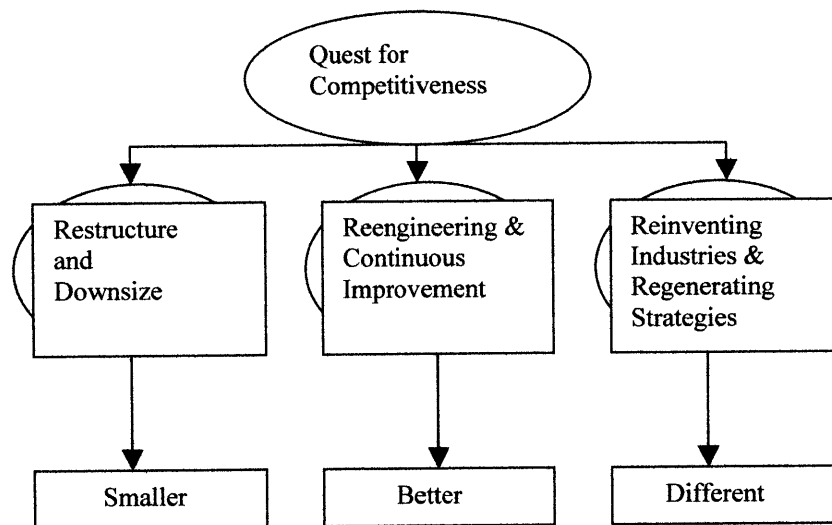
¹⁵⁵ Hamel, Prahalad, 3.

¹⁵⁶ Center for Research in Electronic Commerce, "Key Findings," *The Internet Economy Indicators*, 17 June, 2000, <http://www.internetindicators.com/key_findings_june_00.html> (17 June, 2000).

The Quest for Competitiveness

Internet businesses are clearly in the midst of change. But, how, specifically, can Internet companies apply Hamel and Prahalad's model to compete? Hamel and Prahalad start by explaining their view of three ways that all companies strive to compete, as depicted in the Figure below.

Figure 11: The Quest for Competitiveness¹⁵⁷



In a company's quest for competitiveness, companies in general have three options. First and perhaps the easiest for managers, companies can elect to undergo restructuring to downsize operations. Hamel and Prahalad derisively describe such managers as "denominator managers." This label alludes to these persons' tendency to reduce the denominator rather than increase the numerator in trying to increase the firm's return on investment (ROI).¹⁵⁸ In addition to downsizing, companies can also choose to reengineer and pursue a policy of continuous improvement. The authors observe that most companies compete by pursuing one or both of the first two options. However, the real opportunities, as Hamel and Prahalad highlight, are in the third option—industry reinvention and strategy regeneration. By focusing on this third option, companies can utilize otherwise wasted precious resources to shape and transform the firm's industry.¹⁵⁹

¹⁵⁷ Hamel, Prahalad, 16.

¹⁵⁸ ROI (Return on Investment) = Numerator/Denominator = Net Income/Investment (or Net Assets)

¹⁵⁹ Hamel, and Prahalad, 22-23.

Why Great Companies Fail

Hamel and Prahalad also explain how downsizing and re-engineering can, in addition to missed opportunities, result in a company's failure. One of the ironies illustrated in *Competing for the Future* is that companies with vast resources, both in capital and in personnel, still fail. These and other reasons for companies' failures are listed in the figure below. According to Hamel and Prahalad, great companies such as Sears, Westinghouse and IBM at different points have failed to maintain or achieve industry leadership. These companies refused to break from traditional strategies, or they simply were not able to develop a vision of their industry's future.¹⁶⁰ In a world where businesses operate and change at Internet speed, only those companies that successfully envision the future will stay on top.

Figure 12: Why do Great Companies Fail?¹⁶¹

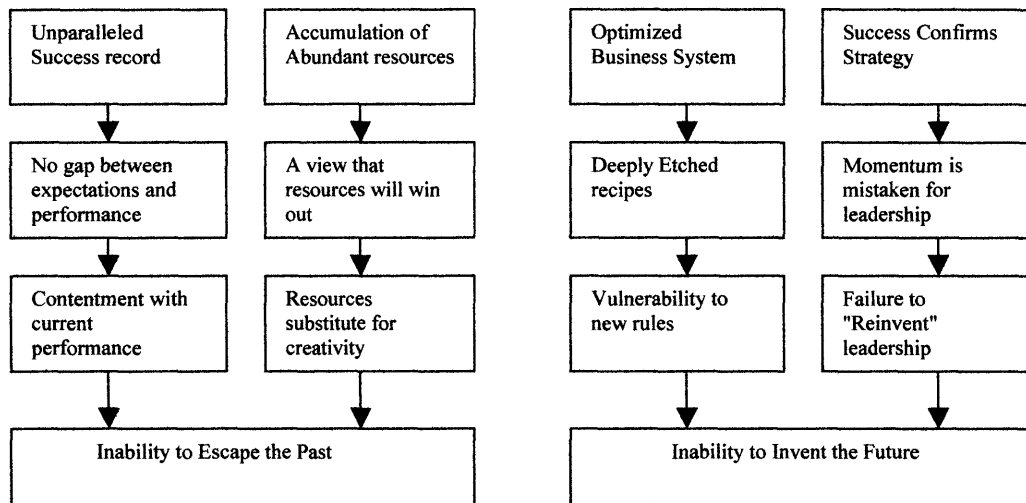


Figure 12 also illustrates how companies can fail to maintain leadership even though they start with successful track records, substantial resources and efficient business systems. Successful companies with large amounts of resources may become complacent. They may assume that resources alone, without direction, can validate a poor strategy. Thus, companies may rest on their laurels and fail to escape the past.

On the other hand, in highly efficient companies procedures for their specific products may become so ingrained that they fail to recognize new product trends or procedures that might increase efficiency. In these situations, management may assume that the momentum of corporate procedure is a substitute for thinking through ways to reinvent their industry.¹⁶²

¹⁶⁰ Hamel, Prahalad, 117.

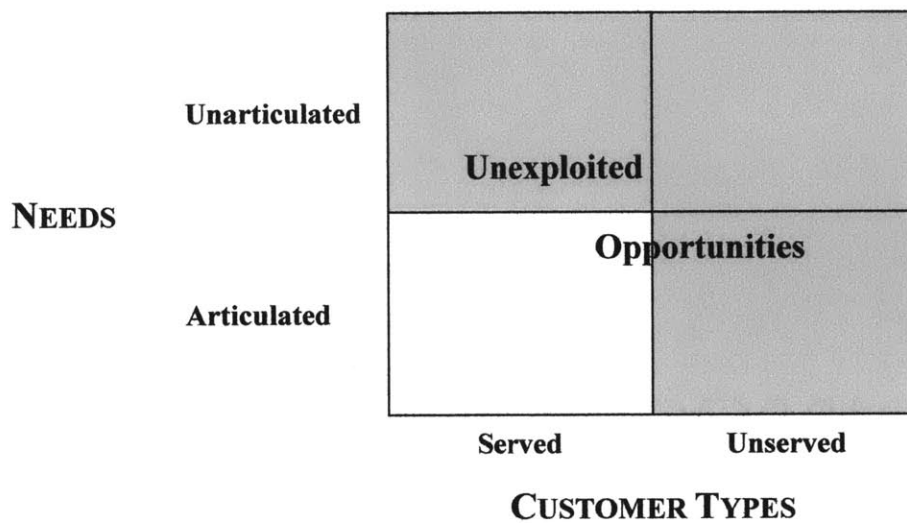
¹⁶¹ Hamel, Prahalad, 128.

¹⁶² Hamel, Prahalad, 127-130.

Reinvention of Industry versus Regeneration of Strategy

How does a company prevent myopic adherence to procedure and continue to achieve competitive advantage in an industry? According to Hamel and Prahalad, in order to reinvent itself in an industry, a company must change some fundamental rule of engagement in the industry. It must redraw the boundaries between industries, or create entire new industries.¹⁶³ Figure 13 provides both tenants and landlords with a useful framework to help envision and create their industries' future.

Figure 13: Beyond "Customer-Led"¹⁶⁴



According to Hamel and Prahalad, many companies are choosing a competitor strategy known as “customer led,” which calls for a company to focus on the explicit needs of their current customers. The flaw with this strategy is evident in Figure 13. “Customers,” state Hamel and Prahalad, “are notoriously lacking in foresight.”¹⁶⁵ Customers often do not know what they want until they see it. This lack of foresight is perhaps best illustrated by the questions posed to Hamel and Prahalad’s readers in 1994:

Ten or fifteen years ago, how many of us were asking for cellular telephones, fax machines and copiers at home, 24-hour discount brokerage accounts, multivalve automobile engines, video dial tone, compact disk players, cars with on-board navigations systems, hand-held global positioning receivers, automated teller machines, MTV, or the Home Shopping Network?¹⁶⁶

¹⁶³ Hamel, Prahalad, *Competing for the Future*, 21.

¹⁶⁴ Hamel, Prahalad, 112.

¹⁶⁵ Hamel, Prahalad, 108.

¹⁶⁶ Hamel, Prahalad, 108.

All these revolutionary products and services are represented by the three shaded boxes of Figure 13. By serving only the articulated needs of existing customers, companies would have missed the opportunity to supply their customers with all of these plus dozens of other innovations that have been launched in the six years that have passed since Hamel and Prahalad first posed the questions.¹⁶⁷ These are the technological achievements that allow companies to transform industries into what they want the future to be.

In recent years, the Internet has been the principal tool for redrawing industry boundaries. For example, Sun Microsystems markets software that is based exclusively on the World Wide Web. These web-based software packages are redrawing the traditional boundaries of competition in the software industry where packaged software traditionally has dominated.

More and more companies are operating in the ever-changing world of Internet-based New Economy. To be successful, these companies must constantly consider altering or completely changing their strategies. Strategy regeneration is the process of unlearning the past, developing foresight into an industry's future, and creating an architecture by which one can dominate future markets.¹⁶⁸ In the previous diagram, strategy regeneration would entail looking beyond the articulated needs of a firm's current customers to other areas outside the firm's zone of expertise and comfort.

Industry reinvention and strategy regeneration are not easily accomplished. They require that both management and its workforce be creative, flexible, and willing to learn. One of Hamel and Prahalad's key points is that all levels of the organization should be involved in the process.¹⁶⁹ This point is reinforced when the authors stress that strategy must convey, for all groups, a sense of direction, discovery, and destiny for the company.¹⁷⁰ Hamel and Prahalad also emphasize what they describe as a "stretch," which they define as the ability to set corporate challenges beyond the organization's traditional businesses. These challenges should be personalized to reach each member of the organization.¹⁷¹

Resource Leverage

Finally, the authors describe how small companies with fewer resources often strive to leverage their resources to their greatest advantage. It is a commonly observed fact that larger already-successful organizations often become complacent in their positions and dependent on their resource abundance to achieve steady but not optimal growth. On the other hand, startups and other ambitious firms often have the vision and the desire to dominate an existing industry or create a new market but typically lack the resources to achieve their goals. It is with this dilemma in mind that Hamel and Prahalad summarize five basic methods of resource leverage, which are illustrated in the figure on the following page.¹⁷²

¹⁶⁷ Hamel, Prahalad, 107-113.

¹⁶⁸ Hamel, Prahalad, 23.

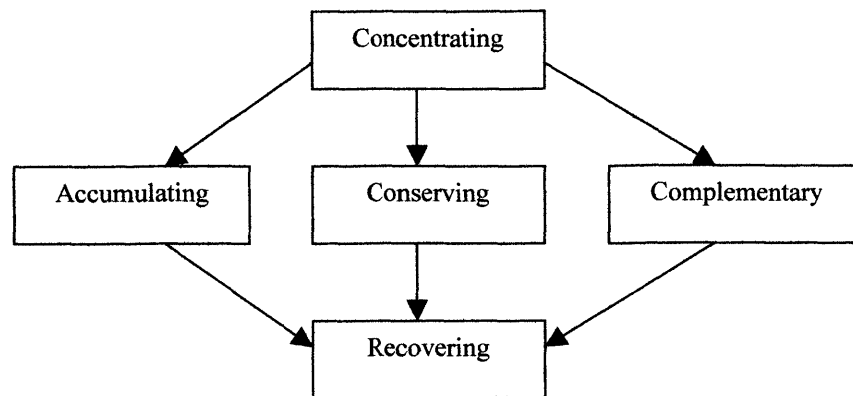
¹⁶⁹ Hamel, Prahalad, 120.

¹⁷⁰ Hamel, Prahalad, 129. This sense of "destiny" can also be described as a feeling of mission and emotion, which illustrates vividly the consequences of success and failure.

¹⁷¹ Hamel, Prahalad, 145.

¹⁷² Hamel, Prahalad, 175.

Figure 14: Categories of Resource Leverage¹⁷³



The first method is the concentration of resources. This concentration is accomplished by "converging," building consensus on strategic goals throughout the organization. Focusing allows organizations to target concrete tasks that can lead to an industry's reinvention or regeneration. Companies also concentrate resources by targeting only those services or products perceived to have the most potential for success.

Companies can also leverage resources by accumulation. Companies can either "mine" or learn a new technology. Also, they can borrow from other organizations through strategic alliances.

Another option of resource-constrained firms is the ability to complement resources to achieve leverage. The organization can blend skills in new ways, or it can secure complementary assets that are critical to its current functions. The company can also reuse skills or resources more productively and/or find ways to shield resources from competitors to gain advantage.

Finally, all of these methods of resource leverage depicted in Figure 14 are dependent on the last form of resource leverage—recovery. This refers to a company's ability to use and recover its resources with speed. Often, the company that is quickest to market gains the advantage.

Figure 14 illustrates a logical sequence for leveraging resources. After the company determines its strategy, it concentrates its efforts in a way that moves the organization toward realizing its vision of future industry leadership. This is followed by a period of accumulating, conserving and complementing resources as the development of the strategy progresses. Once the organization has gained the resources and complementary assets and also has processed its needs, it brings this new technology to market as quickly as possible to minimize the payback time for the innovation and industry leadership.¹⁷⁴

The Bottom Line

As these discussions of Porter and Hamel/Prahalad's frameworks indicate, each theory of competitive strategy proposed by these three professors is either explicitly or implicitly distinct in four significant ways that are befitting of certain firm types, as indicated in the table below.

¹⁷³ Hamel, Prahalad, 192.

¹⁷⁴ Hamel, Prahalad, 175.

First, Porter’s frameworks explicitly stress the importance of the past and present as expressed in current market and industry conditions. In contrast, Hamel and Prahalad emphasize creating and shaping the future, a mindset common to creative, high-tech firms. Second, in more Porter-like firms, technology generally plays a supporting role in a traditional firm’s value chain while Hamel and Prahalad see technology as an opportunity for firms to reinvent industries and create new markets.

Table 5: Competitive Strategy Framework Comparison

Points of Comparison		Porter	Hamel/Prahalad
	Present-Past/ Future Orientation	Present-Past	Future
	Use of Technology	Input	Means of shaping the future
	Growth Rate	Low, but steady	Extremely high, but volatile
	Resource Abundance/Use	High	Low
	Representative Firm	Traditional	Technology-driven

The third and fourth differences, unlike the first two, are more implicit in nature but are critical issues for understanding the tenants’ real estate needs. One of these implicit differences is growth. The theory framed by Porter generally refers to a mature industry where existing forces and value chains are emphasized. Mature industries, by definition, experience slower, more stable growth relative to their earlier growth rates when the industries were just emerging. Hamel and Prahalad, however, focus their attention on what can be described as emerging industries, transforming industries, or nonexistent industries not yet appeared. Such industries are conditions generally show high growth rates coupled with volatility.

The final difference of significance pertains to relative resource abundance. Hamel and Prahalad’s theory of competitive strategy stresses the importance of leveraging a firm’s resources. In that emphasis lays the assumption that firms ascribing to Hamel and Prahalad’s theory typically have experienced a dearth of necessary resources. From Porter’s theory can be inferred that its constituents have more abundant resources relative to the more ambitious, more resource-constrained Hamel/Prahalad firms. Likewise, Porter’s frameworks tend to encourage greater caution in firms’ strategic initiatives that correspond to less need for resource leverage and more relative abundance of resources.

After comparing these theories of competitive strategy, Porter and Hamel/Prahalad’s frameworks have demonstrated significant differences and a tendency to correspond to the traditional and high-tech tenants, respectively. These frameworks now can be applied in actual cases to verify their usefulness for landlords seeking to understand and serve.

Chapter Five: Discussion of Three Cases.

This section provides an in depth discussion of three real estate development cases to test how well the Porter model applies to an "Old Economy" tenant and how well the Hamel/Prahalad model applies to "New Economy" businesses. Each case will illustrate how the tenant/landlord has translated (or failed to translate) the tenant's business and technology strategy into a functioning real estate development. Each case begins with an overview of the tenant's industry, followed by a discussion of the tenant's business strategy, development and technology selection issues for the landlord and tenant, tenant/landlord operations and management issues and concludes with a discussion of the tenant's and landlord's view of the future. The first case covers the development and improvement of Northwestern Mutual Life Insurance Company's North Headquarters building in Milwaukee, Wisconsin. The second case illustrates the development and operation of YankeeTek Incubator and Akamai Technologies, in Cambridge, Massachusetts. The final case studies the development of Teleplace, a telecom hotel in Florida.

Case 1: Northwestern Mutual Life Insurance Company

Introduction

The case studies begin, appropriately enough, with a most venerable "Old Economy" financial, insurance and real estate (FIRE) business, Northwestern Mutual. This Case will discuss why Northwest was chosen, how their business model compares to Porter's model of competitive advantage, what development and technology considerations for the north building of their headquarters considered, how these decisions have affected operation and management, and finally, how Northwestern views its future. The case will conclude by summarizing Northwestern's competitive strategy and development approach as a point of comparison for the two cases that follow.

The result of this analysis will be two-fold. First, recall that, in comparing Porter and Hamel/Prahalad, there were four fundamental differences in strategic outlook that distinguished Porter's competitive strategy from Hamel and Prahalad's view of competitive strategy. These four comparison points were: 1) Past/Present versus Future-oriented business strategy, 2) Use of Technology, 3) Growth rate, and 4) Resource abundance. The case will look back at Northwestern's competitive strategy to measure these four strategic points.

Second, Chapter 3, Development Issues, predicted the development strategy of FIRE businesses, Internet-businesses and Telecom Hotels in their approach to project feasibility, site selection, design, and operations. This case summary will conclude by reviewing Northwestern's development approach along these four areas as a point of comparison for the remaining two cases.

Why Study Northwestern?

Northwestern is an interesting case study of financial, insurance and real estate (FIRE) businesses for several reasons. First, Northwestern is a very large insurance company that is

involved, on either the "buy side" or "sell side," in all the classic FIRE business lines. Recently, Northwestern Mutual purchased Frank Russell Company, author of the Russell 2000 small stock index and a major pension fund and mutual fund money manager based in Tacoma, Washington. This one billion dollar purchase, in combination with other purchases, has given Northwestern a much stronger standing in financial services.¹⁷⁵ In addition, Northwestern has always had an established investment house to maximize value to their policyholders. Northwestern Mutual Life Insurance's name change to Northwestern Mutual reflects the company's added focus in the financial services arena.¹⁷⁶ The company owns approximately \$5.5 billion dollars in directly managed real estate assets.¹⁷⁷ Hence, although the company has always and continues to focus on insurance, their headquarters must also support operations in financial services and real estate.

Second, and perhaps just as important, Northwestern has been very open in allowing timely access to data and personnel throughout the organization that is relevant to this study.

Third, Northwestern is often cited as one of the best-run insurance companies in the industry. Fortune has ranked Northwestern the "most admired" company in its industry for over sixteen years in a row, a record matched in only one other industry covered by the Fortune survey. The same study also showed that one in every four Fortune 500 CEO's use Northwestern as their personal life insurer.¹⁷⁸ Compared to the BBB rating of most American Corporations, Northwestern currently has triple A investment ratings from Moody's, Standard & Poors and Duff & Phelps, and Northwestern Mutual also achieved an "A++" rating from A.M. Best, the oldest and most respected insurance rating agency.¹⁷⁹ Since the insurer has been able to achieve consistent success, it is logical to assume that this success is not "beginners luck" but, rather, that it is based on a strong strategy and vision that has adapted to the market. More fundamentally, Northwestern's success implies that they have a management strategy. Fortunately, as this study shows, this implication turned out to be correct. Furthermore, the strategy has been used to drive the company's communications technology and real estate decisions. Hence, Northwestern's business scope, timely and relevant data, and strong market standing have made Northwestern an excellent test case to apply to Porter's model as it relates to their development of the North building and their implementation of communications technology on the headquarters campus.

Northwestern's Competitive Strategy

Chapter 4 covered some of the basic strategic business models, and showed why Porter's model of competitive advantage might be expected best to explain the business strategy of traditional FIRE commercial office users. In this section, that model is applied to Northwestern Mutual. This analysis does not follow the exact order Porter uses, because his ordering was meant for developing a business strategy for a new company or business unit and then considering which

¹⁷⁵ Deborah Lohse , "Northwestern Mutual's Deal to Purchase Frank Russell Gives It More Wares to Sell," *Wall Street Journal*, Aug 11, 1998.

¹⁷⁶ Armin Gumerman, former Director of Information Services, Northwester Mutual Life Insurance Company, Telephone Interview conducted by Geoffrey Morgan, July 10, 2000.

¹⁷⁷ Donald L. O'Dell, Managing Director, Real Estate Asset Management, Northwestern Mutual, Interview conducted by Geoffrey Morgan, Milwaukee, WI, May 25, 2000.

¹⁷⁸ Carolyn T. Geer , "Where the CEOs shop for insurance," *Fortune*, (Vol 139, Issue 4) March 1, 1999, 264-266.

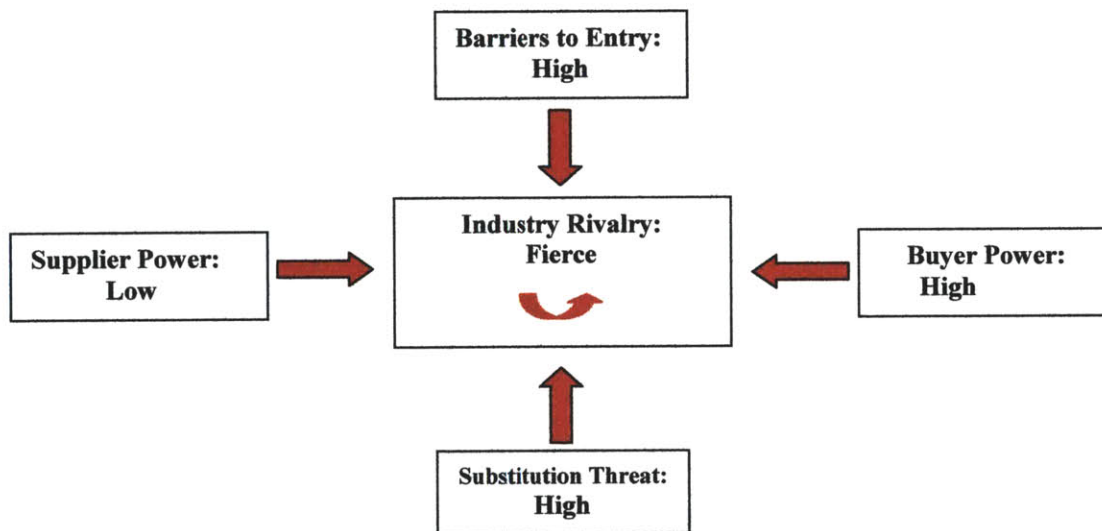
¹⁷⁹ Northwestern Mutual Life, "Northwestern Mutual Life Investment Report, 1999" (Unpublished).

market it should fit into. Instead of choosing a generic strategy to fit the market first, this case starts by introducing the overall competitive environment in which Northwestern Mutual functions now using the five forces model. Discussion of the competitive environment then leads to a focus on Northwestern Mutual's generic competitive strategy. The details of Northwestern's model are revealed through inspection of their firm and industry value chain. All of these pieces of the model include a discussion of technology changes play into Northwestern's business strategy.

