

Information Rules

A STRATEGIC GUIDE TO
THE NETWORK ECONOMY

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1 | The Information Economy

As the century closed, the world became smaller. The public rapidly gained access to new and dramatically faster communication technologies. Entrepreneurs, able to draw on unprecedented scale economies, built vast empires. Great fortunes were made. The government demanded that these powerful new monopolists be held accountable under antitrust law. Every day brought forth new technological advances to which the old business models seemed no longer to apply. Yet, somehow, the basic laws of economics asserted themselves. Those who mastered these laws survived in the new environment. Those who did not, failed.

A prophecy for the next decade? No. You have just read a description of what happened a hundred years ago when the twentieth-century industrial giants emerged. Using the infrastructure of the emerging electricity and telephone networks, these industrialists transformed the U.S. economy, just as today's Silicon Valley entrepreneurs are drawing on computer and communications infrastructure to transform the world's economy.

The thesis of this book is that durable economic principles can guide you in today's frenetic business environment. Technology changes.

Economic laws do not. If you are struggling to comprehend what the Internet means for you and your business, you can learn a great deal from the advent of the telephone system a hundred years ago.

Sure, today's business world is different in a myriad of ways from that of a century ago. But many of today's managers are so focused on

***Technology changes.
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the trees of technological change that they fail to see the forest: the underlying economic forces that determine success and failure. As academics, government officials, and consultants we have enjoyed a bird's-eye view of the forest for twenty years, tracking industries, working for high-tech companies, and contributing to an ever-growing literature on information and technology markets.

In the pages that follow, we systematically introduce and explain the concepts and strategies you need to successfully navigate the network economy. Information technology is rushing forward, seemingly chaotically, and it is difficult to discern patterns to guide business decisions. But there is order in the chaos: a few basic economic concepts go a long way toward explaining how today's industries are evolving.

Netscape, the one-time darling of the stock market, offers a good example of how economic principles can serve as an early warning system. We're not sure exactly how software for viewing Web pages will evolve, but we do know that Netscape is fundamentally vulnerable because its chief competitor, Microsoft, controls the operating environment of which a Web browser is but one component. In our framework, Netscape is facing a classic problem of interconnection: Netscape's browser needs to work in conjunction with Microsoft's operating system. Local telephone companies battling the Bell System around 1900 faced a similar dependency upon their chief rival when they tried to interconnect with Bell to offer long-distance service. Many did not survive. Interconnection battles have arisen regularly over the past century in the telephone, the railroad, the airline, and the computer industries, among others. We wonder how many investors who bid Netscape's stock price up to breathtaking heights appreciated its fundamental vulnerability.

We examine numerous business strategies on both the information (software) and the infrastructure (hardware) sides of the industry. Software and hardware are inexorably linked. Indeed, they are a leading example of complements, one of the key concepts explored in our book.

Neither software nor hardware is of much value without the other; they are only valuable because they work together as a system.

INFORMATION

We use the term *information* very broadly. Essentially, anything that can be digitized—encoded as a stream of bits—is information. For our purposes, baseball scores, books, databases, magazines, movies, music, stock quotes, and Web pages are all *information goods*. We focus on the value of information to different consumers. Some information has entertainment value, and some has business value, but regardless of the particular source of value, people are willing to pay for information. As we see, many strategies for purveyors of information are based on the fact that consumers differ greatly in how they value particular information goods.

Of course, information is costly to create and assemble. The cost structure of an information supplier is rather unusual. Since the very nature of competition in information markets is driven by this unusual cost structure, we begin our overview of information strategy there.

The Cost of Producing Information

Information is costly to *produce* but cheap to *reproduce*. Books that cost hundreds of thousands of dollars to produce can be printed and bound for a dollar or two, and 100-million dollar movies can be copied on videotape for a few cents.

Economists say that production of an information good involves *high fixed costs* but *low marginal costs*. The cost of producing the first copy of an information good may be substantial, but the cost of producing (or reproducing) additional copies is negligible. This sort of cost structure has many important implications. For example, cost-based pricing just doesn't work: a 10 or 20 percent markup on unit cost makes no sense when unit cost is zero. You must price your information goods according to consumer value, not according to your production cost.

