INTRODUCTION:
PERSPECTIVES
ON BUSINESS
TELECOMMUNICATIONS

As far as we can tell, face-to-face communication has been a regular part of our lives as long as our ancestors were recognizably human. The development of writing and the invention of printing presses marked major turning points in our history, but really dramatic events that bring us to the current point took place more recently. Regularly published newspapers were available around the start of the 18th century, and developed countries established postal systems by the end of the same century.

The telegraph was invented in 1837, followed by the telephone in 1875. The era of modern telecommunications began with deployment of the first commercial telephone switchboard in 1878; nearly 1,200 exchanges were created over the next decade.
Radio became a significant factor following the First World War, and regular broadcasts began in 1921. Experimental television stations were in operation by the end of the 1920s; the first commercial TV sets were sold in 1938 with regular broadcasts initiated in 1939. Experimental use of terrestrial microwave transmission for long-distance calls began in 1945, and frequencies were formally allocated in 1948. In 1959 feasibility of commercial satellite links was demonstrated, and INTELSAT, the International Telecommunications Satellite Consortium, was formed in 1964. The Internet, then called ARPANET, was created by the Department of Defense and a handful of university researchers in 1969 and was introduced to the general public at a 1972 demonstration. Cellular telephone service and paging were approved in the United States in 1982—two years after services were launched in Japan—and most U.S. franchises came into existence in 1986.

THE REVOLUTION IN PROCESS

The communication systems just mentioned developed independently. They have remained largely autonomous because none can fully replace its predecessors. Despite virtually ubiquitous telephone networks and the growing popularity of the Internet, we continue to receive significant amounts of information from radio and television broadcasts as well as newspapers and journals delivered by couriers, express services, and postal carriers. As a result, we have grown accustomed to working in an environment characterized by many communication vehicles, each of which provides specific, limited kinds of information. In addition, these systems are "vendor driven": Information providers determine what information will be available and when it will be delivered. For example, local television stations determine when the news will be aired, what stories will be covered, and how much time will be devoted to each.

The telecommunications revolution is fundamentally changing these features. Contemporary technology is dramatically expanding the capacity of communication media while information sources are being consolidated. We can look forward to an environment in which all of the information with which we work is available through one or more high-capacity communication vehicles. Moreover, refined distribution systems make it possible for receivers to decide when information is delivered, what topics are covered, and how much detail is presented. The Internet is the leading exemplar of these changes, but as you will see, even more powerful systems are on the horizon.

Formal terms associated with the revolution include "bandwidth," "convergence," and "push technology." These terms will be explained in the chapters ahead, but for the moment it is important to understand the general features of the revolution. The revolution is changing core assumptions about how communication systems work, what kinds of information are communicated, and who controls the timing and content of information delivery. The result is a whole new paradigm for the distribution and application of information. The principal differences between the "old" and emerging paradigms are summarized in Table 1-1. In our view, responding to these changes and capitalizing on the opportunities they create is essential for the growth, development, and even survival of all businesses.
TABLE 1-1

THE TELECOMMUNICATIONS REVOLUTION: OLD AND EMERGING PARADIGMS

<table>
<thead>
<tr>
<th>Old assumptions</th>
<th>Emerging opportunities</th>
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</thead>
<tbody>
<tr>
<td>1. Individual communication vehicles have limited capacity, and each delivers a specific kind of information.</td>
<td>1. High-capacity communication vehicles make it possible to consolidate different information products in relatively few systems.</td>
</tr>
<tr>
<td>2. Because each communication vehicle has limited capacity, coping with the world requires use of multiple information sources; users must coordinate the isolated streams of data.</td>
<td>2. Consolidation makes it possible for users to rely on a single information source while resources are coordinated by intelligent programs or &quot;agents&quot; acting on behalf of information users.</td>
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<tr>
<td>3. The content and timing of information delivery systems is controlled by information providers; recipients must accommodate their schedules to those of the vendors.</td>
<td>3. User-driven systems allow receivers to determine what information is delivered and when it is available.</td>
</tr>
</tbody>
</table>

TELECOMMUNICATIONS AS A CORE BUSINESS COMPETENCY

Formally defined, "a core competency is a basis for competitive advantage because it represents a specialized expertise that rivals don't have and cannot readily match." Understanding the emergence of telecommunications as a core competency calls attention to fundamental changes taking place in the very structure of our society.