The Insurance Industry, Northwestern and the Five Forces Model

Chapter 4 reviewed Porter's conception of Industry structure. He said any industry can be described as consisting of five component parts, namely, barriers to entry, threat of substitution, buyer purchasing power, and supplier purchasing power, all of which feed into industry rivalry, the final element of industry structure. The following diagram illustrates the nature of the insurance industry using the five forces model. The remainder of this section will then describe and explain the insurance industry's five forces, as illustrated in Figure 15.

Figure 15: Insurance Industry Structure¹⁸⁰



In order to understand why the industry's five forces act as they do, it is important to have a strategic understanding of the industry itself. This section describes industry structure of the insurance, the primary industry of Northwestern Mutual. The section starts with a brief industry overview, followed by a brief description of Porter's five industry forces as they relate to the insurance industry.

¹⁸⁰ Porter, *Competitive Strategy*, 4.

Insurance Industry Overview

The insurance business itself started in a coffee shop by the Thames River over 300 years ago as a means of insuring the uncertain business prospects of British merchant shipping by the foundation of Lloyds of London, an association of marine merchantmen.¹⁸¹ Property and Casualty Insurance grew beyond commercial interests to include household coverage with the development of whole life policies. These policies have been the mainstay (life insurance representing 80% of revenues) of Northwestern Mutual's business since its establishment in 1857.¹⁸² Today, there are new life insurance products that include whole life, universal life and variable annuity products. These three categories serve to increase Northwestern's product diversity and, as a result, customer satisfaction.

Currently, A. M. Best, in their insurance industry overview, lists several fundamental industry trends that are affecting insurance companies. During the 10th annual PriceWaterhouseCoopers' Executive Conference for the Life insurance Industry, panelists addressed what they believed, were the most significant trends in the industry. These trends included global competition, which has inspired increased industry consolidation. Insurance industry leaders also discussed changes in regulation which allows insurers in some states to "demutualize," i.e., for mutuals to shift from privately held companies to publicly traded companies, accountable to the public markets for quarterly earnings performance. Increased competition has lowered margins for some products as well. Further, many Insurers are interested in the Internet and computer technology proliferation.¹⁸³

Barriers to Entry

One of the industry trends mentioned above is consolidation. Consolidation implies that size is a major barrier to entry. The insurance industry is, by its very nature, a study in stock portfolio theory. The more policyholders there are in a pool the more idiosyncratic risk is diversified away, yielding a greater return for the type of risk.¹⁸⁴ Furthermore, it is possible for larger organizations to consolidate operations through mergers and save overhead expenses; scale economies are a classic reason why companies in similar industries merge.

The concept of size as a barrier to entry implies a requirement for high capitalization. Indeed, industry surveys show that the top 150 competitors each hold, on average, well over one billion dollars in policy coverage.¹⁸⁵ Hence, capital constraints are an implied as a barrier to entry because size is a barrier. As Andrew Kigerman, a life insurance analyst with Schroder & Company of New York put it, "Bigger companies will continue to grow bigger."¹⁸⁶ This means that, for the foreseeable future barriers to entry, which are already high, will get higher.

¹⁸¹ Lloyds of London, "What is Lloyds, Heritage: A brief History of Lloyds, updated July, 2000" <http://www.lloydsflondon.co.uk/entrypoints/her_index_gi.htm>, July 18, 2000.

¹⁸² Ron Parko, "Plotting a course," *Best's Review* (Volume 100, Issue 8), Dec 1999, 73-77.

¹⁸³ Parko, 73-77.

¹⁸⁴ Zvi Bodie, Alex Kane, Alan J. Marcus, *Investment, Fourth Edition*, (Boston: Irwin/McGraw Hill: 1999), 147.

¹⁸⁵ Jim Conolly, "Life Numbers Look Good, but the Gap between leaders and followers is widening," *National Underwriter*, (vol 103, Issue 30) July 26, 1999, 22-31.

¹⁸⁶ Conolly, 22-31.

Threat of Substitution

Northwestern specializes in whole life Insurance policies. Adaptations of variable annuity and universal life policies are offered¹⁸⁷ but are not the specialty of Northwestern. Universal life policies were especially popular during inflationary periods, when many insurers promised "vanishing premiums" as a result of these policies. Northwestern held back from offering these policies because they did not think they were in the long term best interests of their shareholders; this opinion was shared by many industry professionals, even some who were offering the policies. Nonetheless, Northwestern suffered six years of some lost market share to these policies, until they offered a competing product and reduced whole life policy pricing. Northwestern then rebounded while many of its competitors were fighting lawsuits for fiduciary liability when promises of universal life policies "vanishing premiums" did not materialize.^{188, 189} Today, variable annuity products have also become very popular. Clearly, many substitutions have been, and are being, offered to the whole life policies which represent the bulk of Northwestern Life's insurance business. Hence, the threat of substitution to Northwestern's core product, whole life policies, is quite high.

Buyer Purchaser Power

The emergence of the Internet has increased the ability of insurance holders to choose among a vast variety of products.¹⁹⁰ Web sites such as HealthAxis.com and WebMD allow users to select insurance based on coverage and pricing without going through the traditional agent. With increased information and a variety of new insurance products, purchasers can choose from a variety of options. Although the individual purchaser of insurance is not able to change a company's underwriting standards or pricing, the relative ease of movement of the market as a whole makes the consumer's aggregate pricing power very high; insurers', low.

Supplier Purchaser Power

Conversely, the insurers have somewhat greater bargaining power with suppliers. The Telecommunications Act of 1996, for example, gave all users, including insurers, a larger menu of telecommunications choices than existed before the passage of the act. Furthermore, Insurers such as Northwestern have large networks of agents linked to a large headquarters facility. Northwestern has 7500 employees, four thousand of which are situated in their corporate headquarters in Milwaukee. Furthermore, Northwestern has at its disposal \$86 billion in managed assets.¹⁹¹ Clearly, organizations of this size are able to negotiate fairly competitive national contracts for a variety of products and services. For example, Bill Hegge described how, in the late seventies, he had his choice of three telephone switches to purchase in order to set up a

¹⁸⁷ Whole Life is a fixed payment instrument guaranteeing death benefits or payment at the end of the insurance term. Variable Annuity is an instrument which allows the investor to select the financial instruments in which they would like to invest which allows repayment at the time of retirement. Universal Life is a combination whole life and variable annuity instrument whose final payments vary based on the interest rates and securities performance. (for additional information, please see the Northwestern Mutual Website at <http://www.northwesternmutual.com>)

¹⁸⁸ Leslie Werstein Hann , "Embracing the mutual," *Best's Review*, (Volume 99, Issue 11.), Mar 1999, 35-40.

¹⁸⁹ Ron Parko, "Northwestern Mutual: The profits are mutual" *Best's Review*, (Volume 99, Issue 8), Dec 1998, 26.

¹⁹⁰ Armin Gumerman, Telephone Interview conducted by Geoffrey Morgan, 10 July 2000.

¹⁹¹ Northwestern Mutual, "Annual Report, 1999," (Unpublished), 1.

private branch exchange (PBX) in his office. This choice would not have been possible before the CarterPhone Decision. The proliferation of the Internet and related business-to-business e-commerce sites can only have increased the insurer's bargaining power with suppliers.

Rivalry

High buyer purchasing power, coupled with high threat of substitution and a long list of competitors means that the rivalry in the insurance industry is fierce. Margins have been steadily falling for most insurance products. This fall is partially responsible for the "demutualization"¹⁹² of many insurance companies. Mutual insurers, anxious to tap the initial windfall from public stock offerings, have lobbied many states to relax restrictions and allow their conversion to "mutual holding companies." Ironically, this initial conversion is most tempting for those who will have the least long-term benefit. After all, poorly run insurance companies will not become better run because of an offering. Eventually, stock prices will only rise above the value of the other company assets because of increases in perceived "good will." If management is not able to demonstrate that they can add to the book value, the initial euphoria of equity infusion will be replaced by the anguish of falling share value and constant short-term scrutiny in a business whose outlook has traditionally been long term. Northwestern has experienced growing policyholder dividends and growing revenues. Despite their healthy "Goodwill" and their successful lobby of the state to allow demutualization, they continue to vow they will not go public. In any case, demutualization, high substitution power, high buyer purchasing power and lower margins all point to the high levels of rivalry in the insurance industry.¹⁹³

Porter's Generic Strategies and NML

Armed with an understanding of the insurance industry's competitive environment, Northwestern's generic competitive strategy becomes more understandable. Northwestern's generic strategy is implied in the company's strategic vision, as it was summarized by Northwestern's executive committee in 1888:

The ambition of the Northwestern has been less to be large than to be safe; its aim is to rank first in benefits to policy owners rather than first in size. Valuing quality above quantity, it has preferred to secure its business under certain salutary restrictions and limitations rather than to write a much larger business at the possible sacrifice of those valuable points which have made The Northwestern preeminently the policy owner's company.¹⁹⁴

The authors constantly rediscovered references to this philosophy, stated over 110 years ago, both in research of printed literature and in the face-to-face phone interviews. The philosophy was typically summarized by the following generic question: Is a proposed action in the long-

¹⁹² The term "demutualization" refers to an Insurance company revoking its status as a mutual insurance company. Mutual insurance companies are owned by the company's individual policyholders. Some states have laws which restrict the ability of insurance companies to "demutualize." Many companies are motivated to do this so that they, and their policyholders, can go public and reap the windfall of an initial public offering.

¹⁹³ Michael A Cohen, Larry G Mayewski, Michael L Albanese "End of an era?," Best's Review, (Volume 99, Issue 4)Aug 1998, 75-82.

¹⁹⁴ Northwestern Mutual, "Executive Committee Resolution," 1888 (Unpublished).

term best interests of the policyholders? For example, when Northwestern acquired the Long Term Care Group through the purchase of another company, Peter Goldstein noted in his negotiations with David Simbro, a Northwestern Senior Actuary, that Northwestern wanted assurances of zero disruption of services if the deal did not work out. After Goldstein expressed concern that his investors (who were also board members) would be uncomfortable with certain clauses, Simbro declared, "I'm so sick of hearing about your investors. What about our policyholders?" The negotiation was conducted around committee decision to ensure that Long Term Care Group functioned "the Northwestern way." Goldstein was also quick to add, however, that the atmosphere of the meetings was "very open minded." He said that the culture is flexible and pragmatic regarding new ideas.¹⁹⁵ Mr. Melone, an executive who retired from Equitable, a competing insurance firm, in 1998, described the strength and consistency of their culture in this way:

[The company's statement of values represents] more than hollow words.... A lot of companies have the right idea, but they [Northwestern Mutual] seem to be very, very effective at getting the vision and values into the bone marrow of the organization. They've imbued the field with a religious zeal that this is a great organization, we do the best by our policyholders and you should be proud to represent us. They've got a terrific consistency, which I always admired in the organization.¹⁹⁶

Porter defines generic strategies along the two dimensions: focus (narrow versus wide) and competitive advantage (cost versus differentiation). Northwestern's generic strategy is illustrated in the following diagram.

Figure 16: Northwestern Mutual's Generic Competitive Strategy¹⁹⁷

		COMPETITIVE ADVANTAGE	
		Lower Cost	Differentiation
COMPETITIVE SCOPE	Broad Target	1. Cost Leadership	2. Differentiation
	Narrow Target	3A. Cost Focus	3B. Differentiation Focus: Northwestern Mutual

¹⁹⁵ Leslie Werstein Hann, "Setting a long-term care strategy," *Best's Review*, (Volume 99, Issue 11), March, 1999, 41.

¹⁹⁶ Leslie Werstein Hann, "Embracing the mutual" *Best's Review*, (Volume 99, Issue 11), Mar 1999, 35-40+

¹⁹⁷ Porter, *Competitive Advantage*, 12.

Northwestern has narrowed its insurance sales to specific markets. According to Richard Hall, Senior Vice President for Business Development, Northwestern focuses on submarkets:

We really work four marketplaces-the upscale-personal, the small-business, the estate-planning and the corporate marketplaces, and we expect growth in all four marketplaces in the years ahead-the upscale-personal because of the financial needs of the aging baby boomers; the small business because of the growth of the economy; and the estate-planning and corporate markets because government will continue to keep a lid on qualified benefit programs.¹⁹⁸

Northwestern appears to compete with other companies on the basis of differentiation more than cost. Some Northwestern executives have stated that customer-agent relationships based on agent expertise and highly personalized service are the key to unlocking each of Northwestern's four major insurance markets. According to Hall, "Our success will be determined by our ability to place trained, highly educated agents in those marketplaces"¹⁹⁹

Given current fears of Internet disintermediation of insurance and financial advisors, James D. Ericson, the President and CEO of Northwestern Mutual was asked to give a speech in Dayton, Ohio, addressing the question, "Does the professional advisor add value?" He said:

I believe that in the vast majority of cases, treating life insurance as a commodity will diminish the product-and even worse hurt our customers and policyholders. I also believe it would be a big mistake to expect technology and the Internet to replace the professional agent or advisor. The Internet is a revolutionary tool. But, it's still only a tool. And even such a powerful tool will not dramatically alter human nature, make it easier to confront mortality or prompt people to plan for a future that may not include their presence.²⁰⁰

Ericson then went on to define how he sees the agent as a means of product differentiation in terms of product and service:

First, they're specialists in life insurance. Second, they're experts in developing skills to build and maintain long-term client relationships.²⁰¹

In an interview with Bill Hegge, the Assistant Director of Information Services and thirty-eight year veteran of Northwestern, Bill defines how his company distinguishes itself from other firms as, "Our legendary reputation for integrity." This view of differentiation is supported by lore that stretches back to the very beginnings of the company, when, in 1859, a train derailment killed two passengers who were insured by the Northwestern. The company had only \$2,000 in assets to pay \$3,500 in claims from the train derailment. The president of the company borrowed the shortfall needed to pay the claims personally and then loaned the money to Northwestern so that

¹⁹⁸ "Relationships as usual," *Life Association News*, (Volume 93, Issue 4), April 1998, 80.

¹⁹⁹ "Relationships as usual," *Life Association News*, (Volume 93, Issue 4), April 1998, 80.

²⁰⁰ James D. Ericson, "Personal insurance as a commodity: Does the professional advisor add value?" *Executive Speeches*, (Volume 14, Issue 2), Oct/Nov 1999, 21-25.

²⁰¹ Ericson, 21-25.

the company could honor the claims of the two deceased train passengers.²⁰² Ericson also related a story in his Dayton speech to illustrate how the same ethic exists today:

The story concerns a man who tried to buy a life insurance policy for his newborn daughter. Our agent sent us the application, and we attempted to begin underwriting. But the doctor ignored our requests for the baby's medical records-not just once, but many times. Finally, we were about to close the case. But one day, the prospective policy owner called our agent. He inquired about the case. She told him that we were having problems with the baby's doctor. He said, "Well, don't worry about it. My daughter died this morning from Sudden Infant Death Syndrome." Our agent was devastated. And she worried about it. She called up a claims analyst in our Benefits Department. She asked the analyst to look into the case. Our analyst again asked the doctor for the records, and this time he provided them. At the same time, the claims analyst talked with one of her managers. Together, they decided that if the review showed we would have issued the policy, we would honor the claim. That's what our review showed, and that's what we did. We issued a policy to a deceased infant. And we paid the claim.²⁰³

Northwestern's generic strategy, namely, narrow focus on four insurance markets and differentiation through expertise, personalized service and integrity, illustrates important cultural norms affecting the technology and real estate strategy of Northwestern. First, the company is extremely concerned about integrity. Integrity implies the company's stated commitment to maintain a high degree of privacy and reliability.²⁰⁴

Northwestern's culture also translates into a defined strategy regarding the timing of adoption of communications technology. Northwestern tends to wait to adopt technology until its utility is proven. This helps Northwestern avoid what Porter describes as some of the disadvantages of being a "first mover" in the early adoption of technology. These include pioneering costs, technological discontinuity (little or no industry standard), and unanticipated changes in buyer needs that may make the new technology obsolete.²⁰⁵ For example, Armin Gumerman, who was the head of Northwestern's IS department until his retirement in 1996, related how his department started to experiment with online connections to agents in the early 70's, near the time when the Internet was being invented. Gumerman and senior management were convinced that online computing was not yet standard. Senior management had Gumerman implement a shell system at minimum cost and wait. In watching other mutual companies, Armin is convinced that several competitors soon launched, prematurely, a full blown effort to link all their agents via an online computing system which was not yet standardized, only to spend significant amounts of money later to upgrade. Northwestern waited several years, until Gumerman and officers of Northwestern were convinced that there was an established standard in place.²⁰⁶

²⁰² Northwestern Mutual, "Annual Report, 1999." (Unpublished).

²⁰³ James D. Ericson, "Personal insurance as a commodity: Does the professional advisor add value?" Executive Speeches, (Volume 14, Issue 2), Oct/Nov 1999, 21-25.

²⁰⁴ Bill Hegge, May 25, 2000, Milwaukee. Interview conducted by Geoffrey Morgan.

²⁰⁵ Porter, Competitive Advantage, 180-190

²⁰⁶ Armin Gumerman, former Director of Information Services, Northwestern Mutual, Telephone Interview by Geoffrey Morgan, July 10, 2000.

Despite the caution engendered by Northwestern's need to maintain their reputation of stability and integrity, the company is aggressive in exploring new technology solutions. This fulfills another Northwestern mantra: to maximize the long-term value for the policyholders. In a telephone interview, Armin Gumerman described Northwestern's technology strategy this way:

Northwestern's history has always been slow and cautious. They have always been a little faster, but not the first.... They wait until they see a trend develop, and they get on fairly early. Their whole philosophy is to do it right and do it early, but don't take undo risk.²⁰⁷

Perhaps the most critical implication of Northwestern's generic strategy, however, is their focus on the insurance agent as their source of differentiation. Everything in Northwestern's culture centers around the proper training, care and feeding of the agent, considered the lynchpin holding together Northwestern's relationship with its customers.

All else, including technology strategy, is designed to support this relationship. Armin Gumerman described clarified technology's role in this process in this way:

When they saw the emerging changes in deregulation and the Internet there were a lot of skeptics [about the Internet's usefulness] because of Northwestern's history of face-to-face selling. A lot of people felt that this was not for Northwestern. Later [once the usefulness of the Internet was proven] they accepted the technology. When they saw that the technology complimented [rather than competed with] their selling, they [the agents] got on the bandwagon.²⁰⁸

Chapter 4 shows that Porter views desirable technological changes as those that:

- Lower cost or enhance differentiation
- Have sustainable technological leads
- Shift cost or uniqueness drivers in favor of a firm
- Give first-mover advantages besides those inherent in the technology itself if pioneering the technological change
- Improves overall industry structure²⁰⁹

Since Northwestern views its agents as a primary point of differentiation, technology's role is to enhance the agent's relationship with their clients or make the firm unique in some other way. Northwestern is not interested in first mover advantages, so the company will probably not be able to use technology to become more unique. They may, however, use the technology to lower cost, as an ancillary benefit. In general, technology should improve industry structure for the firm in some way. This means that one of the five forces of industry structure (substitution, barriers to entry, etc.) should improve as a result of the technological change.

²⁰⁷ Armin Gumerman, former Director of Information Services, Northwestern Mutual, Telephone Interview by Geoffrey Morgan, July 10, 2000.

²⁰⁸ Armin Gumerman, former Director of Information Services, Northwestern Mutual, Telephone Interview by Geoffrey Morgan, July 10, 2000.

²⁰⁹ Porter, 171-172.

Northwestern does not, however, seem to expect industry structure will undergo radical change. For example, there is no indication, based on the president's comments, that he believes that the use of the Internet will signal the end of the need for agents. Yet, Northwestern is investing an increasingly large percentage of their profits in Internet implementation. IT spending had grown from \$72 million in 1993 to \$150 million by the end of 1999. Most of this additional money was funneled to the development of Northwestern's web site. This web site is supposed to enhance policyholder's relationships with their sales agents.²¹⁰ Bill Hegge, Northwestern Mutual's Assistant Director of Information Services, said that company executives see the Northwestern Web site as a way to free agents from the burden of routine address changes and administrative matters because the customer will be able to quickly handle such routine changes themselves online. The agents would then be free to handle the non-routine business of relationship building and adding to their customer base.²¹¹ Furthermore, by improving the usefulness of the Web site, customers have an online resource with pages which quick reference definitions of policy types and options. So, Northwestern appears to be strengthening buyer purchasing power by adding a new resource by which customers can stay informed.²¹²

Industry structure and the generic competitive model are probably not enough really to understand how the technology is used in depth. For that, Porter provides a more detailed analysis of how technology is used via the firm and industry value chains.

The Firm and Industry Value Chain: Application of Technology to Operations

Porter's model of the firm and industry value chain explores inner-company and inter-company operations in greater depth than Porter's generic strategies or five forces model. Recall that the industry value chain shows how firms interrelate to create value and competitive advantage. The firm value chain consists of primary functions related to the direct production of the firm's product (inbound logistics, operations, outbound logistics, sales/marketing, service) and secondary functions designed to support production (technology, infrastructure, human resources, procurement).

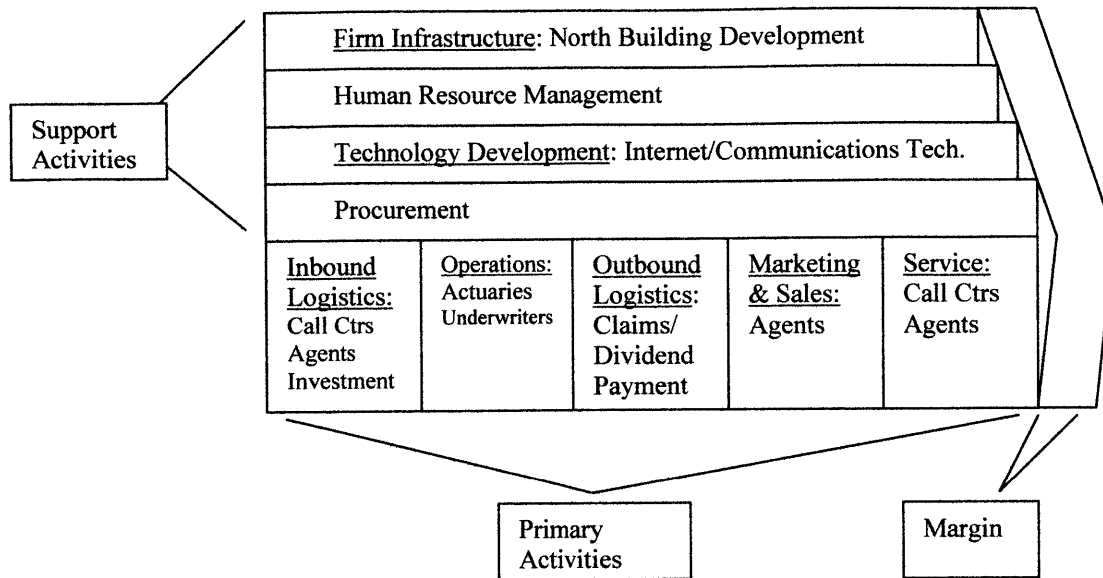
A model of Northwestern's industry value chain might show Northwestern providing value to policyholders in the form of insurance coverage and dividends. Northwestern would receive inputs from a variety of industries to produce this policyholder value. For example, the capital markets would provide the investment side of Northwestern various financial instruments that the investment department would use to create a portfolio that generates enough of a return to support Northwestern's policy claims, operational needs, and dividend goals. Northwestern would also receive numerous inputs from suppliers and vendors for support functions related to the company's infrastructure and technology needs. Support inputs to Northwestern from the industry value chain include telecommunications providers, local and long distance carriers, constructors and design professionals to generate company infrastructure and information technology, among a litany of other inputs. Within the organization, Porter analyzes the function of a company using the firm value chain model shown in the following figure.