Since people have widely different values for a particular piece of information, value-based pricing leads naturally to differential pricing. We explore strategies for differential pricing in detail in Chapters 2 and 3. Chapter 2 is concerned with ways to sell an information good to identifiable markets; Chapter 3 examines ways to “version” information

goods to make them appeal to different market segments which will pay different prices for the different versions.

For example, one way to differentiate versions of the same information good is to use *delay*. Publishers first sell a hardback book and then

***Price information
according to its value,
not its cost.***

issue a paperback several months later. The impatient consumers buy the high-priced hardback; the patient ones buy the low-priced paperback. Providers of information on the Internet can exploit the same strategy: investors now pay \$8.95 a month for a Web site that offers portfolio analysis using 20-minute delayed stock market quotes but \$50 a month for a service that uses real-time stock market quotes.

We explore different ways to version information in Chapter 3 and show you the principles behind creating profitable product lines that target different market segments. Each version sells for a different price, allowing you to extract the maximum value of your product from the marketplace.

Managing Intellectual Property

If the creators of an information good can reproduce it cheaply, others can copy it cheaply. It has long been recognized that some form of “privatization” of information helps to ensure its production. The U.S. Constitution explicitly grants Congress the duty “to promote the progress of science and useful arts, by securing, for limited times, to authors and inventors, the exclusive right to their respective writings and discoveries.”

But the legal grant of exclusive rights to intellectual property via patents, copyright, and trademarks does not confer complete power to control information. There is still the issue of enforcement, a problem that has become even more important with the rise of digital technology and the Internet. Digital information can be perfectly copied and instantaneously transmitted around the world, leading many content producers to view the Internet as one giant, out-of-control copying machine. If copies crowd out legitimate sales, the producers of information may not be able to recover their production costs.

Despite this danger, we think that content owners tend to be too

conservative with respect to the management of their intellectual property. The history of the video industry is a good example. Hollywood was petrified by the advent of videotape recorders. The TV industry filed suits to prevent home copying of TV programs, and Disney attempted to distinguish video sales and rentals through licensing arrangements. All of these attempts failed. Ironically, Hollywood now makes more from video than from theater presentations for most productions. The video sales and rental market, once so feared, has become a giant revenue source for Hollywood.

When managing intellectual property, your goal should be to choose the terms and conditions that maximize the *value* of your intellectual property, not the terms and conditions that maximize the protection. In Chapter 4 we'll review the surprising history of intellectual property and describe the lessons it has for rights management on the Internet.

Information as an "Experience Good"

Economists say that a good is an *experience good* if consumers must experience it to value it. Virtually any new product is an experience good, and marketers have developed strategies such as free samples, promotional pricing, and testimonials to help consumers learn about new goods.

But information is an experience good *every* time it's consumed. How do you know whether today's *Wall Street Journal* is worth 75 cents until you've read it? Answer: you don't.

Information businesses—like those in the print, music, and movie industries—have devised various strategies to get wary consumers to overcome their reluctance to purchase information before they know what they are getting. First, there are various forms of browsing: you can look at the headlines at the newsstand, hear pop tunes on the radio, and watch previews at the movies. But browsing is only part of the story. Most media producers overcome the experience good problem through *branding* and *reputation*. The main reason that we read the *Wall Street Journal* today is that we've found it useful in the past.

The brand name of the *Wall Street Journal* is one of its chief assets, and the *Journal* invests heavily in building a reputation for accuracy, timeliness, and relevance. This investment takes numerous forms, from the company's Newspapers in Education program (discussed in

Chapter 2), to the distinctive appearance of the paper itself, and the corporate logo. The look and feel of the *Journal's* on-line edition testifies to the great lengths designers went to carry over the look and feel of the print version, thereby extending the same authority, brand identity, and customer loyalty from the print product to the on-line product. The *Wall Street Journal* “brand” conveys a message to potential readers about the quality of the content, thereby overcoming the experience good problem endemic to information goods.