Management guru Peter Drucker opens a recent book with the observation that we are currently living through a period of extraordinary change. We are, he says, in the process of creating a "post-capitalist society" in which our world will rearrange itself—"its world view; its basic values; its social and political structures, its arts; its key institutions." In Drucker's view, the change is so fundamental that people born 50 years from now will not be able "even to imagine the world in which their grandparents lived and into which their own parents were born."

Placing this transformation in context, Drucker explains that society crosses a "divide" roughly every 200 years. In a capsule history, he describes recent epochs as follows. The 13th century was characterized by the development of cities and creation of social structures supporting an urban lifestyle. Two centuries later, the world witnessed the invention of movable type and the rediscovery of scientific inquiry from antiquity. The combination of these two forces created an era we call the Renaissance.

Drucker dates the next major transformation to 1776. That era, he says, can be understood as the age of "-isms," featuring the Industrial Revolution and development of the dominant ideologies—capitalism and communism—that have shaped the world-view of our parents’ generation.

Finally, Drucker describes the current era as one in which knowledge\textsuperscript{3} is the dominant factor shaping and organizing our society:

The basic economic resource—"the means of production," to use the economist's term—is no longer capital, nor natural resources, . . . nor "labor." It is \textit{and will be} knowledge. The central wealth-creating activities will be neither the allocation of capital to productive uses, nor "labor"—the two poles of nineteenth- and twentieth-century economic theory, whether classical, Marxist, Keynesian, or neo-classical. Value is now created by "productivity" and "innovation," both applications of knowledge to work. The leading social groups of the knowledge society will be "knowledge workers"—knowledge [workers] who know how to allocate knowledge to productive use, just as the capitalists knew how to allocate capital to productive use.\textsuperscript{4}

Drucker dates the emergence of this era to the 1960s with the widespread availability of computing powers, and he speculates that we will not complete the transition until 2010 or 2020.

In this context, telecommunications has become central because telecommunications and application of knowledge are inseparably bound to one another. Telecommunications systems are the mechanisms through which knowledge is stored, the vehicles through which it is transmitted, and, increasingly, the means of collaboration that facilitate generation of new knowledge.

Bill Gates of Microsoft coined the term \textit{digital nervous system} to make the same point:

A digital nervous system is the corporate, digital equivalent of the human nervous system, providing a well-integrated flow of information to the right part of the organization at the right time. A digital nervous system consists of the digital processes that enable a company to perceive and react to its environment, to sense competitor challenges and customer needs, and to organize timely responses. A digital nervous system requires a combination of hardware and software; it's distinguished from a mere network of computers by the accuracy, immediacy, and richness of the information it brings to knowledge workers and the insight and collaboration made possible by the information.\textsuperscript{5}

In our view, incremental changes over the last few decades have reached a critical mass, bringing the telecommunications industry to center stage. The industry is growing rapidly and dramatically altering our business and personal lives. Look where you will, and the following conclusions are inescapable:

- Telecommunications applications are fundamentally reshaping the way business is conducted in virtually all industries; emerging systems enhance, refine, and in some cases replace existing ways of doing business.
- Forces of change that affect all industries are manifest most clearly in the telecommunications industry: Globalization, increased competition, deregulation, horizontal and vertical integration, and deployment of new technologies—to name just a

\textsuperscript{3}As we use the term, knowledge differs from both data and information. Data are a numerical or other description of a situation or event. Information results from the compilation of data, and knowledge reflects mastery of patterns in information as well as the ability to solve problems and recognize opportunities.


\textsuperscript{5}Bill Gates, \textit{Business @ The Speed of Thought} (New York: Warner Books, 1999), pp. xvii–xviii.
few—are reshaping whole industries. Telecommunications have become a test bed for
their application in other arenas.