²¹⁰ Jeff Moad, "Making noise through IT innovation," *PC Week*, (Volume 16, Issue 50), December 13, 1999, 92-94.

²¹¹ Bill Hegge, Telephone interview by Geoffrey Morgan, 29 July 2000.

²¹² Northwestern Mutual. "Home Page" *Northwestern Mutual*, July 2000 <<http://www.Northwesternmutual.com>>, (20 July 2000).

Figure 17: Northwestern Firm Value Chain²¹³



Northwestern has inbound logistics, the means by which the company receives data for the creation of new policies, in the form of call centers, field agents who receive calls for insurance, and internal institutional buyers who react to financial and real estate market changes and adjust company asset holdings accordingly. Operations, the point of "production" of the policies, might include the actuaries who evaluate risks and the underwriters who process potential insurers to see if potential customers qualify for their products. Outbound logistics might include payment of claims and dividends. Since this is not an industrial facility, these three functions and those of sales and service may all fall interchangeably between corporate call centers and agents who may adopt one or all of the five primary roles in various phases in of interaction with the customer?

Northwestern's generic strategy of differentiation is framed around the agent. As a result, the secondary (support) functions of technology, infrastructure, procurement and human resources are generally designed to support the sales force. For example Northwestern places a great deal of its emphasis, on the human resources side, in the recruiting and training of the agent. Eleven percent of Northwestern's agents are recruited during college as a part of an internship program that has been in existence for thirty years.²¹⁴ Northwestern has a five week training program for new agents to train them in underwriting standards, a Fast Track Academy for especially promising agents and a great number of support desks to help agents clarify underwriting standards and receive continued training.²¹⁵ New agents are evaluated based on a point system that takes into account the number of new contacts and other measures in addition to the traditional total sales measure. The following sections of this case deal with the remaining

²¹³ Based on Figure 2-2, Porter, *Competitive Advantage*, 37.

²¹⁴ Carole Ann King, "'Xers' as future agents and clients," *National Underwriter*, (Volume 102, Issue 23), June 8, 1998, 39-40.

²¹⁵ Carol Ann King "NWML expands training for agents," *National Underwriter*, (Volume 102, Issue 32), Aug 10, 1998, 27.

secondary functions in the firm value chain—procurement, infrastructure and technology—as they relate to development of the North Building of Northwestern's Headquarters and how they relate to the company's strategy.

Site Selection, Design and Technology Demand

Site selection, design and technology choices all relate to the secondary functions of infrastructure, procurement and technology in Porter's firm value chain. This section begins with a description of the site and site selection choices Northwestern made, following with a history of how technology has been used throughout the Northwestern campus, following with a discussion of the design issues addressed in the North Building.

Site selection, on its most basic level, was a fairly straightforward proposition for Northwestern. The original headquarters, built in 1911, and the newer 1978 structure, were both located on land already owned by Northwestern: a parcel along Wisconsin Avenue situated near the center of downtown Milwaukee, close to Lake Michigan. The existing structures could not hold the then 3,000 headquartered employees comfortably. Northwestern was forced to house overflow employees in two nearby offices, at 611 and 733 Wisconsin. Northwestern wanted to maintain a campus environment. According to the then NML Chairman and Chief Executive Officer Donald J. Schuenke, "We considered moving some data services to another location, in rented space, but we feel that the interaction fostered by a campus environment benefits the employees and the product."²¹⁶ Bill Hegge, Assistant Director of Information Systems who was heavily involved in the North Building project, added that:

[The East building's older design] had caused us a lot of consternation because of the rapid growth of people and in our use of technology. We were fortunately able to design the North building with.... flexibility and ease of use. When we had outgrown the building that we had moved into in the seventies, we owned a building on Wisconsin which was supposed to be a tenant building which we then fully occupied [with our own employees]. The employees didn't like working there; they felt they weren't part of the company. There weren't skywalks to connect them to the other buildings, so they had to walk to other buildings through the weather.²¹⁷

Since Northwestern already owned the land and they valued the synergies in a campus environment, the Wisconsin parcel was a clear choice for the campus.

The design process was very deliberate and very inclusive. Armin Gumerman summarized how the design process worked when he described how the company changed the roof design to allow for the possibility of satellite antenna placements:

They were willing to compromise the design of the building for the potential that this technology would emerge and be important to the industry, and therefore important to Northwestern. That's the type of thing they allowed us to do: experiments. We didn't adopt the technology real early, but we didn't cut ourselves out of the possibility of using

²¹⁶ "Flexible Tower Rises from NML's 7-Year Itch," *Facilities Design & Management*, (Volume 10, Issue 10) Oct 1991, 44.

²¹⁷ Bill Hegge, Telephone Interview by Geoffrey Morgan, July 11, 2000

it. It is typical of how Northwestern has reacted over the years, always putting themselves in the position of being able to move very quickly when they feel that it is the right thing to do, and then do it the best way they can possibly do it, and usually the best in the industry. That is pretty much the philosophy of the company as related to technology.²¹⁸

Planning involved an exhaustive three-month committee process involving members of every headquarters department. From the technology design standpoint, however, this process could have been said to have started many years earlier. Armin, a member of the development team, and director of the IS department, had been a member of the Technology Committee for many years. This committee was continually inviting new equipment vendors and technology experts to re-evaluate the use of technology in Northwestern's operations. This continual process was followed by annual technology briefings and recommendations to the most senior levels of company management.²¹⁹

Despite all this deliberation, Northwestern did not anticipate the rate of growth in technology needs in the East Building. The North Building development timing was shorter than they had anticipated: Northwestern was building a new structure only seven years after creating a new tower. One of the driving forces behind the new structure was the need for office space which could handle the additional technology required at each desk. According to Elfa Foldi, the associate director of corporate services at the time of the North Building development,

Our people projections were on target, but technology grew, and that is why our East Building became inadequate when it was only seven years old. Virtually all employees now need a computer screen on their desks. That added about two feet to the space required for each workstation. And that meant a loss of two workstations per floor.²²⁰

Flexibility for new technology was one of the key design factors that entered into the decision-making process behind the development, and added desktop equipment was just one part of the need for flexible design. Northwestern wanted to create a building which would have the technology and capacity to satisfy Northwestern's requirements until the year 2010.²²¹

Bill Hegge had developed some of the basic elements that would allow this building to have flexibility years before the building was considered. In 1978, for example, he recognized that, because of current court rulings, Wisconsin Bell no longer had the exclusive right to install their own switch to service Northwestern. So Hegge got approval and procured a Northern Telecom SL-1 PBX instead. This was one of the first Private Branch Exchanges installed in a large corporation. Wisconsin Bell tried vigorously to win back this business through direct lobbying by their president to NWML's President, through economics arguments and even threats that the system was illegal.²²² Ultimately, the PBX and related phone equipment were installed.

²¹⁸ Armin Gumerman, Telephone Interview by Geoffrey Morgan, July 10, 2000

²¹⁹ Armin Gumerman, Telephone Interview by Geoffrey Morgan, July 10, 2000

²²⁰ "Flexible Tower Rises from NML's 7-Year Itch," Facilities Design & Management, (Volume 10, Issue 10) Oct 1991, 44.

²²¹ "Flexible Tower Rises from NML's 7-Year Itch," Facilities Design & Management, (Volume 10, Issue 10) Oct 1991, 44.

²²² Bill Hegge, May 25, 2000, Interview by Geoffrey Morgan, Milwaukee, WI

Although it is difficult to quantify all the PBX's cost savings, Hegge estimates that the inter-company calls, lower equipment costs, lower maintenance costs, and revenue generation from tenants have resulted in a 3 to 5 million dollar savings to the headquarters over the PBX's twenty year life.

The North Building incorporated this PBX and other equipment into a new campus wiring design. Northwestern has two competing long distance providers (AT&T and MCI), with two separate high speed fiber optic OC-12 SONET (synchronous optical network) loops to the building's main phone switch.²²³ This duplicate wiring, called "diversity routing," is designed to minimize system down time in the event one of the long distance services fails.²²⁴ If the SONET ring is cut on one side, the network will continue to function. Furthermore, if MCI, for example, loses service, than AT&T's SONET ring will automatically pick up the telephone transmissions.

NWL uses a frame relay to establish data connections between the agencies scattered throughout the U.S. and the Wisconsin main office's local area networks. The voice system uses multiple high volume T-1 lines (from the local telcos and long distance carriers) to the main PBX (approximately 21 T-1 lines to serve the 5700 voice lines in the building.) ISDN lines are run separately from the PBX to support video conferencing and some business partner applications. The original voice system used Nortel SL-1 phone sets. This required Northwestern to have two pairs of copper line for each phone. Now the system uses 5700 single pairs of copper wires which run signals to digital phones, although there is substantial additional copper available for expansion.²²⁵ On the data side, fiber optic cabling is run from the SONET loop through the risers to data closets at each floor, where the signal is sent to the desktop via Category 5 twisted pair copper wire.

Armin Gumerman and Bill Hegge both convinced Northwestern Mutual of the need to establish high-speed fiber runs between all the buildings on the campus, and the 611 and 733 buildings off site. To do this, Northwestern had to lobby Mayor Meyers to get permission to open the streets and allow phone carriers to lay multiple "dark" and activated fiber optic cables along the street. As a result, Northwestern is no longer limited in their ability to achieve higher bandwidths by a lack of street cabling.

Technology and flexibility are also supported by raised floors throughout the building, air conditioning systems dedicated to IT and telecommunications equipment, duplicate risers for diversity routing on each floor, and deeper (30 inch) raised floors for wiring needs in the data centers.²²⁶ This is augmented by in-house switches and banks of emergency batteries in the central campus complex. In addition to these changes, Armin Gumerman also pushed to have a flat roof to allow for the flexibility of satellite dishes if they might be needed in the future.

The basic office configuration, however, has not changed; there are offices for more senior management lining the windows with banks of low-walled cubicles in the center. The newer

²²³ Dodd, P. 161

²²⁴ Tom Esau, Network Analyst, Northwestern Mutual, Interview by Geoffrey Morgan. Milwaukee, WI, 25 May, 2000.

²²⁵ Tom Esau, Interview by Geoffrey Morgan, Milwaukee, WI, 25 May 2000

²²⁶ "Flexible Tower Rises from NML's 7-Year Itch," *Facilities Design & Management*, (Volume 10, Issue 10) Oct 1991, 44.

offices also use more indirect lighting, which is favored by the office workers because it produces a softer light that reduces screen glare. Skyways used to connect the South and East building were extended to connect the North building and parking structure, allowing security, access and shelter from weather to employees transiting between buildings. Northwestern also continued to offer a health club and a cafeteria that provides discounted breakfasts and free lunches, amenities that have been offered at Northwestern since 1914.

Operations and Management Issues

The design process that resulted in the development of the North building also occupied a lot of Northwestern's operational priorities. The North Building's flexible design, coupled with the improved campus wiring accompanying the development, resulted in proven efficiencies and features. The facilities department, call centers and data center have directly benefited from the new design. William Morgan, a telecommunications consultant and managing partner of W&J Partnership, helped design the communications technology used in the North Building. He was directly involved in the North Building's structured wiring design, equipment power specifications and system architecture. He described his work consulting with Bill Hegge and Armin Gumerman:

By designing structured cabling to the use of the raised flooring, they [Northwestern] had and have pretty good immunity from future physical media changes (which happened in the industry.) The raised floor has lots of advantages. They really have saved a bundle on re-wiring: moves, adds and changes. By having a common, backed up AC power source for equipment, they could keep on operating whenever there was power interruption. They were immune from surges (saves on equipment downtime). And they saved on floor space because they did not need to have a small UPS at each desk or group of desks. Four, by having physical diversity routing into the building, when there was a manhole problem, the whole company was suddenly not taken out of communications. Wisconsin Bell served them from two, different central offices via two different cable paths and entrance facilities. The extension of this thinking grew to have two long distance carriers. A fifth element that they thought up and did was to put in indirect lighting. It is thought that the cabling and raised floor may have been paid back in less than a year, if soft money savings are considered. If only direct expenses are considered, then the payback was something like less than 3 years.²²⁷

The Facilities Department is a very busy department at Northwestern. According to Mike Skorsted, Facility Operations Manager, Northwestern has a "churn rate," or percentage of total population to move within the office each year, of roughly 60%. Of these moves, 25% are briefcase moves, requiring no cubicle or telecommunications reconfiguration. The remaining "furniture moves" require some degree of heavy lifting and rewiring. Skorsted estimates that of the approximately 1600 furniture moves, 800 occur in the North building, 600 in the East building and 200 or less occur in the South building. The North building was designed to be flexible enough for the "production" force of call centers and other direct agent support and

²²⁷ William A. Morgan, Managing Partner, W&J Partnership, Interview by Geoffrey Morgan, Castro Valley, CA, July 1, 2000.

investment professionals.²²⁸ This building allows quick rewiring through quick floor access and carpet squares. The east building is less flexible, with power and telecommunications wiring running in a concrete deck tray. Moves often require opening new holes through the concrete to accommodate the wiring. The 1911 building is by far the most difficult to work with. This building has floors which are several feet thick in some locations, requiring concrete core drilling or ceiling wiring to the workstation. Skorsted estimates that, in the North building, it costs \$500 to perform a furniture relocation as opposed to \$700 in the East Building or \$850 in the South building.²²⁹

Northwestern's 60 call centers are probably an even more pressing concern because of their direct support role to policyholders and agents. In order to better manage the call centers, the main switch is linked to a Meridian Mail MMEC platform which manages a sophisticated voicemail system that primarily is used for announcements and menus and for scripted calls. "Scripting" refers to the customer controlled routing of calls for call center use. The tallying of statistics on performance (speed of answer, personal call versus customer call time, and dozens of other statistics) is performed by a Nortel MAX call-center reporting package. The PBX measures the speed with which calls are answered and routed via CCR (customer controlled routing). MAX measures the performance of individual call center queues as well as the individual performance of call center reps and agents in answering those calls. Every week, these reports are exported to an archive. The statistics are compiled from a PC which gathers MAX statistics once per day. These statistics are viewable real time within MAX via a Nortel software package called MTE, allowing call center managers the ability to better manage the real performance of their system. Displays at each call center can display various information based on the individual call center's preferences, including the number of calls in a queue, number of calls in process, etc. This information comes from MAX real time via a serial connection. This has allowed departments to measure and improve call center performance. These statistics are also passed, via MAX, to another application called TCS, which takes real call center performance statistics and allows the manager to use statistics for forecasting, and scheduling, including vacation scheduling, and to compare individual call center representative's performance.²³⁰

The first impressions about the data center for most visitors are probably related to its security measures. The space has physical security procedures similar to some military complexes including physical escorts through the space, badges and a prior clearance procedure. This reflects the need for Northwestern to protect sensitive medical data and other client information. The floors are raised higher than standard floors to accommodate much heavier wiring requirements. As time has progressed, data storage equipment has become steadily smaller. Northwestern has moved from large Memorex tape storage units to much smaller IBM virtual storage. Even the increased use of routers and servers, connecting the investment side of the house directly to Bloomberg among other financial networks, and the insurance agents to their wide area network, has not increased the square footage requirements of the data center. Plans have been set forth to convert 30,000 square feet of this 80,000 sf center into office space.

²²⁸ Armin Gumerman, Interview by Geoffrey Morgan, July 10, 2000.

²²⁹ Mike Skorsted, Facility Operations Manager, Interview by Geoffrey Morgan, Milwaukee, WI May 25, 2000.

²³⁰ Northwestern Mutual, "Northwestern Mutual Life PBX and Peripherals Overview," (unpublished), January, 2000.

Armin's one regret about the design is that he overestimated the data center requirements.²³¹ In general, however, he and the design team have much to be proud of: the information infrastructure and design have adapted with virtually no outages and no significant modifications for the last 10 years, a testimony to the forward looking design of the building.

Future Growth: Implications on Space and Technology Needs

Northwestern's strong history has colored the lens through which it peers into the future, perhaps with good reason. After all, the Internet does not appear to have changed the fundamental way Northwestern does business. Employee growth, for example, has kept pace with industry growth. Ericson's observation that the insurance business is "not a commodity" enforces the idea that the company still revolves around the agent, and that they feel that insurance is too specialized a product to be commoditized on the Internet.²³² Yet, the company has more than doubled its investment in new technology since 1993, with most of the proceeds flowing to the company's Internet business. Recently, the company added a corporate officer responsible for Internet implementation, who is among the top 10 highest ranking executives in the company.²³³

So far, the company's strategy of expert customer service to four specialized insurance markets has paid off. The company continues to yield increasing revenues in spite of a shrinking whole life insurance market segment.²³⁴ Since a good portion of the business is direct B2B insurance sales to small businesses, and since the World Wide Web is a fairly new phenomenon, it will be interesting to see in the future if service distinction wins out over price. So far, the company views the Internet as a tool that will be used specifically as an aid to the agent, rather than as the agent's replacement. However, since Northwestern is not immovable and is not just one monolithic voice, the company may simply show change more gradually. Northwestern does not relish the idea of being first to market with technology.²³⁵ However, they have a history of early adoption of new technology: one of the first large companies to computerize (using one of IBM's first mainframes, for example, in 1957), one of the first companies to use a private telephone switch in the late 70's, and one of the first large businesses to cable their entire campus with structured cabling and fiber optics in the early nineties.²³⁶ Many of the highly sensitive customer lines, such as claims, or the more information sensitive investment departments are quicker to adopt to new technology than the less time sensitive departments, such as departments dealing with deceased claims. Although the company has a technology committee, it is a committee, inherently slower to respond and further hampered by the relative differences in speed of each department. Thus, it may take time to observe the company changing view of technology's role in the department level.

Demutualization is another issue which affects Northwestern's strategy. If Northwestern did decide to go public, the shareholders of a publicly held company might feel differently about the

²³¹ Interview, Armin Gumerman, July 10, 2000

²³² James D. Ericson, "Personal insurance as a commodity: Does the professional advisor add value?" Executive Speeches, (Volume 14, Issue 2), Oct/Nov 1999, 21-25.

²³³ Interview, Armin Gumerman, Interview by Geoffrey Morgan, July 10, 2000.

²³⁴ Northwestern Mutual, "Annual Report, 1999." (Unpublished).

²³⁵ Interview, Armin Gumerman, Phone interview by Geoffrey Morgan, July 10, 2000.

²³⁶ Northwestern Mutual, "Annual Report, 1999," (Unpublished) 5.

Internet's role in the Insurance industry and shift some of the focus away from a differentiation to a price strategy. Although Ericson has said he has no intention of demutualizing, he does say that he would do this if management had a change of heart and believed that the move was in the best interests of the policyholders.²³⁷

For now, however, Northwestern seems unified in the idea that headquarters and technology's role is to support the agent, because that is in the best interest of the policyholders. Instead of falling employee counts from disintermediation, headquarters employees have grown faster than projections from one to two hundred employees per year to keep up with increasing demands from the field. Growth above Northwestern's projections appears to be accelerating Northwestern's space needs despite the shrinkage of data center space requirements.²³⁸

Summary

This section comes full circle, to tie the reality of Northwestern and the development of the North headquarters building back to the theory predicting the competitive strategy and development practice of FIRE businesses. The summary starts by comparing competitive strategy with Chapter 4's predictions and then compares Northwestern's development practices to Chapter 3's predictions.

This study has sought to compare Northwestern's competitive strategy to that of the other two cases along four dimensions: present/past versus future orientation, use of technology, growth rate and resource use to test whether Porter's or Hamel & Prahalad's model best apply to the competitive strategy of this company. From the case, it is clear that the model proposed for Porter matches Northwestern. Northwestern looks to its policyholders as owners of the company and is hesitant to make what Northwestern management might call "rash" decisions about the future. The company's 140 year history as the "policyholder's company" still holds as the vision of the future. Hence, Northwestern is focused on serving customers' current needs and learning from the legacy of its past. This is a past/present-oriented organization, focusing on how to maintain its reputation of consistency and integrity and how to serve the current needs of the shareholders, a strategy that does not claim to address the future of the industry explicitly. Communications technology has been clearly defined as an amenity whose role is to support the agent. Growth of employment has been consistently single digit and slightly greater than the FIRE segment as a whole; Northwestern is not a high growth business compared to many "New Economy" businesses. Northwestern is cautious about the use of its resources, preferring to avoid the risks associated with "first movers" in technology development; anecdotal evidence suggests that this strategy has helped Northwestern avoid substantial cost overruns other businesses have faced. In short, Northwestern's outlook on competitive strategy matches the "Porter-like" attributes from the Competitive Strategy Framework Comparison in Chapter 4.

²³⁷ Brian Garrity, "Northwestern Life resists IPO gold rush-for now" *The Investment Dealers' Digest : IDD*, Aug 17, 1998, 7-8. Leslie Werstein Hann, "A case for change" *Best's Review*, (Volume 99, Issue 11), Mar 1999, 42.

²³⁸ Northwestern Mutual, "Northwestern Mutual Employee Growth, projected versus actual," (unpublished), Updated March 22, 2000.

In Chapter 3, this thesis suggested how a traditional FIRE business might approach development along four dimensions: feasibility, site selection, design and operations. Northwestern, representative of typical large insurance companies, has low development risk because of its established, steady market growth and liquidity. Northwestern was very deliberate in its development process, moving only after hearing the concerns of all of its headquarters departments. This was a process of planning that took years from start to finish. Hence, Northwestern conformed to the predicted "feasibility" phase predictions for FIRE development strategy.

Site selection was based on proximity to existing headquarters building, not on proximity to educational institutions or other factors. Northwestern was concerned about power and fiber, and was very forward looking in its decision to trench along Wisconsin Avenue to lay fiber and allow for potential future expansion of the company's bandwidth requirements. Fiber optic placement seemed more important to Northwestern than one might have expected from this study's predictive model, since the building was built fully eight years before most commercial real estate professionals appeared to be taking fiber optics seriously. Thus, predictive development models, analyzed alone, are useful but not 100% accurate predictors of development behavior.

Northwestern's design strategy seems to reflect what this study predicted: Technology design was based on past experience from the less flexible design of the East building. The basic floor plates are fairly uniform, without any notable new amenities added above and beyond previous structures.

Northwestern's operational concerns played a large part in the design process. The company wanted to be able to accommodate its very high churn rate with flexible office movement. The system attempts to avoid system outages with emergency generators and SONET loop fiber technology. The communications technology system is designed around improved flexibility, efficiency of call centers, ease of agent use, and maintainability. The design has also sought to maintain Northwestern's system security standards. Technology, in other words, was viewed in the context of improved efficiency for existing operations. This model would have predicted the use of Last-Mile contractors to provide technology. Unlike the model, Northwestern has decided to own its own equipment and perform the technology management role "in-house" as the company has done for many years.

Northwestern's general development strategy, explained in the preceding paragraphs, is summarized in the table below. This table compares Northwestern's observed development practices with the strategies predicted from a review of current practices.