The computer scientists who designed the protocols for the Internet and the World Wide Web were surprised by the huge traffic in images. Today more than 60 percent of Internet traffic is to Web sites, and of the Web traffic, almost three-fourths is images. Some of these images are *Playboy* centerfolds, of course—another brand that successfully made the move to cyberspace—but a lot of them are corporate logos. Image is everything in the information biz, because it’s the image that carries the brand name and the reputation.

The tension between giving away your information—to let people know what you have to offer—and charging them for it to recover your costs is a fundamental problem in the information economy. We talk about strategies for making this choice in our discussion of rights management in Chapter 4.

The Economics of Attention

Now that information is available so quickly, so ubiquitously, and so inexpensively, it is not surprising that everyone is complaining of information

***“A wealth of information
creates a poverty of
attention.”***

overload. Nobel prize-winning economist Herbert Simon spoke for us all when he said that “a wealth of information creates a poverty of attention.”

Nowadays the problem is not information access but information overload.

The real value produced by an information provider comes in locating, filtering, and communicating what is useful to the consumer. It is no accident that the most popular Web sites belong to the search engines, those devices that allow people to find information they value and to avoid the rest.

In real estate, it is said that there are only three critical factors:

location, location, and location. Any idiot can establish a Web presence—and lots of them have. The big problem is letting people know about it. Amazon.com, the on-line bookstore, recently entered into a long-term, exclusive agreement with America Online (AOL) to gain access to AOL's 8.5 million customers. The cost of this deal is on the order of \$19 million, which can be understood as the cost of purchasing the *attention* of AOL subscribers. Wal-Mart recently launched the Wal-Mart Television Network, which broadcasts commercials on the television sets lined up for sale at the company's 1,950 stores nationwide. Like AOL, Wal-Mart realized that it could sell the attention of its customers to advertisers. As health clubs, doctors' offices, and other locations attempt to grab our valuable attention, information overload will worsen.

Selling viewers' attention has always been an attractive way to support information provision. Commercials support broadcast TV, and advertisement is often the primary revenue source for magazines and newspapers. Advertising works because it exploits statistical patterns. People who read *Car and Driver* are likely to be interested in ads for BMWs, and people who read the *Los Angeles Times* are likely to be interested in California real estate.

The Internet, a hybrid between a broadcast medium and a point-to-point medium, offers exciting new potentials for matching up customers and suppliers. The Net allows information vendors to move from the conventional broadcast form of advertising to one-to-one marketing. Nielsen collects information on the viewing habits of a few thousand consumers, which is then used to design TV shows for the next season. In contrast, Web servers can observe the behavior of millions of customers and immediately produce customized content, bundled with customized ads.

The information amassed by these powerful Web servers is not limited to their users' current behavior; they can also access vast databases of information about customer history and demographics. Hotmail, for example, offers free e-mail service to customers who complete a questionnaire on their demographics and interests. This personal information allows Hotmail to customize ads that can be displayed alongside the user's e-mail messages.

This new, one-to-one marketing benefits both parties in the transaction: the advertiser reaches exactly the market it wants to target, and consumers need give their attention only to ads that are likely to be of

interest. Furthermore, by gathering better information about what particular customers want, the information provider can design products that are more highly customized and hence more valuable. Firms that master this sort of marketing will thrive, while those that continue to conduct unfocused and excessively broad advertising campaigns will be at a competitive disadvantage. We'll examine strategies for customizing information in detail in Chapters 2 and 3.

TECHNOLOGY

We have focused so far on the information side of “information technology.” Now let's turn to the technology side—that is, the infrastructure that makes it possible to store, search, retrieve, copy, filter, manipulate, view, transmit, and receive information.

Infrastructure is to information as a bottle is to wine: the technology is the packaging that allows the information to be delivered to end consumers. A single copy of a film would be of little value without a distribution technology. Likewise, computer software is valuable only because computer hardware and network technology are now so powerful and inexpensive.

In short, today's breathless pace of change and the current fascination with the information economy are driven by advances in information technology and infrastructure, not by any fundamental shift in the nature or even the magnitude of the information itself. The fact is, the Web isn't all that impressive as an information resource. The static, publicly accessible HTML text on the Web is roughly equivalent in size to 1.5 million books.