- Telecommunications and supporting industry groups are among the most rapidly
growing employers in the knowledge economy. Students graduating today as well as
those yet to be born are likely to find productive employment in telecommunications
and supporting industries.

Peter Keen, a leading author and consultant, describes the transition as follows:

[T]elecommunications is out of the box. It’s a major and growing competitive force. It’s a
complex technical and organizational challenge, a key competitive opportunity or con-
straint. Telecommunications plays a vital business role in every international environment;
that is, it plays a vital role in every business environment.6

QUESTIONS OF INTEREST TO MANAGERS AND STRATEGISTS

Although both curious laypersons and network managers or technicians might benefit
from reading this book, we have written Global Telecommunications: The Business
Perspective with an eye to the needs of executives as well as students preparing for ca-
reers in management. Understanding how the needs and interests of today’s managers
and executives differ from those of other groups will help you appreciate the material
that follows as well as inescapable biases that have shaped this book.

With its move to center stage, the telecommunications industry has attracted the in-
terest of countless laypersons who see their lives being reshaped. Many are enthusias-
tically interested in what’s new and how it will affect them. In general, their needs can
be satisfied with relatively brief treatments that highlight recent developments without
delving too deeply into technological foundations.

On the other hand, network managers and technical professionals often look for
very detailed treatments of particular technologies. They might read entire books de-
voted to the details of managing a single network, and still want more.

In our view, today’s executives, as well as those preparing for careers in manage-
ment, need more detail than curious laypersons and greater breadth than technical pro-
fessionals. Managers and executives need a fundamental understanding of telecommu-
nications systems complemented by a broader understanding of the ways telecommunica-
tions affect business processes and markets. We believe preparation for an
executive career demands knowledge sufficient to answer the following questions:

1. How are existing business processes affected by telecommunications?
2. What forces are shaping the evolution of telecommunications?
3. What business opportunities are being created by the evolution of the telecommu-
nications industry?
4. Who are the major players in the telecommunications industry?
5. What strategic choices are being made by the major players?
6. How are the choices likely to affect telecommunications and other industries?

6Peter Keen, Networks in Action; online at http://frontpage.peterkeen.inter.net/ni.htm, p. 16.
The answers to these questions will shape your professional life and the lives of everyone who depends on you: colleagues, clients and customers, employees and managers, family and friends.

Although no single book can answer all of these questions, we’ve written *Global Telecommunications Revolution: The Business Perspective* to provide a starting point in your search for answers.

**STAYING ABREAST OF CURRENT DEVELOPMENTS**

As is true of any industry in the midst of a revolution, telecommunications is far from static. Dramatic events unfold almost every day; some of the most dramatic changes include changes in the competitive landscape, introduction of new technologies, and an increasingly broad range of interests affected by the industry. We chronicle many of these developments in subsequent chapters, and you should follow the news media for corporate mergers and acquisitions, introduction of new technologies, and efforts to mediate conflicting interests of consumers, vendors, and regulators.

These changes are enriching our lives and increasing the resources available to us, but they pose problems for authors, instructors, and students alike. Simply stated, it is virtually impossible for instructional materials to keep up with the pace of change. It is not uncommon for instructors to awake to news reports that substantially change lectures to be delivered in the next few hours. Moreover, textbooks become obsolete rapidly, occasionally before they are even published. For example, the number of regional Bell operating companies in the United States changed three times while we were writing this book.

Authors and instructors are accustomed to such traumas, but we’ve introduced two features to mitigate their effects on readers. First, we’ve integrated the growing resources of the Internet into our treatment of the subject and created a web site to support your use of the text: [www.rcf.usc.edu/~housel](http://www.rcf.usc.edu/~housel). We have also created a CD-ROM for instructors that supports use of this text with a variety of resources, including PowerPoint slides, sample syllabus, and assignments.

Second, we’ve incorporated a series of analytic tools in most chapters. For class, you will probably use these tools as *heuristics* to analyze cases and other problems. Beyond the classroom, these tools are powerful means of placing current events in meaningful contexts.