Table 6: Comparison of Northwestern's Observed and Predicted Development Practices

	Northwestern	
	Expected Development Practices	Observed Development Practices
Feasibility Development Timing Business Risk	Moderate Low/Mod.	Moderate Low
Site Selection Criteria Proximity to Skilled Workforce Access to High Speed Fiber Access to High Power Volume	Mod. /High Important Important	Moderate Important Important
Design Uniformity of Floor Plate Flexibility of Space Information Technology Design Structural requirements Level of Amenities	High Moderate Mod. Vol. Average Average	High Moderate High Vol. Average High
Operations Use of Technology Power/IT Outages Technology Provider Business Relationship	Efficiency Mod. Impact "Last Mile"	Efficiency Mod. Impact In house.

Northwestern has behaved as both the competitive strategy and development models predicted, with few exceptions. It seems that a great deal of Northwestern's business model relies on their differentiation focus. If Northwestern had based their competitive strategy on price and on a broader customer base, they might feel the effects of the Internet "e-insurance" competition more acutely today. So far, however, the FIRE segment as a whole has not suffered increased unemployment. Since the World Wide Web is still young, it is probably too early to tell if Northwestern will face a serious disintermediation threat in the future.

Case 2: YankeeTek Incubator and Akamai Technologies

“Imagination is more important than knowledge.”

-Albert Einstein

Introduction

This study moves now from a world where the future, it seems, can be measured, to a world where competitors vie for leadership through imagining a future with new industries yet unknown. Northwestern's business model, based on a mature industry with predictable growth, stands in stark contrast to the fast and unpredictable growth and future of the Internet and Telecommunications industries in which YankeeTek Incubator and Akamai Technologies compete. The second case begins with an explanation of why YankeeTek and Akamai were chosen and why they are studied together. This explanation includes a discussion of the industries in which these two companies compete. Given this justification, the case proceeds to explain each company's business model as it relates to the framework of industry reinvention/regeneration and resource leverage discussed by Messrs. Hamel and Prahalad. This business model is then linked to the real estate development and operational decisions both companies have made. The next section will then discuss how Akamai and YankeeTek view the future as it relates to technology and development issues.

Like the Northwestern case, the end result of this case's analysis will be two-fold. First, in comparing Porter and Hamel/Prahalad, there were four fundamental differences in strategic outlook distinguish the "Porteresque" company in a standardized or mature industry with an established value chain, and the "industry reinvention" focused company of Hamel/Prahalad. These four comparison points were: 1) past/present versus future oriented business strategy, 2) use of technology, 3) growth rate, and 4) resource abundance. The case will look back at YankeeTek and Akamai's competitive strategy to measure these four strategic points.

Second, Chapter 3, Development Issues, concluded by predicting the development strategy of FIRE businesses, Internet-businesses and telecom hotels in their approach to project feasibility, site selection, design, and operations. The summary will then conclude by reviewing YankeeTek's and Akamai's development approach along in these four areas as a point of comparison for the remaining two cases.

Why Study YankeeTek and Akamai?

YankeeTek and Akamai are a study in the evolution of a high technology business. This section starts by describing the nature of both companies' businesses, and explaining why it makes sense to analyze both companies together. This discussion shows that the two companies each reveal insights about how an Internet company's strategy, technology and real estate strategies might

change at various growth changes. This, combined with our ability to gather data from a rich variety of sources representing landlords and tenants, makes this a very interesting exploration of Internet company strategy and real estate development.

YankeeTek Incubator, as the name implies, is a company and location where business ideas can be nurtured and developed in a protected environment until the fledgling businesses are able to make it on their own.²³⁹ YankeeTek was founded by Howard Anderson around the end of 1999 to sponsor communication technology startups.²⁴⁰

Anderson's foray into the communications industry started at the ripe old age of 24, almost immediately after his graduation from Harvard Business School, when he founded the now well-known Yankee Group.²⁴¹ He sold the company three years ago to Primark Corporation for approximately \$30 million. Recently, Reuters bought the communications consulting company from Primark for \$72.5 million.²⁴² In 1984, he started a venture partner firm called Battery Ventures that funded, among other companies, the fledgling Akamai Technologies in 1995. It is not surprising that Professor Anderson teaches entrepreneurship as the William Porter Distinguished Lecturer at MIT's Sloan School of Management. As one might expect, Anderson is not bashful about his strategic philosophies. Since he is an outspoken and prolific writer and speaker on telecommunications, his opinions on communications technology and strategy are easy to discover.

Anderson resigned from Yankee Group in November of 1999, just prior to the company's initial public offering, to start YankeeTek Incubator. Anderson saw a market niche that he didn't feel was adequately filled. Some emerging companies did not yet have the capital they needed to continue operations, yet their needs were too small and the idea too new for venture capital firms, who sought fewer, larger deals. In a July 17th interview by the authors in his 12th-floor office located within the incubator itself, Anderson said:

This year, there will be \$50 billion in new funds raised. A few years ago, it was \$9 billion. So the subject is clearly hot. Those who can add value can raise about as much money as they can possibly spend.... we are buying in at 3 million dollars at a 6 million value when the next round [of VC financing], so we can afford to take a greater risk.... What is interesting is that all these VCs would like to work in smaller startup companies and they can't do it any more because the amount they raised is so much, in Battery Ventures we just raised a billion dollars there, that's serious money. If I've got ten partners they each have to spend 50 million dollars this year and 50 next year, or they haven't spent the billion. You can't do two or three million dollar deals. It's just too many deals. So instead they invest in YankeeTek and say to call when you're ready for the second round of financing.²⁴³

²³⁹ For a list of selected incubators, see Appendix B.

²⁴⁰ Bradley Spurrison, "With IPO in sight, Anderson bolts firm for new VC fund," The Investment Dealers' Digest, Nov 15, 1999, 10.

²⁴¹ Howard Anderson, "Off-line," Telecommunications, (Volume 32, Issue 2) Feb 1998, 82.

²⁴² "Reuters to acquire The Yankee Group for \$72.5 million," Information Today, (Volume 17, Issue 6), Jun 2000, 72.

²⁴³ Howard Anderson, Founder of YankeeTek, Interview By Geoffrey Morgan and Ben Pettigrew, Cambridge, MA, July 17, 2000.

YankeeTek's investors constitute a prestigious list of firms that range from venture capital firms like Battery Ventures to large communications and technology companies like Nortel Networks and 3Com. YankeeTek gives these firms an opportunity to invest in and establish key alliances with early-stage startups that hopefully will give the investors abundant rewards in the form of equity appreciation and technological innovations.²⁴⁴ In exchange for helping YankeeTek's portfolio companies at their riskiest stage, Anderson hopes to reap substantial benefits, perhaps 50% ownership, where a standard venture capital deal at later stage of funding would yield 30% to the investors.²⁴⁵ The incubator provides expertise in areas in which the entrepreneur may be lacking, such as group insurance, payroll, intellectual property law expertise, law firms, office management, space, Internet and telecom access and IT support. Anderson adds, however, that it is not really the physical office space his incubator provides which adds value but his relationships and expertise in technology and venture capital to provide what he calls "smart money":

Space is irrelevant. Smart money. I'll go with smart money. Not only do we have money, but also we can help. For example, a company can say, 'I have a good new product here, I need a beta customer.' [Then I might say]. 'Jesus, my guys at Federal Express probably could use that product. Let me make a call for you.' Then, the company says, 'Ok, I've got my product working, now what do I do about getting a sales manager?' [Then I might say] 'Well, let me see who's good, because I've seen these guys before.' That is a lot better than passive money. That is essentially what we [at YankeeTek] offer. If I call up another VC and I say, we're raising next round 15 million, they say, 'when can we come over?'

Anderson is skeptical of the prospects for many incubators because they do not have the ability to offer the range of expertise and services that YankeeTek provides. In an interview with the Sloan School of Management professor, he shared a prophecy that reveals a potentially dark future for many incubators:

Ninety percent of incubators will fail. We will succeed because we bring marketing expertise from the Yankee Group, the best talent in the nation and sophisticated money.²⁴⁶

Although Anderson's incubator is new, his experience in the world of venture capital and angel investing is not. He has had considerable success in his investments in communications technology companies, perhaps the most notable of these being Akamai Technologies.

Akamai Technologies is, arguably, one of Anderson's most successful investments. This business is what Anderson hopes for from every company within YankeeTek's portfolio. His initial investment of \$5 million dollars in January 1999 yielded a \$2.5 billion return by February

²⁴⁴ YankeeTek. "Our Investors." July 2000. <<http://www.YankeeTek.com>>, (July 19, 2000).

²⁴⁵ Howard Anderson, Founder of YankeeTek. Interview by Geoffrey Morgan and Ben Pettigrew, Cambridge, MA, July 17, 2000.

²⁴⁶ Bradley Spurrison, "With IPO in sight, Anderson bolts firm for new VC fund," The Investment Dealers' Digest : IDD, Nov 15, 1999, 10.

2000.²⁴⁷ He sponsored Akamai through Battery Ventures. Professor Tom Leighton, now head of Algorithms at MIT's Laboratory for Computer Science, was inspired by MIT's Tim Berners-Lee, inventor of the World Wide Web, who said that the greatest challenge that would be faced by the Internet would be to invent a better, faster way to deliver content. A renowned expert on parallel algorithms, Leighton realized that the problem was mathematical. He enlisted the help of two other mathematicians and/or computer scientists and formed one of the first content delivery companies.²⁴⁸ The team has succeeded in coming up with new technology to speed and improve content on the Web, which has resulted in explosive growth, from 50 to 1,050 employees, a 2000% growth in one year.²⁴⁹

Joint analysis of YankeeTek and Akamai allow unique insights into the changing strategic, technological and real estate needs of an Internet company through various phases of growth. YankeeTek and Akamai both owe, or will owe, their success, in great measure, to the fact that Howard Anderson was willing to back their venture. Anderson was and is a direct investor in Akamai who had a definite influence on their business strategy and industry leadership as the founding member of their venture partner, Battery Ventures. The combined analysis of YankeeTek and Akamai allow an unfettered view of the workings of this strategy from the Internet company's inception to its growth phase. This allows the discussion of the changing nature of an Internet company's strategy and its real estate and technology needs.

Anderson has also produced a great deal of written literature directly related to YankeeTek and Akamai's business strategy. His writings cover many facets of his business philosophy in investing in startup companies such as Akamai and the six start-up companies that comprise YankeeTek's portfolio.

YankeeTek and Akamai's Competitive Strategies

Hamel and Prahalad discussed why companies failed, and then elaborated two major strategic actions a company must take to maintain market leadership. Hamel's and Prahalad's study of why companies fail is a cautionary tale; the main thrust of their book relates to how companies can excel through industry regeneration and reinvention and market leadership. The next section will discuss the extent to which YankeeTek and Akamai use industry regeneration, industry reinvention and resource leverage to maintain market leadership.

Industry Reinvention and Regeneration

Recalling Hamel and Prahalad, they said that in order to reinvent an industry, a company must change some fundamental rule of engagement in the industry, redraw the boundaries between industries, or create entire new industries. Hamel and Prahalad defined regeneration of strategy

²⁴⁷ Tish Williams, "New hot spot: Cold Boston," *Upside*, (Volume 12, Issue 2), Feb 2000, 38.

²⁴⁸ Akamai, "Origins," <<http://www.akamai.com>>, July, 2000, July 19, 2000.

²⁴⁹ Jerry Nadeau, Real Estate Manager, Akamai, Interview by Geoffrey Morgan, Cambridge, MA July 12, 2000.

as the process of unlearning the past, of developing foresight of an industry's future, and of creating an architecture by which one can dominate future markets.²⁵⁰

Incubators such as YankeeTek are concerned with industry reinvention only. After all, a newly born business, by definition, cannot be regenerated. Some of Anderson's criteria for what makes "a product great" closely echo industry reinvention:

What makes a product great? It works well with other products of the same design, so your investment is not trashed prematurely. It returns substantial and continuing economic benefit to the user. It becomes the standard. It creates a better way. It lets applications that were not previously possible thrive.

Bottom line: "The Best" may be an illusive term, but we all have experienced such products. Great companies don't start out great by themselves; they begin with these insanely great products. The designers won't compromise; they strive to outdo themselves and won't settle for me-too products.²⁵¹

What Anderson calls "the standard," Hamel might call changing some fundamental rule of engagement. Where Hamel discusses new industry creation and redrawing industry boundaries, Anderson says a product "lets applications that were not previously possible thrive" and "creates a better way." Anderson even implies the need for industry leadership when he admonishes equipment vendors not to settle for "me-too products."²⁵²

Akamai's product line is an excellent example of industry reinvention. Until 1995, there really were no content providers. After all, the World Wide Web really did not come into common use until 1995. Very few persons realized that there was a need for innovations that allow more efficient use of bandwidth on the World Wide Web, because the Web had just started its existence. Tom Leighton attempted to execute solutions for a need that the Web's inventor, Tim Berners-Lee, foresaw but, at that moment, did not exist. The web was invented. And then the services surrounding the Internet were reinvented. As a reward for their leadership, Akamai now acts as content provider for all of the top 100 companies on the NASDAQ.²⁵³ Bob Nicolson, a Partner with Spectrum, a venture capital firm described the transformation he sees in the Internet:

The Internet is going to become telecommunications in all capacities. Four years ago, the Internet was Netscape - people surfing the Web - but now it's become a critical part of business communications and the way businesses operate. Everything is going to revolve around the Internet.²⁵⁴

²⁵⁰ Hamel, Prahalad, 23.

²⁵¹ Howard Anderson, "The best of the best," *Network World*, (Volume 16, Issue 4), Nov 15, 1999, 120.

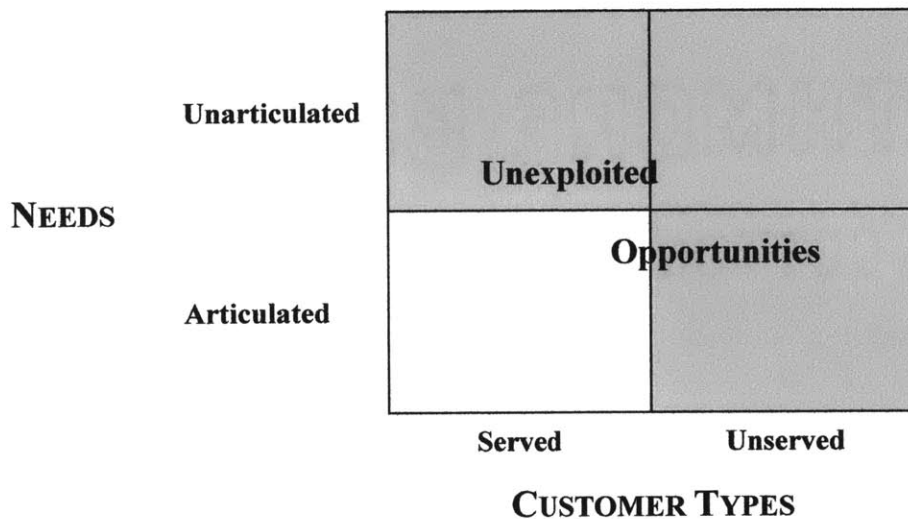
²⁵² Howard Anderson, "The best of the best," *Network World*, (Volume 16, Issue 4), Nov 15, 1999, 120.

²⁵³ Jerry Nadeau, Real Estate Manager, Akamai Technologies, Interview by Geoffrey Morgan, Cambridge, MA July 12, 2000.

²⁵⁴ Debra Lau, "In the Beginning, there was Telecommunications: The Internet has reshaped this fast growing sector, changing the way VCs think and operate when backing such deals," *Venture Capital Journal*, Mar 1, 2000, 50-53.

Akamai tapped into a demand for increased speedy high volume Internet traffic that, as Nicolson has said this march, was not non-existent four years ago, when Leighton began working on algorithms to speed Web access. That work led to the formation of Akamai. Hamel and Prahalad describe this strategy as one that is "benefits led;" they would say that Akamai went beyond the customer's articulated needs and served needs to go after and unexploited opportunity, as shown in Figure 18.²⁵⁵

Figure 18: Akamai: Beyond Customer Led²⁵⁶



Akamai has not rested on their laurels. Even as a young company, they are looking to the future and attempting industry regeneration. Recently, for example, Akamai purchased Intervu, a company which is ahead of Akamai in developing streaming media technology the World Wide Web. This stock swap merger, implicitly, is designed to give Akamai a competitive advantage as streaming video and other media transmission over the Web becomes more viable.²⁵⁷ Akamai has also partnered with RealNetworks to provide RealSystem G2, which allows streaming video and slide presentation as well as attendance displays on the World Wide Web.²⁵⁸

Resource Leverage

One of the keys to Hamel and Prahalad's conception of competitive strategy is that of the Resource leverage, the stretch of resources to go beyond expected limits to pass unsuspecting, resource rich but complacent competitors. Chapter 4 discussed Hamel and Prahalad's five strategies that say companies use to leverage their resources and take or hold industry and technological leadership. Akamai employs Hamel and Prahalad's model of resource leverage in

²⁵⁵ Gary Hamel, C. K. Prahalad, *Competing for the Future*, Boston, MA: Harvard Business School Press, 1994, 320.

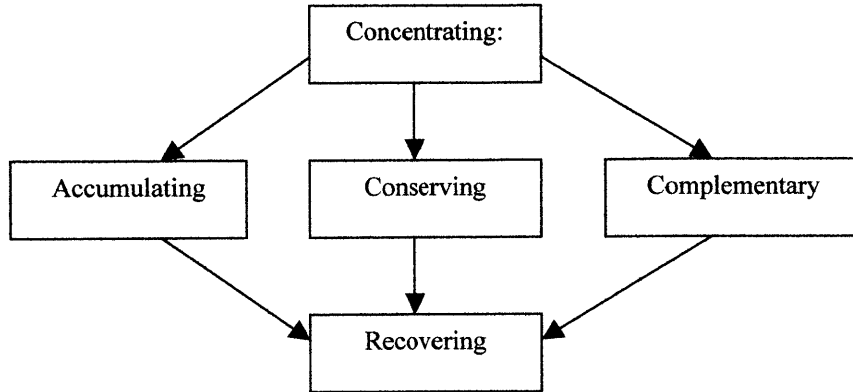
²⁵⁶ Hamel, Prahalad, 112.

²⁵⁷ David Rohde, "Akamai snaps up streaming media content provider," *Network World*, (Volume 17, Issue 7.), Feb 14, 2000, 29, 32.

²⁵⁸ Stephanie Sanborn, "Akamai reveals traffic management, conferencing services," *InfoWorld*, (Volume 22, Issue 24)Jun 12, 2000, 12.

all of its five aspects: concentration, accumulation, conservation, complimenting and recovery. Each strategy is described below as they relate to YankeeTek and Akamai, as illustrated in Figure 19.

Figure 19: Five Leveraging Strategies²⁵⁹



Concentration

Concentration, in its broadest terms, refers to how a company directs its resources to achieve industry leadership. This can be done by converging all levels of the organization into one mission. This is relatively easy in a startup at the incubator level where the company consists of a handful of owners and far more difficult for large organizations. Akamai, for example, has grown in one year from approximately 50 to 1050 employees.²⁶⁰ Another method of resource concentration is focus. Companies can focus on a limited number of concrete goals to galvanize the company's movement in one direction. Again, with incubators, all effort is directed on one core product. Larger companies tend to have a tougher time focusing. However, Akamai has focused as a content provider, but they have added some additional concrete objectives which include adding streaming media and video conferencing capability to their system.

Accumulation

Hamel and Prahalad, in describing resource accumulation, say that companies can either "mine" or learn a new technology, or they can borrow from other organizations through strategic alliances. Akamai is doing both. They have acquired companies such as Intervu to gain expertise on streaming media capabilities. The company has also developed alliances with CCBN. This company provides a higher level of functionality directly to corporate sites by integrating database information, real player playbacks of conference calls. CCBN's real time conferencing with can integrate power point presentations and other material to the company's existing web sites in such a way that it appears all to be coming from the same site. Akamai has become, not only an investment partner, but also a part of CCBN's system.²⁶¹

²⁵⁹ Hamel and Prahalad, 192.

²⁶⁰ Jerry Nadeau, Real Estate Manager, Akamai. Interview by Geoffrey Morgan, Cambridge, MA July 12, 2000.

²⁶¹ Paul Way, "CCBN and Akamai extend deal to put investor calls on Web," Wall Street & Technology, (Volume 18, Issue 7), Jul 2000, 20.

Conservation

Conservation, as the name implies, refers to the efficient use of assets given a specific target. For example, Hamel and Prahalad talk about recycling the use of similar technologies in the pursuit of like products, or about working with another company to set up synergies and economies of scale which will help deal with additional competition (also known as co-opting). A company can also conserve by "protecting." That is, the company does not approach a subset of their market that is already well accessed by competitors, but instead, the company goes after specific markets which are viable, but less easy to compete in. Hamel use the example of Dell competing with Compaq by going into the mail order business because they knew Compaq would be hesitant to move into that market, given their existing relationships with retail distributors.²⁶²

Conservation should not be confused with merely upgrading an existing operation. Hamel uses conservation, the recycling of assets and co-opting in the pursuit of industry leadership and re-invention; these are not strategies to save resources on operations in existing businesses. Instead, they are ways of stretching resources in the pursuit of industry reinvention.²⁶³

A great deal of YankeeTek's strategy appears to be built around what he calls the Internet Keiretsu. Originated in Japan, the term refers to a cartel of complimentary interests which combine forces to compete, typically with other Keiretsus. This strategy is reminiscent of the idea of co-opting to conserve resources. Anderson's connections to venture capital and to other hi-tech businesses and potential customers represent the formation of this Keiretsu or co-opting strategy. Anderson describes his strategy this way:

Keiretsu members do business with companies outside the keiretsu but give 'most-favored-nation' status to fellow members.... And like the fully integrated Japanese keiretsus, each Internet keiretsu will have a full array of Internet assets: search engine, portal, online e-commerce shops, e-bank, insurance company, auction site and so forth. Whatever part each keiretsu doesn't yet have, it will build or buy into. Then the keiretsu will post links to its newly acquired companies from its own site and make these new companies work better....

Entrepreneur Bill Gross has used the Internet keiretsus concept at idealab!, a so-called "incubator" for Internet businesses, and it's working like a charm. Full disclosure: I'm starting a high-tech Internet incubator, YankeeTek Incubator, right next door to the Massachusetts Institute of Technology, and I have been receiving offers and some not-so-subtle threats from the keiretsus. Their message: Let us invest in your incubator fund, and your young companies will have access to our muscular Internet friends and the powerful cyberspace brands we control. Don't let us invest, and your phone calls may not be returned in your lifetime and your e-mail will somehow never hit our server.²⁶⁴

²⁶² Hamel, Prahalad, 187.

²⁶³ Hamel, Prahalad, 187.

²⁶⁴ Howard Anderson. "Internet 'Keiretsus': 'Net firms find strength in numbers,'" Network World, (Volume 16, Issue 43), 25 October 1999, 55.

Complement

Chapter four showed that there are many ways to complement resources to achieve leverage. The organization can blend skills in new ways, or secure complementary assets that are critical to their current functions. The company can also reuse skills or resources more productively and/or find ways to shield resources from competitors to gain advantage. Anderson's concept of Keiretsu also parallels Hamel and Prahalad's ideas on complimenting resources because the "Keiretsu," i.e., YankeeTek's partnerships between 3Com, Compaq, Nortel Networks and Novell. Although the incubator has just started existence, part of the concept behind incubators is the thought that entrepreneurs, working in close proximity to each other, will have a free flow of ideas that will help each person be even more creative and imaginative. Howard Anderson describes complimenting resources this way:

[In YankeeTek] there's some cross-fertilization. I may have an HR person working in two or three of my companies. I may have computer maintenance, maybe my CFO becomes their CFO. The companies themselves can work together. [The companies might meet and say] your product would go well in my product. Once a week, my companies get together for lunch and discuss common interests. So, you want to build a little miniature Keiretsu.