The technology infrastructure makes information more accessible and hence more valuable.

The UC Berkeley Library has 8 million volumes, and the average quality of the Berkeley library content is much, much higher! If 10 percent of the material on the Web is “useful,” there are about 150,000 useful book-equivalents on it, which is about the size of a Borders superstore. But the actual figure for “useful” is probably more like 1 percent, which is 15,000 books, or half the size of an average mall bookstore.

The value of the Web lies in its capacity to provide immediate access to information. Using the Web, information suppliers can distribute up-to-date information dynamically from databases and other repositories. Imagine what would happen if the wine industry came up with a bottle that gave its customers easier, quicker, and cheaper access to its wine. Sure, the bottle is only infrastructure, but infrastructure that can reduce cost and increase value is tremendously important. Improved information infrastructure has vastly increased our ability to store, retrieve, sort, filter, and distribute information, thereby greatly enhancing the value of the underlying information itself.

What's new is our ability to manipulate information, not the total amount of information available. Mom-and-pop hardware stores of yesteryear regularly checked their inventories. The inventory information now captured by Home Depot, while surely more accurate and up-to-date, is not vastly greater than that of a generation ago. What is truly new is Home Depot's ability to re-order items from suppliers using electronic data interchange, to conduct and analyze cross-store demand studies based on pricing and promotional variations, and to rapidly discount slow-moving items, all with minimal human intervention.

Indeed, in every industry we see dramatic changes in technology that allow people to do more with the same information. Sears Roebuck popularized catalog sales more than a century ago. Lands' End does not have that much more raw information than Sears did. Like Sears, it has a catalog of products and a list of customers. What is new is that Lands' End can easily retrieve data on customers, including data on previous purchases, that allows it to engage in targeted marketing. Furthermore, Lands' End can use the telecommunications and banking infrastructure to conduct transactions in real time over the telephone and on-line.

Content providers cannot operate without infrastructure suppliers, and vice versa. The information economy is about both information *and* the associated technology.

Systems Competition

Systems show up everywhere in information technology: operating systems and applications software, CPUs and memory chips, disk drives and controller cards, video cassette recorders and the videotapes themselves. Usually, one firm cannot hope to offer all the pieces that make up

an information system. Instead, different components are made by different manufacturers using very different production and business models. Traditional rules of competitive strategy focus on competitors, suppliers, and customers. In the information economy, companies selling complementary components, or *complementors*, are equally important. When you are selling one component of a system, you can't compete if you're not compatible with the rest of the system. Many of our strategic principles are specifically designed to help companies selling one component of an information system.

The dependence of information technology on systems means that firms must focus not only on their competitors but also on their collaborators. Forming alliances, cultivating partners, and ensuring compatibility (or lack of compatibility!) are critical business decisions. Firms have long been faced with make/buy decisions, but the need for collabora-

Focus not just on your competitors but also on your collaborators and complementors.

tion, and the multitude of cooperative arrangements, has never been greater than in the area of infotech. We describe how firms must function in such a systems-rich and standards-rich environment in Chapter 8.

The history of the Microsoft-Intel partnership is a classic example. Microsoft focused almost exclusively on software, while Intel focused almost exclusively on hardware. They each made numerous strategic alliances and acquisitions that built on their strengths. The key for each company has been to commoditize complementary products without eroding the value of its own core strengths. For example, Intel has entered new product spaces such as chipsets and motherboards to improve the performance of these components and thereby stimulate demand for its core product: microprocessors. Intel has helped to create a highly competitive industry in component parts such as video cards, sound cards, and hard drives as well as in the assembly and distribution of personal computers.

Microsoft has its following of independent software vendors (ISVs), and both companies have extensive licensing programs with original equipment manufacturers (OEMs). And they each have each other, an extraordinarily productive, if necessarily tense, marriage. It's in the interest of each company to create multiple sources for its partner's piece of the system but to prevent the emergence of a strong rival for its own piece. This tension arises over and over again in the information technol-