**REACH AND RANGE**

Much of what is happening in the telecommunications industry is driven by business decisions. Companies’ strategists are constantly evaluating competitors and making decisions about a variety of issues: how to price their services, which rulings or legislation to challenge, what technologies to deploy, and how to position their services, to

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7Formally, a *heuristic* is a theory or model that helps the person using it integrate what he or she already knows about a situation and ask questions to generate additional information or insight. For example, Peter Keen’s model described in the following paragraphs is a heuristic that can help users compare communication systems.
More generally, reach and range analysis is just one of the analytic tools you will encounter as you read this book.

THREE KEY PERSPECTIVES ON TELECOMMUNICATIONS

With the development of modern telecommunications systems, three distinct views of business telecommunications have emerged. One view emphasizes the use of telecommunications to enhance normal business processes. Connecting with customers and suppliers and coordinating activities at remote sites were among the most important early applications, and opportunities are growing exponentially as more networks are placed in service. Initial efforts by telephone companies were the forerunners of today's full range of telecommunications applications and gave rise to the first view of business telecommunications: the use of telecommunications to augment normal business processes.

A second view focuses on the telecommunications industry—a complex, rapidly evolving industry consisting of customers, service providers, equipment vendors, and regulators. Critical business issues include defining industry boundaries and identifying substitute products, selecting marketing strategies and tactics, determining optimal levels of horizontal and vertical integration, managing technology development and deployment, monitoring the effects of competition, and evaluating expressed needs for interoperability standards. These concerns and related issues constitute a perspective that makes telecommunications an industry worthy of study in its own right.

Finally, telecommunications are fully integrated into society and may be seen as an essential service or utility. Telecommunications systems are vital national resources subject to regulations intended to protect the public interest. The nature and effects of regulation are subjects of ongoing debate, and open questions include the nature of the public interests protected, the need for regulation, the desirability of different forms of regulation, and the effect of regulations on the deployment of new services.

The business perspective encompasses all three of these views:

- Use of telecommunications to enhance normal business processes.
- Interactions between telecommunications customers, service providers, and equipment vendors.
- Effects of regulations.

By themselves, none of these views is adequate to understand business telecommunications, yet each poses distinct issues and offers unique insights. Effectively melding them into a coherent whole was one of the most demanding tasks we faced in preparing this book and may be one of the most daunting challenges you face in developing your own understanding of the subject.

The next three chapters explore each of these perspectives in turn. Chapter 2 describes the use of telecommunications to augment normal business processes, while Chapter 3 describes global telecommunications as an industry worthy of study in its own right. Issues associated with standard setting and governmental regulation are addressed in Chapter 4.
SUMMARY

Communication plays a central role in our history, and systems that expand our capabilities have been in play for nearly three centuries. Newspapers, postal systems, telephones, and—to a lesser extent—telegraph, radio, and television have long histories. However, each has remained largely autonomous because none has the capacity to replace the others. The addition of computer networks in the 1960s launched a revolution that is fundamentally changing our most basic assumptions about communication. Increasingly, we employ large-capacity telecommunications systems that consolidate multiple sources of information and make it available at times and places determined by users.

Simultaneously, telecommunications has become a core competency for virtually all businesses, and its emergence is linked to fundamental changes in our society. We are now well into the information age—an era in which knowledge and its application are the dominant factors shaping our lives—and telecommunications are integrally linked with the acquisition, distribution, and use of knowledge.

Mastering business telecommunications requires effectively integrating three distinct perspectives:

- Use of telecommunications to augment and enhance business processes.
- Telecommunications as a business arena worthy of study in its own right.
- The complex interplay of various interest groups mediated by governmental regulation.

These three perspectives are explained in the next three chapters.

QUESTIONS FOR REVIEW AND DISCUSSION

1. How do emerging telecommunications systems differ from those to which we are accustomed?
2. Why are telecommunications regarded as a core business competency?
3. What is the relationship between telecommunications and the knowledge economy?
4. How do the interests of sophisticated executives differ from those of curious laypersons and technicians?
5. To what questions do sophisticated executives need answers? Why?
6. What are reach and range? How do these concepts contribute to analysis of telecommunications systems?

FURTHER READING