Akamai's aforementioned alliances with various firms such as CCBN and Intervu all capitalize on the complimentary skills of these companies. In addition, Akamai, could be construed as belonging to a Keiretsu of their own, consisting of their partnerships with such companies as Yankee Group, Cisco Systems and Battery Ventures.²⁶⁵

Recovery

Finally, and perhaps most importantly, the company can leverage resources with speed. The product life cycle is extremely short in the technology companies, in general. For example, some experts suggest that 75% of all the gross margins of a new personal computer line are earned within the first ninety days of the product's release.²⁶⁶ Internet companies are willing to spend a great deal of money to in the hopes to get the product to market while the concept is still new and unchallenged so their investment will be recovered quickly. Anderson said that there will be " a blunt sorting of businesses and businesspeople into two camps: the quick and the dead."²⁶⁷ One venture capitalist concisely stated the critical importance of delivery speed in the world of communications technology:

There's enormous emphasis on speed to market, and investors are more likely to pursue an aggressive strategy now than they were three to four years ago. Part is necessity and part is opportunity. It's a horse race between greed and fear.²⁶⁸

²⁶⁵ Akamai, "Investor Relations" <<http://www.akamai.com>> (July, 2000), July 19, 2000.

²⁶⁶ Richard Karlgaard, "You in 2002," *Forbes*, (Volume 164, Issue 1), Jul 5, 1999, 43.

²⁶⁷ Richard Karlgaard, "You in 2002," *Forbes*, (Volume 164, Issue 1), Jul 5, 1999, 43.

²⁶⁸ Debra Lau , "In the Beginning, there was Telecommunications: The Internet has reshaped this fast growing sector, changing the way VCs think and operate when backing such deals," *Venture Capital Journal*, Mar 1, 2000, 50-53.

A great deal of this growth is caused by the conflict between, what Anderson calls, "attackers," the inventors of new technology, and "defenders," those established firms which are in older technology markets. Attackers, as one would expect by Prahalad's model, are stretching and leveraging resources to take market share from incumbent firms. These companies are racing against time to bring products to market and establish a presence before the incumbent firms are able to counterattack. Anderson goes on to describe, with some humor, a sequential series of reactions of defenders to the attack consisting of denial, anger, grudging, acceptance and acquisition.²⁶⁹

Akamai represents a third type that Anderson classifies as the "arms merchant." This company provides bandwidth to all the competitors, both attackers and defenders. As a result of fierce competition in related markets, both sides buy Akamai's technology in the hope of staying competitive.²⁷⁰ Thus recovery is one of the most important points of resource leverage for Akamai and for the communications technology companies that YankeeTek sponsors.

Site Selection, Design and Technology Demand

Akamai and YankeeTek are both located in Cambridge, very close to the MIT campus. YankeeTek is located in 1 Memorial Drive, a high rise with very good name recognition as one of Cambridge's few high-rise class "A" spaces. Akamai is located in at 400 Technology Square in one of the few complexes remaining with approved and ongoing construction since Cambridge's development moratorium. Both companies value the space for the same basic reason: proximity to MIT and the student talent of fifteen colleges in the Boston MSA. Anderson owns some commercial land in Cambridge, as well. He says that proximity to the MBTA Subway's Red Line is his major site selection criteria.²⁷¹

The companies are both trying to attract a demographic profile which is younger than that of an IBM or Oracle. To do this, the company's feel it is critical to be near campus. As Anderson put it:

I like to be on the red line [of the MBTA], I invest on the red line as strange as it sounds. That's important to my companies to be able to come and be close [to the red line]. You know, ideally I want to be close as I can to Kendall Square. I may have a university Professor who is a founder or whatever, and I want the company to have access to his brains or his graduate students. We're working on a project and he can run out between classes and see how they are doing and that's the important differentiator.²⁷²

Both companies feel that their growth requirements are outstripping space supply. According to Jerry Nadeau of Akamai, their company had the option to occupy all of 400 Tech Square, but simply did not project the kind of demand for space they would experience. Thus, Scient claimed the last two stories of the second floor.

²⁶⁹ Howard Anderson, "The annual Upside downside," *Upside*, (Volume 11, Issue 3), Mar 1999, 124-150.

²⁷⁰ Anderson, 124-150.

²⁷¹ Tracey A. Nicolson, Property Manager, One Memorial Drive, Equity Office Properties, Interview by Geoffrey Morgan and Benjamin Pettigrew, July 18, 2000.

²⁷² Howard Anderson, Interview by Geoffrey Morgan & Ben Pettigrew, July 17, 2000.

Meanwhile, YankeeTek is already grown beyond their limits at one Memorial drive. The building, run by Equity Office Properties, is a recent acquisition, but needs updated services. Tracey Nicholson, the property manager, stated that space requirements, on a scale of 1 to 10, should rate approximately 8 or 9 in importance to tenants.²⁷³ Anderson, on the other hand, sees space requirements as only a small part of his business, and he has relocated some new businesses to other areas around Cambridge because of the shortage of space. So, although site selection is very important, Anderson can and has made due with other sites, and is beginning to look at alternatives for future growth, such as Somerville.²⁷⁴ Jerry Nadeau, a real estate manager for Akamai, rates the importance of real estate as a "6 or 7" and adds that the upper management has been very supportive of his departments space acquisition because they understand how important real estate is to their strategy.²⁷⁵

Both locations look and feel like standard office buildings. The offices are standard floor plates, with cubicle and window office layouts, very unlike the more random, open layouts that were expected. Akamai uses lower cubicle walls in their sales spaces to create a sense of energy and activity. Research and development spaces have higher cubicles to allow more privacy. Nonetheless, these spaces are remarkably similar in layout to any other office. When asked about amenities, Anderson said tersely, "They need McDonalds to keep going." Akamai, on the other hand, has a health club and game room to allow employees to "blow off some steam" during the very long hours they keep. Both facilities have T-1 service. Equity office is installing T-1 and a collocation space to allow two competing last mile contractors, Allied Riser and Cypress Communications, to compete for individual tenant business. At 400 Technology Square, Beacon properties uses Cypress communications to provide last mile service from a Fiber optic network which uses ATM switching technology.²⁷⁶

YankeeTek's incubator companies have, at their stage in growth, little need for more than a telephone and a high speed Internet connection. Akamai, on the other hand depends on its Internet connection for its very livelihood. On the first floor of 400 Technology square sits a central network control room consisting of dozens of large screens and monitors stacked in a semicircle and reminiscent of Florida's Cape Canaveral. The site, according to Jerry Nadeau, an Akamai real estate manager, is partly for network control, and partly for marketing...it is located behind floor-to-ceiling glass walls adjacent to the building lobby. Nadeau said that the President wanted to give people the sense that they had "stepped inside the Internet" when they viewed the space.²⁷⁷ All the network equipment, emergency power and wiring for the administration of this

²⁷³ Tracey A. Nicolson, Property Manager, One Memorial Drive, Equity Office Properties, Interview by Geoffrey Morgan and Benjamin Pettigrew, July 18, 2000.

²⁷⁴ Howard Anderson, Interview by Geoffrey Morgan and Benjamin Pettigrew, July 17, 2000.

²⁷⁵ Jerry Nadeau, Real Estate Manager, Akamai Technologies, Interview by Geoffrey Morgan, Cambridge, MA July 12, 2000.

²⁷⁶ Jack Deary, Development Manager, Beacon Properties, Interview by Geoffrey Morgan, Cambridge, MA, July 10, 2000.

²⁷⁷ Jerry Nadeau, Real Estate Manager, Akamai Technologies, Interview by Geoffrey Morgan, Cambridge, MA July 12, 2000.

network was installed and maintained entirely by Akamai; the company did not want any risk of network failure as such a failure would strike at the very root of Akamai's business.²⁷⁸

In the end, Akamai and YankeeTek were interested in 400 Technology Square and One Memorial Drive not for their design or even their technology. These two companies needed location. Jerry, when asked about the Akamai's space needs, stated it this way:

In a speech he gave to Akamai, the CEO of Lycos even said they haven't built their [information technology] infrastructure the way Akamai has. Akamai has been pioneering that technology. We have been putting in this infrastructure since the company had only 50 people. And we have grown through them and grown with them. I think that is what's really made our group dynamic. We are looking at hundreds of thousands of square feet of space even though we only need fifty thousands of square feet [right now]. It's dynamic, really dynamic. You know, we are on our brokers five times a day for [additional space.] We are giving approved [space] requisitions for people who are moving in next week. How do you...we are having meetings with accounting people Thursdays and Fridays that are coming next week. And the last thing Corporate Services wants is to be the reason we couldn't get a product to market....that we couldn't reach an end user because we didn't have the facilities. Its kind of dynamic because its no holes barred, budgets we try to stick to a budget, but how do you do that when you have six times as many people as you thought you'd have....We had 50 people last April a year ago last April and we are up to 1,050 now.

For Akamai, access to real estate is critical to support their growth. As Nadeau states above, Akamai is in a relentless, unquenchable pursuit of space. This problem is compounded by the company's need to be near MIT. They are not as concerned with other aspects of the space; they just need space in the right location in great quantities. Even technology could be upgraded as long as the space was available. Now that both companies have reached the limit of their existing space, it will be interesting to see how they cope with the future. Equity Office and Beacon both have large portfolios of space. Beacon is building a new site on Technology Square, on of the last sites to be approved prior to Cambridge's building moratorium. Equity Office's lease rollovers are not occurring, in most spaces, for at least another two years, but they do have a portfolio of 17 properties that could help YankeeTek house tenants. Unfortunately, the incubator companies may miss important complimentary resource leveraging if they are split among several Boston buildings.²⁷⁹

Operations and Management Issues

Operations at both One Memorial Drive and 400 Technology Square reflect the younger "twenty-something" demographic of these two companies. Operations are hectic and nonstop. Even though Akamai is not officially in a "startup" mode, the pace is still grueling. Nadeau still occasionally sees employees sleeping overnight at their desk to keep up with the workload. He

²⁷⁸ Jerry Nadeau, Real Estate Manager, Akamai Technologies, Interview by Geoffrey Morgan, Cambridge, MA July 12, 2000.

²⁷⁹ Tracey A. Nicolson, Property Manager, Equity Office, July 18, 2000.

worries that, if there is a fire or security issue, if the occasional employee is sleeping under their desk, they may be caught off guard by a safety or security problem.²⁸⁰

Tracey Nicolson Says that the younger crowd is lively but much more destructive than the law firms she dealt with in her previous post in the financial district. Her offices are also much more densely populated because of the shortage of space. As a result, tenants are charged additional premiums to account for the added building maintenance.²⁸¹

In order to keep these tenants happy, both buildings keep the air conditioning running all night. They understand that the operation does not stop at 5 pm. As a result of the construction on their campus, Akamai has experienced several phone and power outages since their opening. Only phones and networks internal to the building were effected, however, because Akamai does not use Cypress or any other last mile contractor to control the company's administration of over 4000 servers around the world; all the network services and installation are done by Akamai.²⁸²

Neither YankeeTek nor Akamai are terribly concerned about reconfiguring or reorganizing office space; they simply don't have the time. Jerry Nadeau has spent most of his time speaking with brokers and mobilizing new space for their explosive employee growth. Hence, there is virtually no office reconfiguration at Akamai once the cubicles are placed. YankeeTek is set within a series of window offices, so their space, by its very nature, is not very susceptible to modification. Perhaps in a less tight office market, this inflexibility would be a concern. Currently, however, merely having space seems to be all that matters to these tenants.

Future Growth: Implications on Space and Technology Needs

It is difficult to say what the future holds for the real estate and technology needs of Akamai and YankeeTek, except that both will, no doubt, be greater. This case has shown that the technology must be at a baseline service to allow these Internet companies to operate. Further, the case illustrates the great value both companies place on their proximity to MIT and other schools, as these are the places from which the ideas for future technologies and industry dominance will come. Beyond these restrictions, however, each company appears to have little concern for the additional amenities of the space. Perhaps, if the moratorium is lifted and the space supply becomes less constrained, the Internet companies may begin to expect other provisions. Howard Anderson was not at a loss in describing some additional concessions he might expect in a less supply-constrained market:

I want somebody to build a "startup hotel." I want something about as big [as a high rise] where the RE company would charge reasonable rents, would not take a year's rent in advance, would take some reasonable amount of warrants, and maybe it has, as its investors, seven or eight venture capital companies. And I get a floor....as some of my companies grow, some companies will do more some will do less. I want a lease where, rather than cosign a ten year lease for a technology company, I sign a lease for 10,000 sf

²⁸⁰ Jerry Nadeau, Real Estate Manager, Akamai Technologies Interview by Geoffrey Morgan, Cambridge, MA July 12, 2000.

²⁸¹ Tracey A. Nicolson, Property Manager, Equity Office, July 18, 2000.

²⁸² Jerry Nadeau, Real Estate Manager, Akamai Technologies Interview by Geoffrey Morgan, Cambridge, MA July 12, 2000.

and I can put any number of tenants in there. The real estate industry regards all startups in the same boat, but they are really not. Startups with good backing [from reputable VC firms] will not go bankrupt for at least a couple of years because their partners will stick with them where companies with no backing or angel backing might go bankrupt. The real estate guys have to figure out who is who's who.

How about a short form for a lease, right to have options on space, but not guaranteed options? I might have to be on non-contiguous floors, or relocate occasionally. Maybe there is a beehive of locations where my lease carries. Can I forgive some of that rent for equity? I would love to not have to buy this PBX, and pay a fixed cost per employee. I get phone and Internet access with payments within the lease. I'd like to have. Quick ability to provision, DSL and other services. Do some of the heavy lifting for some of discounts on web hosting services if you can.²⁸³

In this quotation, Anderson pointed to many characteristics he felt were important to Internet companies, especially startups, when they consider property. He was especially concerned, for example, with flexibility, reflecting the uncertain growth patterns of Internet businesses. Anderson felt that quick access to high-speed communications infrastructure was very important. He implied that a "last mile contractor," or anyone other than the tenant would do YankeeTek a great service if they were competent enough to provide reliable communications technology, and that Anderson would like to pay a fixed premium for the use of that infrastructure. He also wanted the ability to move start ups to non-contiguous floors to accommodate for expansion possibilities. He then mentioned allowing startups to convert a portion of their rent to equity. Since the leases are not directly to the Internet startup but, rather, to YankeeTek, some of the individual risk is removed in leasing space. Most of Anderson's suggestions imply added risk to the owner, so the risk premium for YankeeTek's added flexibility would become an issue. Nonetheless, Anderson's discussion points out some of the ways a landlord could provide flexibility to his incubator and other startups.

Summary

This thesis has sought to compare Akamai's and YankeeTek's competitive strategy to that of the other two cases along four dimensions: Present/Past versus future orientation, use of technology, growth rate and resource use, to see how the case fits the Hamel/Prahalad model. Incubator's, by their nature, are future oriented, and Akamai has shown that it not does not intend to lose the leadership of the future it established as one of the Internet's pioneering content providers. Technology is the heart of Akamai's business and of YankeeTek Incubator's six ventures. YankeeTek is banking on very rapid growth from a few of their companies, perhaps even as great as Akamai, whose share values have soared into the billions of dollars from their initial public officering of 86 million dollars less than two years ago; the 36% growth of the Internet industry in 1998, as recorded by the University of Texas' Center for Research on Electronic Commerce seems to echo this trend. These companies have resources. But, as this case has shown, Akamai and YankeeTek are using strategies identified by Hamel and Prahalad to leverage those resources; Unlike Northwestern, they are much more interested in accelerating

²⁸³ Interview, Howard Anderson, Interview by Geoffrey Morgan and Benjamin Pettigrew, July 17, 2000.

future growth than in paying dividends. Both YankeeTek and Akamai appear to possess Hamel & Prahalad's attributes of competitive strategy as suggested in the Competitive Strategy Framework Comparison in Chapter 4.

In Chapter 3, this thesis suggested how a traditional FIRE business might approach development along four dimensions: feasibility, site selection, design and operations.

For every Akamai which is successful, there are many unsuccessful Internet startups.

YankeeTek is able to achieve extremely high-risk premiums precisely because of the risky nature of the communications technology startups YankeeTek invests in. Furthermore, once these companies do grow, as the following case has shown, the growth is often violently unpredictable, reducing the company's startup horizon to months or even weeks. Hence, the risk premium for these tenants is high, as the development model for Internet-Business Development model in Chapter 3 would have predicted.

Site selection for both YankeeTek and Akamai seemed to center on their need to be near MIT in order to continue to draw from the well of technical talent needed to fuel these companies' growth. Access to fiber was important, but less so, because the city of Cambridge already had the fiber infrastructure in place. YankeeTek and other tenants of One Memorial Drive were willing to settle for an outdated improving communications technology infrastructure because of the building's proximity to a superior pool of technical labor. Power requirements were not substantially different from any commercial office building. None of these findings deviated from the development model predicted in chapter 3.

The floor layouts were not the funky, open design anticipated in the development model; these businesses were too busy growing and too constrained in supply to worry about the subtlety and inefficiency of an exciting interior design. Amenities were limited to a health club and game room at Akamai; YankeeTek, who was less worried about motivating company owners to stay, provided no amenities. YankeeTek's incubator businesses demanded essentially phone and Internet access, but not much more in communications infrastructure; these businesses were too early in their lives to need more advanced systems. Akamai, on the other hand, was extremely concerned about maintaining a highly reliable, highly redundant system design to ensure that the control center which allowed the efficient transfer of information across all the top one hundred NASDAQ company's Web sites never failed. Akamai built and maintained this system independent of the office communications equipment at 400 Technology Square. Unlike Akamai's system, 400 Technology Square was subject to frequent construction outages that would have been disastrous for Akamai's operation. Akamai and YankeeTek did differ between each other and from the development model in Chapter 3 in many ways, including Floor plate Aesthetics, flexibility and technology needs.

Operationally, YankeeTek was willing to work with Equity Office's new alliance with Allied Riser and Cypress Communications, two major "last mile" contractors who are in the process of setting up their communications infrastructure in the building. Akamai did not use Cypress to set up their control center, and made certain that the system would not go down during the building's outages. YankeeTek did not express any emphasis on avoiding outages. Neither tenant was terribly concerned with flexibility because they were both in rapid growth phases and simply did not have the time or resources to conduct a great deal of inner office reconfigurations.

Akamai viewed technology as a critical part of their competitive strategy. YankeeTek viewed technology at a conceptual level because their product was not yet in operation, where Akamai had to deal with the technology operation of an ongoing business whose product was technology at that moment. Table 7 summarizes some of the development strategies of Akamai and YankeeTek and how they compared with practices predicted in Chapter 3.

Table 7: Comparison of Development Predictions for YankeeTek and Akamai

	Expected Development Practices	Observed Development Practices
Feasibility Development Timing Business Risk	Fast High	Fast High
Site Selection Criteria Proximity to Skilled Workforce Access to High Speed Fiber Access to High Power Volume	High Necessary Important	Extremely high Necessary Important
Design Uniformity of Floor Plate Flexibility of Space Information Technology Design Structural requirements Level of Amenities	Low High High Vol. Average High	High Mod. High Vol. Average Low-Avg.
Operations Use of Technology Power/IT Outages Technology Provider Business Relationship	Core Bus. High Impact "Last Mile"	Core. Bus. High impact. "Last Mile"

Akamai and YankeeTek were very similar in their strategic and competitive outlook, implying that Hamel and Prahalad's model fit these two Internet-based businesses well. On the other hand, the two companies differed from each other and from the development model in Chapter three in design and operational needs. The implication is not surprising, insofar as design and operational needs appear to fundamentally change from the incubator phase through the growth phase of an Internet company. The explosive growth of Akamai is not sustainable; therefore, the company may put more emphasis on design and amenities, per the model, once the company's planning window lengthens.

Case 3: TelePlace

Out of the dusk a shadow
 Then a spark;
Out of the clouds a silence,
 Then a lark;
Out of the lure a rapture,
 Then a pain;
Out of the dead, cold ashes,
 Life again.
—John Banister Tabb (1845-1909), *Evolution*

Introduction

Having tested the appropriateness of the Porter and Hamel/Prahalad frameworks on an Old Economy insurance behemoth and a New Economy high-tech incubator, the frameworks will now be applied to perhaps the ultimate progeny of real estate evolution in the New Economy—the telecom hotel. The specimen chosen for this study will be a Miami telecom hotel developed from an old telephone central office building under the direction of and operated by the facility’s master tenant, TelePlace, Inc. After first explaining why this particular telecom hotel was selected, this case study will then begin to apply Hamel and Prahalad’s frameworks on TelePlace in an attempt to better understand the telecom hotel operator’s business. The case study will then end by discussing the implications of the lessons learned in the analysis of TelePlace.

Why Study TelePlace?

Of course, the first question that must be addressed is, why examine TelePlace’s Miami site over all the other available telecom hotels throughout the world?²⁸⁴ Why not study one of the more classic examples of telecom hotel evolution, such as 60 Hudson Street in New York City, One Wilshire Boulevard in Los Angeles, or the Infomart in Dallas? The answer to these questions is multifaceted. The aforementioned buildings in many ways do embody the evolution of the telecom hotel. From the “meet-me room”-less 60 Hudson Street’s fiber-jammed conduits to the Infomart’s loading-bay-blocking generator, one can trace the progression of the telecom hotel in these and other characteristics as these buildings quietly transitioned from the Old Economy to the New Economy long before such distinctions were popularized.²⁸⁵ Like the Flatiron Building and the Empire State Building in New York City, these older telecom hotels will forever stand as historical landmarks to the dawning of a new age—the Internet Age.²⁸⁶

²⁸⁴ For a listing of telecom hotels, see Appendix C.

²⁸⁵ Branson, Ken, “No Vacancy: Telco Hotels Can’t Go Up Fast Enough,” *X-Change Magazine*, April 1999. Howard Beckerman, Real Estate Broker of United Commercial Realty in Dallas, Interview by Benjamin Pettigrew, January 15, 2000.

²⁸⁶ The Flatiron Building in New York City was the first “skyscraper” in the world. The Empire State Building in many ways was the first modern skyscraper.

Despite the nobility of and the human obsession with the quest to understand the past, historical significance alone is not sufficient to justify studying a telecom hotel with an obsolete infrastructure or an evolution stunted by long-term leases.²⁸⁷ It is true that by studying the shortcomings of the evolved telecom hotels one can improve the functionality of telecom space in newly planned telecom hotels. But the usefulness of history lessons in determining trends in technology-related fields is extremely limited. As Hamel and Prahalad astutely affirm, “The future is not an extrapolation of the past.”²⁸⁸ Doing so would be tantamount to studying the use of blood letting in medicine in an effort to extrapolate a cure for cancer. An attempt to focus on one of the classic examples of telecom hotels would not only fail to capture the new complexities facing high-tech tenants and landlords today but also might suffer from an overreliance on hindsight. In a study seeking to de-emphasize *hindsight* and to emphasize *foresight*, these risks are too costly to take.

Whenever the *future* and not the past is the direction of interest (as in the case of trying to meet or preempt the needs of forward-looking tenants), clarity of vision becomes paramount. In astronomy, telescopes are not placed in the depths of the ocean to study the interactions of the stars and other heavenly bodies. They are placed on mountains or, ideally, in space where atmospheric distortions will be minimized or eliminated entirely.²⁸⁹ Likewise, this study must be devoid of anything—including the past—that might obstruct or distort the authors and the readers’ visions of the future. This means that 60 Hudson Street, One Wilshire Boulevard, the Infomart, and other historical telecom hotels must be content to serve only as points of reference and comparison for a case study on an operational purpose-built telecom hotel that sits near or at the very edge of technological understanding and advancement.²⁹⁰

TelePlace’s 90,000 square-foot “Convergent Technology Center” in Miami, Florida more than adequately qualifies as a telecom hotel on the cutting edge. This telecom hotel integrates carrier-neutral central office, collocation, data center, rooftop, and “meet-me room” space with some of the most advanced HVAC, fire protection, security (which includes futuristic biometric hand-geometry scanners), and power systems available. The building’s infrastructure as well as the building’s in-house security and maintenance teams consequently results in a savings for tenants of 12 to 18 months.²⁹¹ Most importantly, the Miami telecom hotel is already operational and has been (at least partially) since the fall of 1999, allowing it to serve as an illustration of how well (or poorly) theory is translated into reality.²⁹² Furthermore, although the space is moving quickly, full lease-up and build-out has not yet been achieved. What this means is that TelePlace will still be in a position in which they can respond to and meet their potential tenants’ requests. All of the

²⁸⁷ Scott Haugland, President of TelePlace’s North American Division, Interview by Benjamin Pettigrew, July 20, 2000.

²⁸⁸ Hamel, Prahalad, *Competing for the Future*, 32.

²⁸⁹ It is important, as in the case of any analogy, to focus on the aspects of the analogy highlighted here and not to take this analogy too far. The authors are well aware that any observation of heavenly bodies that lie at light-years from the earth actually is an observation of the past activity that occurred thousands or even millions of years ago.

²⁹⁰ “Purpose-built” is used to describe telecom hotels that, like 60 Hudson Street and the Infomart, did not evolve into telecom hotels. These are buildings that either have been built or redeveloped completely with the intention of creating a telecom hotel.

²⁹¹ <<http://www.teleplace.com/CITHome.htm>>

²⁹² Scott Lehman, Vice President of Business Development for TelePlace, Inc., Interview by Benjamin Pettigrew, July 20, 2000.

building's physical features and timing simply confirm the appropriateness of TelePlace's Miami site for this case study.

Another reason why the Miami telecom hotel has been selected as the focus of this case study is its master tenant—TelePlace itself. This telecommunications startup was founded in 1999 by a multinational management team highly experienced in network design and management. With a recent infusion of \$100 million in first-round private equity funding in June 2000 from various private investors, TelePlace, Inc. is seeking to deploy 100 telecom hotels worldwide by 2004. In fact, TelePlace's Miami facility is their first telecom hotel and the locale where they have been “incubating” their evolving business model.²⁹³ Consequently, the likelihood of finding significant alterations in their business plan and in the building itself should be, at least in theory, higher than a company with a proven track record and product.

The final reason TelePlace's telecom hotel in Miami has been chosen as the object of study for this case pertains to its unusual partnership with Florida East Coast Realty (FECR). FECR is a Miami-based real estate company that specializes in the development of office and multifamily residential buildings. Although the details of its partnership with TelePlace are much more complex, the relationship between FECR and TelePlace for all practical purposes can be described as that of landlord and master tenant respectively. As the operator of the facilities, TelePlace may request site enhancements, but only FECR, as the money partner for all infrastructure and tenant improvements, has the authority to make the investments.²⁹⁴ This means that FECR could become a legitimate obstacle to the evolution of TelePlace's first telecom hotel should the startup decide to alter its business model. Between the implications of the startup's changing business plan and the development and operational issues of its first telecom hotel, TelePlace's Miami facility should be an interesting case to test the appropriateness of Hamel/Prahalad's frameworks on technology-oriented tenants.

TelePlace's Competitive Strategy

The structure of this final case study will, in many ways, closely parallel that of the previous case, which examined perhaps the most advanced example of a smart office tenant—a high-tech incubator. Like YankeeTek, TelePlace serves a tenant mix consisting largely of startups vying to become the next eBay or America Online. To describe as daunting TelePlace's task of understanding and meeting their clients' rapidly changing needs and accommodating their enormous growth would be a serious understatement. For a “landlord” like FECR with only limited experience in dealing with high-tech tenants, the difficulty of servicing TelePlace and its clients is only amplified. Only by understanding its tenants (i.e. TelePlace and TelePlace's clients) and the direction their industries are taking can FECR hope to effectively preempt TelePlace's future needs.²⁹⁵

²⁹³ Scott Haugland, President of TelePlace's North American Division, Interview by Benjamin Pettigrew, July 20, 2000.

²⁹⁴ Scott Lehman, Interview by Benjamin Pettigrew, July 21, 2000. Scott Haugland, interview by Benjamin Pettigrew, July 20, 2000.

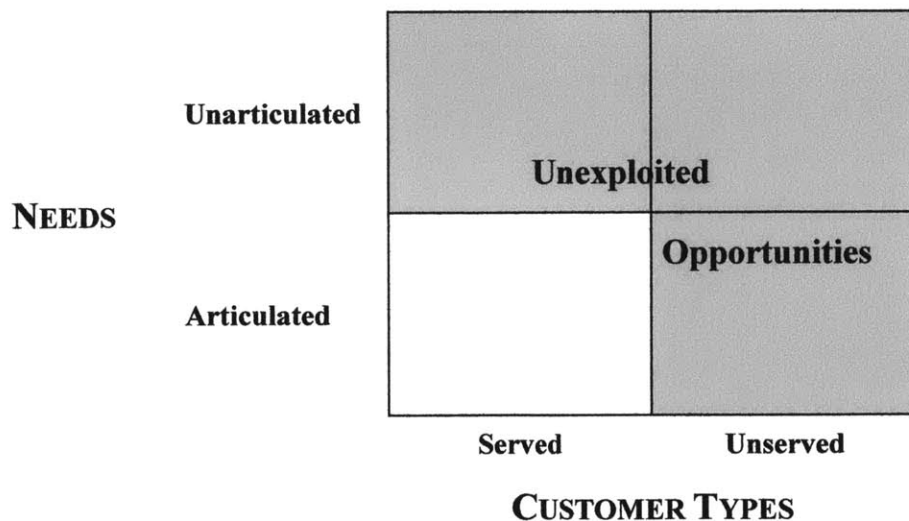
²⁹⁵ Scott Lehman, interview conducted by Benjamin Pettigrew, 20 July 2000.

The task of understanding TelePlace and the companies it is serving, as implied earlier, is easier said than done. Landlords and developers can overcome these difficulties by utilizing analytical frameworks based in competitive strategy theory. These frameworks, however, must fit appropriately and be applied correctly. Michael Porter’s competitive strategy model, for example, can be extremely effective in trying to understand the competitive nature, opportunities, and problems of *structured, mature* industries. Applying those same “today-oriented” tools to analyze “tomorrow-oriented” technology firms probably would not be appropriate. The relatively unstructured nature of emerging and, obviously, non-existent industries would make an application of Porter’s rule- and structure-dependent frameworks ineffective at best and misleading in all likelihood.²⁹⁶ For these reasons, this third and final case study will follow the lead of the previous case and utilize the forward-looking competitive strategy model outlined by Gary Hamel and C.K. Prahalad.

Strategy Regeneration and Industry Reinvention

As explained previously, Hamel and Prahalad’s competitive model provides one possible set of frameworks that can be used by landlords to understand technology-driven tenants such as TelePlace. According to this theory, companies hoping to dominate or maintain their dominance of the future should be constantly striving to “escape the myopia” of their current markets and products.²⁹⁷ This requires companies to look beyond the past and the present to envision the future. This process is illustrated in Figure 20, which reveals the matrix described in Chapter 4.

Figure 20 : Beyond Customer Driven²⁹⁸



By looking beyond the articulated needs of a firm’s current customer base one can see other unexploited opportunities to serve the unserved as well as those needs the customers are not

²⁹⁶ Hamel and Prahalad, 33, 45.

²⁹⁷ Hamel and Prahalad, 90, 93.

²⁹⁸ Hamel and Prahalad, 112.

aware they have. Only then can they begin to regenerate their strategies that would allow them to either create new industries or reinvent their current ones.²⁹⁹

When TelePlace and Florida East Coast Realty formed their partnership in 1999, their business plan called for the development of what one telecom professional describes as a “fourth generation” telecom hotel, a prototype that still represents the most advanced space-focused telecom hotel model currently in operation.³⁰⁰ Only a few months after TelePlace began to execute its strategy through the acquisition and retrofit of the Miami building, however, did TelePlace already recognize the need to regenerate its strategy. Under its original business model, TelePlace would only provide its tenants with completely finished space (including generators, fire protection systems, sufficient power per square foot, etc.), monitoring, maintenance, and security. These services would be placed in the served, articulated needs of TelePlace’s customers.

Although TelePlace’s executives believed that the exploding demand for high quality telecom space in Miami would allow TelePlace to lease its space in its Miami facility quickly at high rents, TelePlace’s cash flow in that building and others would remain relatively static after lease-up.³⁰¹ Furthermore, the building’s state-of-the-art infrastructure and systems, as in the case of 60 Hudson Street, would only depreciate with time and could detract from the telecom hotel’s future leasability.³⁰² These concerns, combined with the “almost inevitable” oversupply of telecom space, reveal potentially significant flaws in any business model based on a space-centric telecom hotel.³⁰³

With the implementation and execution of TelePlace’s regenerated strategy, however, these concerns should be significantly alleviated. After observing the rapidly closing window of opportunity for space-centric telecom hotels and discovering new opportunities in the market (the shaded areas of Figure 20), the foresightful TelePlace executives under the leadership of Chief Executive Officer Stephen Saldanha quickly transformed their business model into that of a “service-centric” telecom hotel.³⁰⁴ Through both outsourcing and their own telecommunications expertise, TelePlace will provide an array of value-added managed services that will include bandwidth, server and PC backup, information management, data storage, and content. By providing these and other services as well as cutting edge space and infrastructure, TelePlace has become a “one-stop shopping” source for any company desiring to accelerate its speed-to-market or simply to avoid the headaches it would face at space-centric telecom hotels. More significantly, TelePlace is quietly raising the bar for its competitors and is in the process of reinventing an emerging industry.

²⁹⁹ Hamel and Prahalad, 32-33.

³⁰⁰ Scott Lehman, interview conducted by Benjamin Pettigrew, 21 July 2000.

³⁰¹ Scott Lehman, 20 July 2000.

³⁰² Branson, Ken, *X-Change Magazine*, April 1999.

³⁰³ By “space-centric” telecom hotels, the authors are referring to telecom hotels that provide space and minimal services that might include monitoring and maintenance. “Service-centric” telecom hotels, on the other hand, provide managed services as their core business.

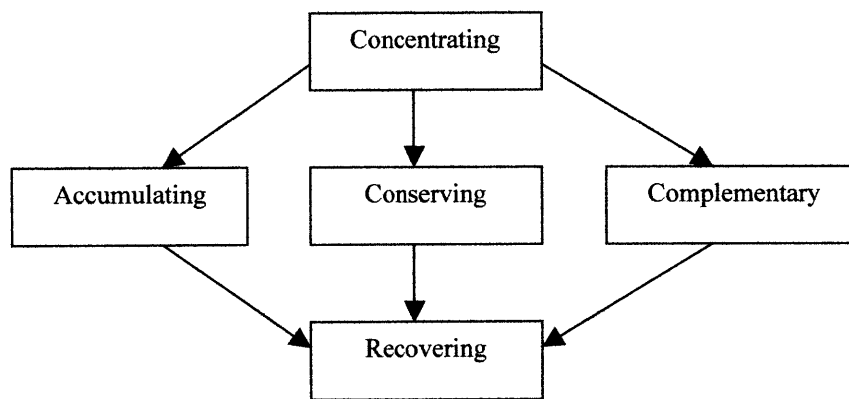
<<http://www.thestandard.com/article/display/0,1151,16774,00.html>>

³⁰⁴ Scott Haugland, interviewed by Benjamin Pettigrew, 20 July 2000.

Resource Leverage

As in the case of Akamai and any other hungry, resource-constrained company, TelePlace and its tenants' success and survival to a large extent depends on their ability to "stretch" and leverage their limited resources.³⁰⁵ Whether their assets are physical, human, financial, or intellectual in form, startups and other companies in which "ambition forever outpaces resources" must allocate their means with utmost precision and care.³⁰⁶ In *Competing for the Future*, Hamel and Prahalad provide a framework that outlines several ways in which such companies can leverage and stretch themselves well beyond their apparent means. This framework is illustrated in Figure 21.

Figure 21: Categories of Resource Leverage³⁰⁷



Concentration

The Hamel/Prahalad resource leverage framework begins with resource concentration, as depicted in Figure 21. For high-growth telecom companies that are seeking to establish Points of Presence (POPs) over large geographical areas, resource concentration would seem to be difficult if not impossible. TelePlace, for example, currently has less than 45 employees, but yet it is already in the process of establishing multiple Convergent Technology Centers across the United States and Europe simultaneously. TelePlace has headquarters in Boca Raton and Amsterdam but its corporate real estate group is based in Virginia. To further add to the appearance of dispersion rather than concentration, TelePlace's primary real estate and financial partner is located in Dallas! Given TelePlace's geographical dispersion, it would be tempting to describe TelePlace as an example of resource stretching but not of resource concentration. A closer examination reveals that TelePlace exemplifies both.

At the base of all of TelePlace's wild, market-reaching tendrils dwells a force that serves as an anchor for TelePlace in the midst of the "permanent turmoil" unleashed by the Internet and

³⁰⁵ Hamel and Prahalad, 169-170

³⁰⁶ Hamel and Prahalad, 170.

³⁰⁷ Hamel and Prahalad, 192.

telecommunications deregulation.³⁰⁸ This force is a shared vision of creating a true network of 100 next-generation service-centric telecom hotels in almost every major market in the world. What differentiates the shared nature of TelePlace's vision from those of other companies is the manner in which the dreams have been diffused both from the top-down and from the bottom-up. The TelePlace concept originated, as occurs in many companies, from the inspirations and aspirations of one man. The embrace of this vision by TelePlace's employees, however, has been solidified by the "wide-eyed" enthusiasm of the firm's customers and tenants to the new TelePlace concept. They are these facial and verbal testimonies of company outsiders that have caused the TelePlace vision to saturate the minds and the hearts of TelePlace's employees only to emerge as a zeal one employee described as "evangelical."³⁰⁹ It is this truly common focus that allows TelePlace to target specific rather than random goals that form the critical path to the realization of the firm's dreams.

Accumulation

In addition to concentrating and focusing existing resources effectively, Hamel and Prahalad also emphasize the importance for firms to continue to accumulate additional resources either internally or externally.³¹⁰ This method of resource leverage follows that of concentration, as illustrated in Figure 21. TelePlace fits this component of resource leveraging quite well. It is true that TelePlace's team is small in terms of sheer numbers. Where TelePlace falls short in employee numbers, however, the startup more than compensates in wealth of experience and expertise. The company has successfully recruited It is through these mined experiences that TelePlace was able to foresee the need for a more advanced telecom hotel model and confidently commit itself to making that model a reality.

Whenever TelePlace has lacked sufficient internal resources to meet the current and anticipated needs of their tenants, it has turned outside to acquire those resources. This has been done through the recruitment of key talent such as Aad H. van Waveren (former President and CEO of AT&T Unisource) who now is President and CEO of TelePlace's European Division. Similar to its alliance with Clearview TelePlace, LLC who would become TelePlace's principal real estate and financial partner, TelePlace is also establishing strategic partnerships and alliances through which the startup can outsource (at least temporarily) those product and services its core competencies cannot or does not want to provide.³¹¹ Among its initial outsourcing partnerships are those with Pacer International, who is designing and building the technology-intensive spaces within the telecom hotels, and with Clearview TelePlace, who is directing the search and acquisition of appropriate telecom buildings throughout the world. In the future, TelePlace's outsourcing will include many of the managed services they will bundle as part of the startup's offerings to tenants. Thus, as Hamel and Prahalad would have predicted, TelePlace has been able to expand its resource base quickly and substantially through the "mining" and "borrowing" of resources.

³⁰⁸ Hamel and Prahalad, 43.

³⁰⁹ Lenny Chesal, Director of Distribution for TelePlace, interviewed by Benjamin Pettigrew, Boca Raton, FL, 14 July 2000.

³¹⁰ Hamel and Prahalad, 180.

³¹¹ Scott Lehman, interviewed by Benjamin Pettigrew, Boca Raton, FL, 13 July 2000.

Complementing Resources

From resource accumulation, this discussion moves to the complementing resources component at the other end of the resource leverage framework in Figure 21. “Complementing” is the ability of a firm to “blend” and “balance” resources in such a way that creates a total value that is greater than the sum of each individual resource.³¹² Understanding how a resource-constrained tenant such as TelePlace complements its resources is perhaps, at least in the case of TelePlace, the most important component of resource leveraging for a landlord to understand.³¹³

Leveraged resources through complimenting can be performed in two ways. First, a resource-constrained firm can “blend” different skills or knowledge sets in an effort to create a successful product. What differentiates TelePlace from its telecom hotel and collocation service competitors is this ability to blend its telecommunication, Internet, and real estate expertise to create a product that is highly attractive to a variety of telecom, Internet, and corporate customers.³¹⁴ Most telecom hotels provide only infrastructure and space to their tenants. Those companies that do provide managed services in their space, such as Level 3, are not “carrier neutral,” which means that tenants have little or no ability to choose their fiber-provider.³¹⁵ TelePlace, through the blending of its resources, combines these two product types—telecom hotel and managed services—into its “Convergent Technology Centers,” each of which acts as a single source for a tenant’s telecommunications needs.

The second manner in which a firm can complement resources to achieve resource leverage is through “balance.” By balance, Professors Hamel and Prahalad refer to the necessity of a firm to have sufficient depth in each of its core competencies (e.g. research & development, production, sales, etc.) so that none act as a bottleneck to the firm’s growth.³¹⁶ Because many smaller high-tech firms are weak in certain areas, those firms that succeed in developing a balanced set of core competencies can in effect use their resources most efficiently. In the case of TelePlace, the startup has recognized the importance of what Hamel and Prahalad have named “balance” and are striving to strengthen its weaker competencies through the hiring of talent or outsourcing functions like site acquisition. In this manner, TelePlace is positioning itself to achieve the most efficient growth trajectory possible.

Conservation

Conserving resources is the fourth method of resource leveraging included in Hamel and Prahalad’s framework. In the case of a telecom hotel, the two most relevant subsets are what the academics describe as “protecting” and “co-opting.” TelePlace has demonstrated the principle of

³¹² Hamel and Prahalad, 175.

³¹³ Hamel and Prahalad, 184.

³¹⁴ Lenny Chesal, interviewed by Benjamin Pettigrew, Boca Raton, FL, 14 July 2000.

³¹⁵ Richard Berglund, Director of New Markets for TelePlace, interview by Benjamin Pettigrew, July 25, 2000. For a list of telecom hotel and collocation service competitors, see Appendix C.

³¹⁶ Hamel and Prahalad, 185.

protection on numerous occasions in its execution of its business plan. For the location of its first telecom hotel, TelePlace selected its own backyard—Miami. Because of the firm’s familiarity with the area and its proximity to the site, Miami in many ways has served as a safe haven for TelePlace as they incubate their own business model.³¹⁷

The second component, “co-option,” is one that is critical to TelePlace’s business model. Co-option in the general sense of the term is a way for a company to collaborate with a competitor to achieve a mutually beneficial end. In this manner, a resource-constrained competitor can utilize the resources of other firms in addition to its own. This is a particularly common practice in the deregulated telecommunications and unstructured Internet industries, where the lines between industries are becoming blurred or erased entirely. TelePlace, for example, has leased space in its Miami site to a firm named Colo.com. Like TelePlace, Colo.com provides space in which different companies can collocate their servers and switches in a safe environment, and typically this requires the collocation company to provide its clients with upgraded security, fire protection, power, and HVAC systems. Hence, TelePlace and Colo.com are competitors. However, Colo.com is also a tenant in TelePlace’s Miami facility. What brings TelePlace and Colo.com together in this case are the synergies that are created from their co-option. TelePlace benefits from Colo.com’s rent, diverse clientele, and the fees Colo.com’s clients pay for the Meet-Me Room connections with other tenants in the building. Colo.com benefits from its tenancy because it is able to generate even more business from TelePlace’s other tenants in the same building and does not have to make costly investments to retrofit the space with backup generators, precision HVAC, etc.³¹⁸ For these reasons, TelePlace can utilize Colo.com’s resources by allowing the collocation company into its space and, as a result, leverage TelePlace’s own finite resources.

Recovery

Recovery is the final determinant of resource leverage depicted in Figure 21 and perhaps the one that attracts tenants to telecom hotels the most. Recovery is measured by the speed with which a firm can recover its investments. One almost universal benefit of the more advanced telecom hotel prototypes is the speed in which telecom and other tenants can enter the space. The more quickly their switches and servers are up and running the more quickly will those firms recover their investments. Most importantly, landlords must realize that speed-to-market for many telecom tenants is the pivotal issue.³¹⁹ The more the landlord can do to expedite its tenants’ business plan and move-in, the better the market will reward him or her.

Site Selection, Design and Technology Demand

Having completed the exercise of applying Hamel and Prahalad’s model in an effort to learn more about TelePlace as a growing, technology-oriented tenant, how do industry reinvention and

³¹⁷ Scott Haugland, interviewed by Benjamin Pettigrew, 20 July 2000.

³¹⁸ Richard Berglund, Director of New Markets, interviewed by Benjamin Pettigrew, 25 July 2000. Scott Lehman, President of TelePlace’s North American Division, interviewed by Benjamin Pettigrew, 13 July 2000.

³¹⁹ Scott Lehman, Vice President of Business Development for TelePlace, interviewed by Benjamin Pettigrew, 14 July 2000.

resource leverage affect TelePlace's real estate needs? When TelePlace selected the building that would become its first Convergent Technology Center, TelePlace's site selection criteria and building design had been determined with its original space-centric business model in mind. As in the case of any telecom hotel, proximity to multiple providers of fiber was critical. High clear ceiling heights (greater than 12 feet) and floor load capacity (at least 150 pounds per square foot) were also important for the installation and operation of the telecom equipment in the space. The building's power capacity was not a significant concern at first since TelePlace felt it would suffice in the short term. It did not take long before power became a serious problem as the newer servers and switches required more and more power per square foot. In fact, most of their \$3 million investment in the building's infrastructure was allocated to upgrading the building's power capacity to 75 watts per square foot, which is still significantly less than TelePlace would require in its next sites!³²⁰

The building itself was designed to provide a functional place for every telecommunications customer type imaginable. Bulk space would be provided on the lower levels for the larger inter-exchange and local exchange carriers, and a data center for smaller, more specialized equipment would be located on one of the upper floors. Even the rooftop would be utilized for the fast-growing wireless and satellite telecommunications solutions. Of course, a meet-me room was constructed to give TelePlace's tenants a place to access each other's services and equipment. Despite its attempt to make their space in their Miami facility as scaleable and as upgradeable as possible, TelePlace's Miami facility would not be completely prepared to follow TelePlace's transition from a specialized space provider to a managed services provider.³²¹

Operations and Management Issues

TelePlace's entrance into the business of bundling and managing value-added services changed nearly every facet of TelePlace the company. As a result of this strategy regeneration, TelePlace experienced radical changes in its revenue model. Real estate rents, which before had accounted for almost all of TelePlace's revenue, would only account for 20 percent with the remaining 80 percent of total revenue being derived from those services the startup would provide.³²² What makes these figures especially appealing is that these changes in revenue share are based on increases in revenues from services and not decreases in revenue from the real estate. Still, TelePlace's launch remained fettered by two strong cords—a suddenly outmoded telecom hotel and a dependence on Florida East Coast Realty. Although TelePlace's Miami building has served its purpose as an incubator of its original business model, a shift to a service-centric business model required features that were substantially different from those of a space-centric telecom hotel.³²³ The managed services that TelePlace would provide would require the hiring of technical and sales teams that would service the tenants in the telecom space. The telecom hotel would become, as a result, more people-oriented and would require more common area, better elevators, additional parking, separate entrances for loading and for service teams, and a safer

³²⁰ Scott Haugland, President of TelePlace's North American Division, Interviewed by Benjamin Pettigrew, 20 July 2000.

³²¹ Scott Lehman, Interviewed by Benjamin Pettigrew, 20 July 2000. Scott Haugland, interviewed by Benjamin Pettigrew, 20 July 2000.

³²² Scott Haugland, interviewed by Benjamin Pettigrew, 20 July 2000.

³²³ Scott Haugland, interviewed by Benjamin Pettigrew, 20 July 2000.

location.³²⁴ Such a forced retrofit would most likely be too difficult, too time-consuming, and too costly for TelePlace to make so early after its inception.

As for the second cord binding TelePlace, Florida East Coast Realty resisted the new business model's seductive voice, which had attempted to persuade the firm to leave its prosperous and comfortable realm of real estate and embark on a voyage into the rough, uncharted waters of deregulated telecommunications. As TelePlace's financial partner, FECR's decision to not make the hazardous, yet potentially lucrative journey also prevented TelePlace's Miami telecom hotel from making the passage, forcing the facility to merely observe from the safety of the shoreline the eventual departure of TelePlace's other next-generation telecom hotels into the mist of uncertainty that hangs incessantly over the waters' surface.

Partly due to convenience and economies of scale and partly due to Florida East Coast Realty's reluctance to increase its exposure and adapt to TelePlace's regenerated strategy, TelePlace invited Clearview TelePlace, LLC to become TelePlace's primary real estate and financial partner. Under their agreement, TelePlace succeeding in forming a more forward-looking compact that would grant TelePlace relative independence in allocating financial resources.³²⁵ This way TelePlace's ability to adapt to or create the future would not be limited by external forces.

Future Growth: Implications on Space and Technology Needs

As TelePlace continues in its efforts to roll out their 100 Convergent Technology Centers on five continents in five years, its real estate needs may continue to evolve as it already has in its short existence. As the reader may remember, TelePlace had changed its concept of the telecom hotel in such a way that had almost outmoded its first telecom hotel when it opened in the fall of 1999. TelePlace's evolutions (and mutations), combined with the startup's enormous potential growth, will require TelePlace and its partners to stretch their real estate and technology competencies to their maximum. Just as TelePlace must strive to understand the businesses and needs of their clients, opportunistic landlords should also do all they can to learn about their tenants. Landlords can of course obtain this understanding by utilizing forward-looking theories of competitive strategy such as those described by Hamel and Prahalad. Through this understanding, landlords can develop a vision of the future that combines commercial real estate as well as technology industries. With this vision, landlords and developers can then hope to achieve what is promised in the Japanese proverb, "He who can see three days ahead will be rich for three thousand years."

Summary

The purpose of this case, as with the other two cases, has been to verify how appropriate the Hamel/Prahalad frameworks are in trying to understand the business models of a telecom hotel and its master tenant. Given the four criteria—orientation, use of technology, growth, and resource use—outlined in Chapter 4, TelePlace as a tenant fits well within Hamel/Prahalad's

³²⁴ Scott Haugland, interviewed by Benjamin Pettigrew, 20 July 2000.

³²⁵ Bo Brownley, Clearview TelePlace, LLC, Dallas, TX, 6 June 2000.

theory of competitive strategy. First, TelePlace has demonstrated its future orientation in the manner it has developed, implemented, and regenerated its strategy all within six months of its existence. Instead of only focusing on the telecom hotel market's current demands, TelePlace has pursued its vision of a global network of 100 "Convergent Technology Centers" and, in the process, has discovered a way to exploit the market's unarticulated desire for a telecom hotel offering not only space of the highest standards but also an array of managed services that, they expect, will raise the bar for telecom hotel landlords throughout the world. These managed services will also require TelePlace to continue looking ahead so that the startup can remain at the forefront of telecom hotel and telecom service development.

In addition to its "fit" of Hamel/Prahalad orientation, TelePlace also views technology in a manner that is characteristic of Hamel and Prahalad's theory of competitive strategy. TelePlace, like most telecom hotels, depends on technology in a way that is similar to high-tech firms, such as Akamai, whose existence is devoted to creating and selling technology. TelePlace does not necessarily *create* technology in the traditional sense. The startup does, however, add real value to the telecom and Internet companies using TelePlace's space by providing, facilitating, and even upgrading the technologies and services of its tenants. In this way, TelePlace can satisfy the current and even the future needs of its "tenants" and clients. Furthermore, because TelePlace's tenants are typically technology (i.e. telecom and Internet) firms themselves, TelePlace cannot afford to see technology just as an input. Technology is TelePlace's future.

The third Hamel/Prahalad criterion is growth. Ample evidence exists to demonstrate TelePlace's satisfaction of this more implicit attribute. This thesis has already described in significant detail the unprecedented growth that is occurring in the Internet Economy. It is not uncommon to find Internet and telecom firms experiencing double-, triple-, or even quadruple-digit annual growth: One only needs to look within the walls of TelePlace's Miami building.³²⁶ Satisfying the space demands of existing and potential telecom hotel tenants is a formidable challenge even for the real estate development industry, which is notorious for its tendency to overbuild. Recognizing this demand and the synergies of creating a truly interconnected chain of telecom hotels, TelePlace is racing to build 100 of these telecom hotels by 2004 and is experiencing tremendous growth in the process. Because TelePlace sits at the very epicenter of an extremely high-growth global Internet economy, TelePlace as a telecom hotel master tenant overwhelmingly meets the Hamel/Prahalad growth criterion.

The final determinant of a theory's appropriateness for high-tech tenants is resource use. TelePlace, like all firms, is resource-constrained, but all degrees of resource constraint are not equal. The startup's business model, as would be expected for the telecom industry, is extremely capital intensive. A developer seeking to transform a Boston industrial building into a telecom hotel may expect to pay \$100 or more per square foot just to acquire an appropriate building and then invest another three million dollars or more to upgrade the building's infrastructure.³²⁷ To this end, TelePlace raised in private-equity funding a sum of \$100 million, a sizeable sum for a startup but one that has been allocated for the deployment of TelePlace's next 24 facilities. Only by leveraging these funds with significant amounts of debt and maximizing the firm's human and

³²⁶ As an example, Akamai (not a tenant in TelePlace's Miami site) grew 2,000 percent last year! Scott Lehman, Vice President of Business Development, interview by Benjamin Pettigrew, 20 July 2000.

³²⁷ Richard Berglund, Director of New Markets for TelePlace, Inc., Interview by Benjamin Pettigrew, July 31, 2000.

intellectual resources can TelePlace succeed in accomplishing this first phase of its objective. For these reasons, TelePlace does qualify—especially considering the magnitude of the startup’s objectives—as a highly resource-constrained firm. The fulfillment of this and the other three theoretical criteria imply that, at least in the case of TelePlace, Hamel and Prahalad’s theory of competitive strategy is effective in analyzing telecom-hotel and other high-tech tenants.

Having established the appropriateness of Hamel/Prahalad’s frameworks for high-tech firms on a theoretical level, TelePlace must be examined again to see if the frameworks revealed any development practices of TelePlace that varied from the current development practices outlined earlier in Chapter 3. A modified version of Table 3 from that chapter has been reproduced here to allow for a comparison of current development practices described in Chapter 3 and development practices observed in this case study. As is illustrated in Table 8, the same four categories—feasibility, site selection, design and operations—that are used in the previous case will also be used to examine TelePlace.

Table 8: Comparative Study of Current and Observed Development Practices for TelePlace

	TelePlace	
	Expected Development Practices	Observed Development Practices
Feasibility Development Timing Business Risk	Fast High	Fast Mod./High
Site Selection Criteria Proximity to Skilled Workforce Access to High Speed Fiber Access to High Power Volume	Low Critical Critical	Low/Mod. Critical Critical
Design Uniformity of Floor Plate Flexibility of Space Information Technology Design Structural requirements Level of Amenities	High Low High Vol. High Low	Uniform High High Vol. High Low/Avg.
Operations Use of Technology Power/IT Outages Technology Provider Business Relationship	Core Bus. Hi Impact Tenant	Core Bus.* Hi Impact TelePlace

* Technology for a telecom hotel typically is critical for its core business. However, because TelePlace plans on offering services as well, the importance of technology is amplified significantly.

For the most part, Table 8 predicts with some degree of accuracy TelePlace’s requirements in terms of feasibility. Speed-to-market is critical for TelePlace, and the level of risk attributed to the startup’s tenants is high. However, TelePlace’s adoption of managed services into its business plan should enhance the quality of TelePlace’s product and help reduce its risk relative

to other telecom hotels. A burgeoning Internet economy and an abysmal gap between telecom space supply and demand also help minimize TelePlace's risks in the short run.

As for site selection, TelePlace's Miami building, as predicted, was chosen because of its proximity to multiple fiber providers and because of the relatively high existing power supplied to the building. The building, under the original business model, also required minimum space for workplaces. What the application of Hamel/Prahalad's frameworks reveals in this case is the need for scalable power to allow for less costly power expansions in the future.

Finally and perhaps most importantly, the development criteria for telecom hotels as depicted in Table 8 do overlap with some of TelePlace's operational concerns, including the importance of redundancy in terms of power and fiber. Hamel and Prahalad's frameworks, however, show that technology for TelePlace has become much more important since it regenerated its original space-centric strategy. Under its original business model, most of the technology TelePlace utilizes is in the infrastructure and the equipment within its building. Because of the difficulty and cost of upgrading the facility's infrastructure regularly and because of the long-term leases of its tenants, the technological capability of the building itself becomes relatively static once the telecom hotel leases up, signifying a decreasing incentive to improve the building's technology as tenants move in. Now that TelePlace plans to provide managed services to its tenants and customers, changing market demand and increasing competition serve as constant motivators for TelePlace to seek new and better opportunities to serve their current and future customers. For these reasons, TelePlace's new business model has only amplified the importance of technology to the already technology-dependent startup. In the end, it is the application of Hamel and Prahalad's forward-looking theory of competitive strategy that revealed this and other discrepancies between the current development practices of Chapter 3 and the observed development practices of TelePlace.

Having analyzed and verified in this case the theoretical appropriateness and practical applicability of Hamel and Prahalad's theory of competitive strategy to understand TelePlace, the inevitable question must be addressed: What does all this mean? To the developer and landlord, this case study reveals that current development practices that are prevalent throughout the industry may not be sufficient to meet the needs of rapidly growing and evolving tenants. Like the slow revolving light of a lighthouse on a soon-to-be stormy night, current development practices give brief glimpses to a sailing vessel of where the rocks and channels are lying. Those moments of illumination may come too infrequently for the port-bound vessel already sailing in the treacherous waters of high technology with rocks and reefs hidden just beneath the waves. What the vessel needs is a beacon whose light shines constantly focused on the sailing vessel to guide it safely to port of prosperity. This constant beacon is an in-depth understanding of the landlords' tenants, illuminated by the power of an analytical framework that gives the landlord a clear vision of the opportunities and dangers that may lie ahead in their tenants' paths. The landlords and tenants' need for this vision in the chaotic world of the Internet and telecom deregulation is best summarized in a Biblical Proverb: "Where there is no vision the people perish."³²⁸

³²⁸ Proverbs 19:18.

Conclusions

Having studied and analyzed the three cases—Northwestern, YankeeTek/Akamai, and TelePlace—in depth, attention must now be directed towards digesting the derived information into a concise conclusion. The results of the three case studies are summarized in Table 9.

Table 9: Comparative Summary of Theoretical Applications in Case Studies

		Porter Prototype	Northwestern	Hamel/Prahalad Prototype	YankeeTek/Akamai*	TelePlace
Areas of Comparison	Present-Past/Future Orientation	Present-Past	Present-Past	Future	Future	Future
	Use of Technology	Input	Input	Core business	Core business	Core business
	Growth Rate	Low, but steady	Low, but steady	Extremely high, but volatile	Low/Astronomical	High
	Relative Resource Abundance	High	High	Low	Moderate/Low	Low

* For YankeeTek and Akamai, the results differ somewhat. When such differences exist, the results for YankeeTek are given first and are separated from those of Akamai by a “/”. For example, YankeeTek has moderate resource abundance while Akamai has low resource abundance. If the results are the same for both, then result listed applies to both YankeeTek and Akamai.

As shown above, the three selected cases correspond closely to the prototypes predicted by their assigned theories of competitive strategy.

Northwestern’s competitive strategy focuses, as would be expected of an established FIRE tenant, primarily on past data and current market conditions revolving around the policyholder and agent. The relationship between Northwestern’s strategy and Porter’s framework is also evident in the insurance company’s view of technology as an important but supportive function of Northwestern’s business model. Northwestern’s growth rate has been relatively low and stable despite its access to enormous amounts of capital.

Likewise, YankeeTek, Akamai, and TelePlace appear to fit the Hamel and Prahalad prototypes developed in Chapter 4. YankeeTek, Akamai and Teleplace have each developed a vision of the future that is relatively independent of the past, and they are working to make each dream a reality. Technology in each of these three firms is more than just an input; either directly or indirectly, technology is the foundation of their businesses. In terms of growth, TelePlace and YankeeTek face the numerous challenges caused by the high growth rates of both their tenants and their own businesses. Lastly, all three firms are severely resource-constrained. These firms must leverage their resources as much and as safely as possible to achieve the industry reinvention and/or creation they seek.

Thus, as Table 9 indicates, the framework developed by Michael Porter and that devised by Gary Hamel and C.K. Prahalad appear to be representative of the competitive strategies pursued by Northwestern, YankeeTek, Akamai, and TelePlace.

Despite all of the evidence presented thus far, the would-be New Economy developer should not stop reading here and rush down from the highlands of academic thought into the deadly telecom and Internet frays armed with Hamel in her right hand and Prahalad in her left. As modern-day highlanders, developers and landlords will not cease to use such traditional weapons as “customer-led” and “herd” strategies without having compared the effectiveness of these and other traditional weapons with that of a more forward-looking theory of competitive strategy.³²⁹ Such comparisons are detailed in Table 10 and Table 11.

Table 10: Comparative Summary of Development Predictions—Northwestern

	Northwestern	
	Expected Development Practices	Observed Development Practices
Feasibility Development Timing Business Risk	Moderate Low/Mod.	Moderate Low
Site Selection Criteria Proximity to Skilled Workforce Access to High Speed Fiber Access to High Power Volume	Mod./High Important Important	Moderate Important Important
Design Uniformity of Floor Plate Flexibility of Space Information Technology Design Structural requirements Level of Amenities	High Moderate Mod. Vol. Average Average	High Moderate High Vol. Average High
Operations Use of Technology Power/IT Outages Technology Provider Business Relationship	Efficiency Mod. Impact "Last Mile"	Efficiency Mod. Impact In house.

Table 10 and Table 11 serve as complete summaries of all the cases described in the previous chapter. These tables allow for an easy comparison of the similarities and differences between the “expected” development practices comprising the body of current real estate development

³²⁹ A “herd” strategy is essentially a momentum strategy—follow the herd with the hope that there will still be enough water there when you arrive. This assumes, of course, that the herd will actually find water in the first place. Some might argue with reason that a “herd” strategy is an oxymoron in that it requires no proaction other than deciding to follow others.

practices as described in Chapter 3 and the “observed” practices of each particular tenant as revealed by the Porter and Hamel/Prahalad frameworks in the case studies.

Overall, the development practices as identified by the industry as a whole and summarized in Chapter 3 correspond relatively closely to the observed development practices of Northwestern, YankeeTek/Akamai, and TelePlace. This is particularly evident in the case of Northwestern, as illustrated in Table 10. This concurrence between the expected and observed practices for Northwestern should be anticipated considering the popularity and appropriateness of Porter’s frameworks for traditional tenants.

With regards to the other two cases, however, such apparent agreement is more unexpected. The feasibility subsection in Table 11 shows almost complete unanimity between the expected and observed practices, and the differences that do exist between the development practices are rarely extreme.³³⁰ Thus, landlords and developers may be tempted to continue with their current or non-existent strategies if the differences between the expected and the observed practices are so few.

Table 11: Comparative Summary of Development Predictions—YankeeTek/Akamai and TelePlace

	YankeeTek/Akamai		TelePlace	
	Expected Development Practices	Observed Development Practices	Expected Development Practices	Observed Development Practices
Feasibility Development Timing Business Risk	Fast High	Fast High	Fast High	Fast Mod./High
Site Selection Criteria Proximity to Skilled Workforce Access to High Speed Fiber Access to High Power Volume	High Necessary Important	Extremely high Necessary Important	Low Critical Critical	Low/Mod. Critical Critical
Design Uniformity of Floor Plate Flexibility of Space Information Technology Design Structural requirements Level of Amenities	Low High High Vol. Average High	High Mod. High Vol. Average Low-Avg.	High Low High Vol. High Low	Uniform High High Vol. High Low/Avg.
Operations Use of Technology Power/IT Outages Technology Provider Business Relationship	Core Bus. High Impact "Last Mile"	Core. Bus. High impact. "Last Mile"	Core Bus. Hi Impact Tenant	Core Bus. ³³¹ Hi Impact TelePlace

³³⁰ An example of an “extreme” difference” would be from “high” and “low.”

³³¹ Technology for a telecom hotel typically is critical for its core business. However, because TelePlace plans on offering services as well the importance of technology is amplified significantly.

The differences between the expected development practices and those observed in the case studies may be few in number but are significant in magnitude. The only difference between the expected and reserved regarding the feasibility development issue of telecom hotels, as illustrated in Table 12, is critical.

Table 12: Comparative Summary of Development Predictions—Feasibility

	YankeeTek/Akamai		TelePlace	
	Expected Development Practices	Observed Development Practices	Expected Development Practices	Observed Development Practices
Feasibility				
Development Timing	Fast	Fast	Fast	Fast
Business Risk	High	High	High	Mod./High

If it were not for their exploding demand, telecom hotels in general face considerable risk due to the volatility inherent in startup Internet and telecom companies. Landlords and developers, as explained previously, attempt to mitigate these risks by signing long-term leases with regional or national tenants that have high credit ratings (credit tenants), which also allow the real estate professionals to negotiate more favorable financing terms. Because of the importance of leasing space to them, these credit tenants typically have the most influence of any potential tenant in the design of a building. As was once the case of the current giants Microsoft and Cisco, TelePlace is not a credit tenant. TelePlace, however, subleases space to other companies that include credit tenants. In addition to signing these long-term leases with credit tenants, Hamel and Prahalad’s frameworks reveal that TelePlace further reduces its risk levels and, consequently, those of its landlords by providing a variety of managed services. Such services potentially will enhance the marketability and profitability of TelePlace’s telecom space as time-sensitive telecom and Internet companies take advantage of the added benefit of leasing space in a service-centric TelePlace telecom hotel as opposed to the other space-centric options. A developer dependent on information from current development practices and focused almost entirely on building out their space to please potential credit tenants could miss these critical facts that signify a lower level of risk for TelePlace and a greater opportunity for the landlord than what current wisdom may indicate. For these reasons, developers and landlords should hoping to avoid mispriced risk and missed opportunities should use forward-looking analytical frameworks to better understand their tenants and the risks they carry.

Table 13: Comparative Summary of Development Predictions—Site Selection

	YankeeTek/Akamai		TelePlace	
	Expected Development Practices	Observed Development Practices	Expected Development Practices	Observed Development Practices
Site Selection Criteria				
Proximity to Skilled Workforce	High	Extremely high	Low	Low/Mod.
Access to High Speed Fiber	Necessary	Necessary	Critical	Critical
Access to High Power Volume	Important	Important	Critical	Critical

The two discrepancies under site selection in Table 13 pertain to the importance of being located near a highly skilled workforce. Current development strategies dictate that it is highly important for smart office buildings and relatively unimportant for telecom hotels to be located near an educated workforce. However, what an application of these more myopic development strategies would fail to reveal is the critical importance for incubators (YankeeTek) and Internet companies (Akamai) to be located near universities (MIT, Harvard, etc.) and other high-tech companies to provide the highest quality pool of potential employees possible. For an industry that will shift more towards value-added services, it is becoming increasingly important for telecom hotels to be located in areas where skilled engineers can be recruited and can work. Again, such seemingly minor differences can be sources of significant revenue, but such opportunities would have been difficult to anticipate without the use of a more technology-friendly theory of competitive strategy.

Table 14: Comparative Summary of Development Predictions—Design

	YankeeTek/Akamai		TelePlace	
	Expected Development Practices	Observed Development Practices	Expected Development Practices	Observed Development Practices
Design				
Uniformity of Floor Plate	Low	High	High	Uniform
Flexibility of Space	High	Mod.	Low	High
Information Technology Design	High Vol.	High Vol.	High Vol.	High Vol.
Structural requirements	Average	Average	High	High
Level of Amenities	High	Low-Avg.	Low	Low/Avg.

The design subsection of Table 14 contains several differences, some of which are particularly important to note. The current development strategies would have predicted a much different design for YankeeTek and Akamai than the two firms currently have. From the resources and examples described in Chapter 3, current development strategy would call for the design of flexible, very unique space with several amenities to enhance the quality of life of smart office

tenants. At the same time, one would expect that a telecom hotel would require less flexibility and few amenities because of its equipment-oriented nature. However, YankeeTek and Akamai both are leasing space that is relatively inflexible and provides few real amenities to its users. This space may not be ideal to their purposes but are suitable given their current needs. On the other hand, TelePlace, under its new service-centric business model, requires more amenities and more space flexibility than current development strategies could foresee. As in the case of the other differences, it was the use of Hamel and Prahalad’s frameworks that revealed these small yet critical differences between expected and observed development practices.

Table 15: Comparative Summary of Development Predictions—Operations

	YankeeTek/Akamai		TelePlace	
	Expected Development Practices	Observed Development Practices	Expected Development Practices	Observed Development Practices
Operations				
Use of Technology	Core Bus.	Core. Bus.	Core Bus.	Core Bus. ³³²
Power/IT Outages	High Impact	High impact.	Hi Impact	Hi Impact
Technology Provider	"Last Mile"	"Last Mile"	Tenant	TelePlace
Business Relationship				

Within the final development subsection (detailed in Table 15) concerning operations lays more seemingly innocuous yet critical differences in the current and theoretical development strategies described here. By following the trend of the current practices, a developer would underestimate the importance of technology to TelePlace. Technology, as recognized by current telecom hotel prototypes, is more than just an input or a secondary component of telecom hotels’ operations. The case study on TelePlace reveals that this importance can be taken even farther through the addition of managed services and other features not currently available to tenants directly through the telecom hotel itself. Florida East Coast Realty, for example, remained faithful to its partnership agreement with TelePlace, but at the same time, the real estate firm missed a potentially enormous opportunity to better serve TelePlace’s real estate needs without having to cross the expansive chasm between the real estate and telecommunications businesses. Had Florida East Coast Realty used and applied analytical frameworks developed by Hamel and Prahalad or other forward-looking strategic theorists, the real estate company might have been able to find a way to help TelePlace implement its managed services in the Miami building.

In summary, all of these differences represent actual or potential breakdowns on the supply-side of real estate development. Landlords and developers, under their current competitive strategies, reasonably meet the articulated needs of their tenants, but they generally fall short in their ability to satisfy tenants’ evolving or future needs. What this thesis illustrates is the need for landlords and developers to adopt more forward-looking competitive strategies that fit the mindset and business models of high-tech firms. Michael Porter’s theory and frameworks, as demonstrated in the Northwestern case study, appear to be appropriate for understanding the businesses and needs of traditional tenants. For technology-driven tenants of incubators and telecom hotels, however,

³³² Technology for a telecom hotel typically is critical for its core business. However, because TelePlace plans on offering services as well the importance of technology is amplified significantly.

Hamel and Prahalad's frameworks promise to better help real estate professionals understand the implications of technology.

The aptness of Hamel and Prahalad's theory of competitive strategy, however, has not been demonstrated for technology firms in general. This would require a much more thorough analysis of a broader range of tenants, their landlords, and theories of competitive strategy. Such a study could be especially useful in formulating a theory of competitive strategy specifically for real estate developers and landlords serving high-tech industries. Until such a theory is devised and tested, however, the real estate industry must be content to select theories and frameworks appropriate to the peculiarities of technology-dependent tenants and their industries.

In addition, the theoretical, development, and technological issues discussed here, as comprehensive as they may be, have only served as temporary sustenance in a world starving for lack of technological understanding. Many of the "facts" concerning bandwidth, power, and other infrastructure requirements for telecom hotels, for example, are destined to become outdated. This study's lessons concerning the importance of using appropriate analytical frameworks to understand the current and future needs of tenants, however, are timeless.

For these reasons, the purpose of this thesis, from its inception to its conclusion, has been not to feed real estate developers and landlords but to teach them how to feed themselves. The window of opportunity for building viable incubators and telecom hotels may be closing rapidly, but other windows will open. In order that landlords and developers are prepared for future development opportunities like biotech incubators or pharmaceutical labs, they must constantly strive to understand the businesses and futures of their potential tenants' industries. Only by the careful selection and use of appropriate analytical frameworks can the Internet's landlords hope to service and preempt the real estate needs of the New Economy and any others that may follow.

Appendix A: Technology Notes

Multiplexing and Compression

The type of cable media and the way the signal is transmitted determine the volume of traffic a telecommunications system can support.³³³ New technologies achieve greater speeds through compression (equivalent to the elimination of blank spaces in a signal) and multiplexing (the creation of codes attached to signals allowing multiple channels of communication on the same wire).³³⁴ With the advent of digital signals, very efficient multiplexing and compression have been made possible. Breaking the information into packets is the real efficiency. This packetized information is sent via what is known as a virtual circuit (a physical facility that is shared among many users). The virtual circuit allows a circuit to achieve up to 100 percent utilization.

Additional Notes on Frame Relay and Data Networks

Some organizations have traditionally leased lines from telephone companies and carriers to connect the data networks between buildings campuses or other remote locations, rather than trenching and installing their own facilities. Most of these networks were built using T-1, a multiplexing technology. Within the past decade, carriers began offering a service called Frame Relay and other advanced technologies such as Asynchronous Transfer Mode and SONET. For example, by using Frame Relay, users and carriers saved money on transmission between their local networks. The use of Frame Relay allows local area networks to be managed by the local and long distance telephone companies and to link multiple buildings on a site, nationally, or even internationally. Frame Relay cuts down on the number of lines required to connect, for example, a headquarters with its sub-sites due to added data transmission efficiency. Frame Relay and the other technologies reduce the number of dedicated outside lines a company a traditional data system needs to link disparate networks.³³⁵ Internet connections are beginning to replace much of the traffic that was being routed over the Frame Relay network. This is because the demand for high-speed access to the Internet backbone is skyrocketing.

SONET and Optical Carrier Standards

SONET (Synchronous Optical NETWORK) is commonly operated today at rates of 10 to 80 billion bits per second. Locally, this same technology is usually engineered at slower rates up to 622 million bps. This increased capacity has achieved transmission levels well beyond those of the previous top copper standard of 44 mbps (T-3). While there are various multiplexing standards available, the traditional combining of 24 individual voice circuits into a T-1 and then combining

³³³ For information on how networks achieve faster speeds, please see the notes on Multiplexing and Compression in Appendix A.

³³⁴ Dodd, 14.

³³⁵ Dodd, 155; Newton, 350.

28 T-1's into a T-3 (672 voice channels) has now been "supplanted" by optical standards. Companies like Northwestern Mutual, for example, are connected to SONET rings that minimally operate at OC-12. This transmission rate of 622 mbps is more than 8,000 channels. OC-48 and even OC-192 is now being installed in other end-user sites, with bandwidths up to 10 billion bits per second (to carry 129,000 voice transmissions on a single fiber strand) also being installed.³³⁶

Additional Notes on Specialized Digital Network Services

T-1, Integrated Services Digital Network (ISDN), and Digital Subscriber Lines (DSL) are services that can be fed directly from the building riser to an end user's computer terminal or telephone. T-1 is most commonly used with copper can be transmitted over optical fiber. ISDN is a technology that sought to replace analog transmission with purely digital transmission. It was hoped that it would be one of the first systems to overcome the limited signal capacity of analog³³⁷ copper lines using telephone cable. While there has been some success at replacing some older T-1's with ISDNs Primary Rate Interface (PRI), local loop ISDN, called Basic Rate Interface (BRI), has largely failed to gain market share. The telephone companies are now attempting to provide DSL in place of BRI ISDN and also are often bringing fiber directly into businesses and providing multiple T-1s and T-3's. T-1 is a standard in many new building constructions because of its high bandwidth and flexibility. DSL is used in many buildings that are being retrofitted for higher bandwidth.³³⁸

Emerging Telecommunications Technologies

The proliferation of the Internet, coupled with telecommunications deregulation, has brought forth a new era of increased competition. This has resulted in new switches, hardware and high speed telecommunications services, and even in new real estate products such as the telecommunications hotel. Innovation, however, is not limited to growing existing infrastructure; new wireless technologies promise to further transform information technology. Therefore, discussions of the various options in wire and fiber are not complete without a discussion of the implications of wireless technology on telecommunications.

Wireless technology allows for the transmission of voice and data signals via radio waves. Currently, restrictions in transmission capacity, coupled with "dead spots" where signals fade in buildings and in some outdoor areas, limit the usefulness of wireless technology. Motorola abandoned Iridium. Bill Gates attempted to partner with Loral Systems to create a ring of low earth orbiting (LEO) satellites that would have allowed much greater wireless transmission capacity. For now, the effort has been abandoned because of cost. Despite these setbacks,

³³⁶ Dodd, 161

³³⁷ Analog signals travel in waves through a telephone line. This older method of transmission is less flexible compared to digital transmission, where signals are broken down into binary code. This code allows signals to be condensed and transmitted more efficiently. Most offices now use digital voice and data networks in order to take advantage of high speed, high bandwidth digital technology.

³³⁸ William A. Morgan, W and J Partnership. Telephone interview by Geoffrey Morgan, 18 July 2000.

various companies and organizations continue to strive to make wireless Internet services more viable.³³⁹ Although it is tempting to think wireless technology could make wire-based and even fiber-based services obsolete, most experts believe that the less-secure and inherently lower-capacity wireless telecommunications will tend to enhance connectivity, complementing rather than replacing land based information technology infrastructure.³⁴⁰

³³⁹ Dodd, 231.

³⁴⁰ William A Morgan, W and J Partnership, designer of Roseville Communications Company's RCS Wireless subsidiary's Wireless Local Loop 1900 CDMA service; Meg Walsh, Consultant/Owner of Telecom 21, Interview with Geoffrey Morgan, 6 June 2000.

Appendix B: Select High-Tech Incubators

Company	Website	Locations ³⁴¹	Active/ Passive ³⁴²	Real/ Virtual ³⁴³	Investment Strategy
AV Labs	avlabs.com	Austin, TX	Active	N/A	B2B, infrastructure, and other ideas catalyzed by Internet
Bainlab (Bain & Company's incubator)	bainlab.com	AMERICAS--Atlanta; Bosques de las Lomas, Mexico; Boston; Chicago; Dallas; Los Angeles; San Francisco; Sao Paulo; Toronto; EUROPE/AFRICA-- Brussels; Johannesburg; London; Madrid; Milan; Munich; Paris; Rome; Stockholm; Zurich; ASIA/AUSTRALASIA --Beijing; Hong Kong; Singapore; Sydney; Tokyo;	Active	N/A	B2B; B2C; intermediaries; infrastructure; e-services
BHive	bhive.net	USA--Conshohocken, PA; Alexandria, VA*; Columbus, OH*; Atlanta, GA*; Pittsburgh, PA*; Miami, FL*; Boston, MA*; Jersey City, NJ*; Chicago, IL*; Charlotte, NC*; INTERNATIONAL-- Dublin*; London*; Toronto*;	Active	Real	emerging Internet and technology companies
Broadband Investment Group	bigcorp.net	St. Louis, Missouri	Active	Real	broadband content, infrastructure, applications and hardware
Cambridge Incubator	cambridgeincubator.com	Cambridge, MA (Kendall Sq.)	Active	Real	Dot-com e- commerce

³⁴¹ Locations marked with an "*" are proposed locations and are not operational as of August 2000.

³⁴² "Passive" incubators provide only space and limited services. "Active" incubators provide a wide array of services that include funding, human resources, technical teams, legal advice, strategy, marketing/sales, etc.

³⁴³ "Real" incubators, as defined in this thesis, provide portfolio companies shared common space within the same buildings in order to create an environment where ideas can be exchanged freely. "Virtual" incubators provide either limited or no help finding space for their companies' real estate needs.

Company	Website	Location(s)	Active/ Passive	Real/ Virtual	Investment Strategy
Campsix	campsix.com	San Francisco (SOMA district)	Active	Real	Internet B2B companies
divine interVentures	divine.com	Chicago (Lisle, IL); Austin, TX	Active	Real	Vital businesses for the new economy
eCompanies	ecompanies.com	Santa Monica, CA	Active	Real	e-commerce; Internet-related opportunities
eHatchery	ehatchery.com	Atlanta	Active	Real	Internet-related ideas
Garage.com	garage.com	Austin; Boston (Waltham, MA); Israel; London; Palo Alto; Seattle (Kirkland, WA);	Active	Real	B2B life sciences, infrastructure, hardware, software
HOTBANK (SOFTBANK Venture Capital's incubator)	sbvc.com	Mountain View, CA; Boston, MA (Backbay);	Active	Real	Products and services that utilize the Internet
idealab! (first New Economy incubator)	idealab.com	Boston, MA; London, UK; Los Angeles, CA; New York, NY; Pasadena, CA; San Diego, CA; San Francisco, CA; Santa Monica, CA; Sherman Oaks, CA; Silicon Valley (Sunnyvale, CA);	Active	Real	Companies that use the Internet to satisfy an unmet market need
Internet Capital Group	internetcapital.com	Wayne, PA; Boston; Newark, DE; San Francisco; Seattle Paris; London; Munich; Hong Kong;	Active	Virtual	B2B e- commerce ventures
iStart Ventures	istartventures.com	Seattle (Pioneer District)	Active	Real	Maximize potential of Internet
Reach, LLC	reachincubator.com	Boston, MA (Financial District)	Active	Real	Information technology
Startemup.com	startemup.com	Durham, NC; Atlanta*; Boston*; Washington, DC*	Active	Virtual	Internet technologies
ThinkTank.com	thinktank.com	Aliso Viejo, CA	Active	Real	Internet and infrastructure;
YankeeTek Incubator	yankeetek.com	Cambridge, MA (Alewife)	Active	Both	Internet infrastructure

Appendix C: Key Players in the Telecom Hotel and Collocation Areas

Telecom Hotels

Company	Address	Size (sq. ft.)	Rent (per sq. ft.)
	250 Williams St. Atlanta, GA	720,161	17-21
	55 Marietta Ave Atlanta, GA	398,000	12-27
	56 Marietta Ave Atlanta, GA	130,000	12-29
	800 Boylston St Boston, MA	1,226,539	45
Co Space Services	70 Inner Belt Rd Boston, MA	160,000	18-22
Markley Stern Partners	One Summer St., 1 Chauncey St., Boston, MA	209,000	18-22
	230 Congress St Boston, MA	Bell Atl-10K, Frontier Comm-12K, ACC Natl. Telecom 2K, US1 Comm 12K	
	401 S. LaSalle	144,322	20-25
Lakeside Technology Ctr.	350 E. Cermak Rd. Chicago, IL	1,088,551	15
Chi. Inform. Tech. Exch. Bldg.	14 E. Jackson Chicago, IL	900,000	16
One S. State Street	1 S. State St. Chicago, IL	280,000	20.50
1. N. Dearborn	1. N Dearborn, Chicago, IL	900,000	22
Telequarters Bldg.	717 Wells St. Chicago, IL	96,418	25
Universion Center	2323 Bryan Dallas, TX	459,088	25
	901 Main St. Dallas, TX	1,884,893	26
	350 N.St. Paul Dallas, TX	555,909	17
	2020 Live Oak Dallas, TX	140,000	22
Carrier Center	400 S. Akard Dallas, TX	301,000	20
Info mart	1950 Stemmons Dallas, TX	1,057,000	24-27
Switch Room Design	910 15th St. Denver, CO	150,000	13
	1050 17th Street Denver, CO	575,636	19
	15 th St. & Champa Denver, CO	138,116	22
InFlow	1660Lincoln, Denver, CO	180,000	22

Company	Address	Size (sq. ft.)	Rent (per sq. ft.)
One Wilshire Bldg	624 S. Grand Ave. Los Angeles, CA	570,000	20-32
Telecom Center	530 W. 6th St. Los Angeles, CA	157,400	21
Pacific Finan. Ctr.	800 W. 6th St. Los Angeles, CA		18-20
Transamerica Ctr.	1149 S. Broadway Los Angeles, CA		20-25
Telequarters Bldg.	1149 S. Broadway Los Angeles, CA		20-25
	818 West 7th St Los Angeles, CA		20-24
AT&T Center	611 West 6th St Los Angeles, CA	715,463	23-28
MCI Center	700 South Flower Los Angeles, CA		
	611 Wilshire Blvd Los Angeles, CA		2-25
Peck-Norman Bldg.	700 Wilshire Blvd Los Angeles, CA		19-24
Wells Fargo Building	1200 West 7th St. Los Angeles, CA	990,000	17-22
New World Bldg.	100 North Biscayne Blvd. Miami, FL	100,000	17-19
	200 SE 1st St. Miami, FL	140,000	17-19
	36 NE2nd St. Miami, FL	150,000	17.81
One Bayfront Plaza	100 South Biscayne Blvd, Miami, FL	377,000	19-45
The 60 Hudson Bldg.	60 Hudson St. New York, NY	700,000	24-26
111 8 th Ave.	111 8th Avenue, New York, NY	2,300,000	36-38
325 Hudson	325 Hudson St. New York, NY	205,708	32-34
Starret Lehigh Bldg.	601 West 26th St. New York, NY	2,000,000	19-25
	401 North Broad St. Philadelphia, PA	1,293,000	20-30
	2401 Locust St. Philadelphia, PA	40,000	30
Westin Bldg.	2001 6th Ave Seattle, WA	380,651	32
	701 5th Ave Seattle, WA	1,537,932	37
Eckington Place	77P Street NW Washington, DC	238,429	

Collocation Companies

Company	Address	Size (sq.ft.)	Rent (\$/sq.ft.)
AboveNet	Fairmont Plaza 50 W. San Fernando San Jose, CA		
Co-Let Net	725 D. Wells St. Chicago, IL, 60606		1000/cabinet (set up) 800/cabinet/mnth 2500/72 sf cage 3500/ 95 sq ft cage
Co-Lo House	624 S. Grand Los Angeles, CA	5000	
Colomotion	1021 Mission St. San Francisco, CA	4000	
Concentric Network Group	1400 Parkmore Ave, San Jose, CA		
Compstar Comm	2812 Spring Rd. Atlanta, GA	20,000 avg.	2,500/Cabinet 800/Cabinet
Eagle Comm	Part of IXC Network		200-400/rack
EXODUS Comm	283' Mission College Blvd, San Jose, CA		
ExtraNet	111 8th Ave, Suite 1533 New York, NY		84/sf per cage/10.13/ sq. ft. Power/HVAC billed separately
Gateway Collocation	165 Halsey St. 5th Floor Newark, NJ		
Global Switch	London, UK		
Global Switch	Paris France		
Global Switch	Amsterdam, NL		
IX2		10,000	\$1,500/cabinet \$650 cab/monday \$3,00/Cage setup \$5,000/Cage 20% fee for cross- connect.
IEA	200 SE 1st Street, Miami FL.	5000-5600	\$1,000/rack \$750/cabinet/month \$2,000/cage/setup 1500/cage setup
Layer One Tech	5015 Victor Street Dallas, TX		\$1,000/rack (setup) \$1,000/cabinet (setup)
Level 3	3555 Farnam St. Kiewit Plaza Omaha, NE	55,000	\$1,500/cab (set up) \$720/cab
NetSentinel	55 Marietta St. Atlanta, GA	6,000	\$500/Cabinet (set up) \$1,800-\$2,500/sq. ft/mon. (inside vault), \$1,300-\$1,500/s.f., (outside vault)
NTC Network	700 Wilshire Blvd Los Angeles, CA	10,000	
SAGE Comm.	64 Perimeter Ctr. Atlanta, GA	15,000	\$1,700/cabinet (set up) \$1,650/cabinet/mon.

Company	Address	Size (sq.ft.)	Rent (\$/sq.ft.)
S&DFC	1200 W. 7th St. Los Angeles, CA	22,000	\$10/sf
Telelinks	London, UK		
Telecitey	Manchester, UK		
Telehouse	London, UK		
Telehouse	Paris, France		
Telehouse, Int'l	7 Teleport Drive Staten Island, NY	20,000-40,000	900-1,080/rack/Mon. \$2,400/Cabinet (set up)

Appendix D: Glossary of Terms

This following is an alphabetical listing of various technical terms as they are used in this thesis. For a more complete technical reference of telecommunications terminology, please see *Newton's Telecom Dictionary (15th Edition)*.

ASP: Application Service Provider, Companies that rent space on their hardware servers for software applications. Instead of a company needing a large in-house staff to maintain and support software, it is farmed out to the ASP that runs and maintains it. The customer then accesses the software application via the Internet or through a private network.

ASCII: American Standard Code for Information Interchange. It's the most popular coding method used by small computers for converting letters into digits. This method is used to transmit e-mail on the Internet.

B2B, B2C: These terms refer to "business-to-business" and "business-to-consumer" electronic commerce sights. As the name implies, B2B firms act as intermediaries between two businesses, whereas B2C firms market directly to the consumer.

CLEC: Competitive Local Exchange Carrier, companies established after the 1984 divestiture of AT&T that were only allowed to offer local telephone service

Collocation Space: Collocation spaces house many carriers or servers in cabinets that can be separated for small bandwidth users and individually locked. Some buildings that are primarily office space have collocation spaces. These spaces are similar to telecom hotels because they allow tenants to be serviced individually by different telephone service carriers.

Content Provider: Used in the context of this thesis, "content provider" refers to companies that provide more efficient use of bandwidth and routing to maintain the integrity and speed of use of a World Wide Web site. The term can also be used to describe companies that put content on the World Wide Web, rather than companies that maintain Web sites.

CPE: Customer Premise Equipment, the switches, telephones and other equipment attached to phone lines within the customer's building/location.

FIRE: Financial, Insurance and Real Estate....classic measurements of employment as it effects the commercial office market. The Internet has created a new class of office tenant that is not accounted for in this traditional office category.

IEX: Inter-Exchange Carrier, companies established after the 1984 divestiture of AT&T that were only allowed to offer long distance service.

Incubator: An organization that supports entrepreneurs who wish to launch a business concept from its industrial infancy into a viable business. Incubators can be "real," in that they provide space along with other new business support, or they can be "virtual" if they do not provide

space directly or at all. In addition to sometimes providing space, incubators may also provide funding as well as other services that include accounting and legal advice, recruiting, technical teams, consulting, industry and customer contacts, and business development and other support services.

Internet: A vast computer network linking, by some estimates, over 60,000 sub networks, 9.5 million computers, and 47 million users in over 150 countries.

Internet's Landlords: A term coined by the authors to describe the landlords and developers that serve the real estate needs of Internet startups, telecom companies, and other constituents of the New Economy.

"Last Mile" Contractor: Also known as a "first mile" contractor. "Last mile" denotes the telephone equipment and wiring from the telephone company's demarcation point outside the building to the switches, risers and floor runs within the building. This contractor provides tenants of a building various services, such as local and long distance telephony, Internet connectivity. These companies typically form a joint venture with landlords, paying approximately 5% of their gross revenues to the building owner. Often, the contractor allows a choice of several local and long distance carriers as well as Internet service to the tenants. Either the landlord or the contractor might own the telephone switching equipment within the building.

LATA: Local Access Transportation Area, established as a result of divestiture of AT&T in the early 1980's, roughly represents metropolitan areas and acted as boundaries within which callers were charged for local telephone service only. Calls made between two LATAs were considered long-distance calls.

New Economy Business: Also known as the Internet economy business—defined as “companies directly generating all or some part of their revenues from the Internet or Internet-related products and services.”

Old Economy Business: Businesses that were founded based on non-Internet related revenue creation. Includes traditional businesses.

PBX: Private Branch Exchange, privately owned telephone switches that allow the owner to forego local tolls by avoiding the local phone company's telephone switch for inner-company telephone service. PBX's also allow the landlord to charge tenants for internally switched calls.

POP: Point of Presence, the point where local telephone calls are routed through the long distance carrier's lines. For the Internet, a "Point of Presence" is the common connections along the Internet that links disparate Internet Service Providers (ISPs).

RBOC: Regional Bell Operating Company, formed during divestiture when AT&T was split into seven regions. These seven RBOCs each represented groups of local telephone companies operating within their region.

Riser: The conduit or path between floors of a building into which telephone and other utility cables are placed to bring service from one floor to another.

Routers: Intelligent Internet switches that control (route) traffic to their respective domains and networks, and hence individual equipment, along the information superhighway

Switch: A mechanical, electrical or electronic devices which routes voice or data, completing a circuit to a destination based on the incoming call's data.

Switches and Mortar: Another phrase coined by the authors to describe telecom hotels, smart office, and other buildings to which the internal housing of Internet and telecommunications equipment are critical.

Technology: Used in this thesis interchangeably with the communications technology and information technology and high technology to refer to the general usage of the Internet, computers and telecommunications to meet various commercial needs.

Telecom Hotel: Data-centric, rather than people-centric, facilities that house routers, switches, servers, and other equipment dedicated to telephone switching, data storage, collocation, and/or cable management systems.

Smart Office: In this thesis, "smart office" refers to any building, redeveloped or newly constructed, that has high and redundant connectivity, and highly flexible space. Potentially smart office could mean any other building system that adds value to the tenants that use that space.

Telecommunications Act of 1996: This act expanded on 1984 telecommunications deregulation by allowing local Bell operating companies to compete within the long distance market once they took certain actions to allow long distance carriers to compete within the local market.

World Wide Web: A universe of accessible information attached together by the Internet, accessed via "Web Browsers" such as Netscape, Windows Explorer, etc.

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