ON LINE DATA BASE MARKET

1987 - 1992

INPUT

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**Market Analysis and Planning Services
(MAPS)**

Online Data Base Market, 1987-1992

Abstract

This report provides an analysis and five-year forecast of the U.S. online
data base market.

The forecast data provided shows the industry-specific and cross-industry
segments and their growth rates through 1992.

The main emphasis of this report is to describe the market environment in
terms of the events and issues shaping the market. There has been signifi-
cant growth in several industries that have become dependent on making
business decisions based on the data/information accessible through
online data bases.

Recommendations and strategy considerations are offered to provide
insight and direction in how to take advantage of opportunities in this
dynamic market.

This report contains 57 pages and 15 exhibits.

Table of Contents

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Exhibits

I

Introduction

I

Introduction

A
Scope

This study, part of INPUT's Market Analysis and Planning Service (MAPS), examines the US domestic market for online data base services. It updates and expands INPUT's last major review of this industry, which was conducted in 1984.

Several factors make the online data base market particularly worthy of scrutiny at this time:

- As a whole, the industry has been one of the most consistent performers in the information services domain, expanding at an annual growth rate of 18%.

- Some sectors of the industry, such as the news group, are experiencing growth rates in excess of 30% per year.

- Certain technologies on the horizon, especially optical media and artificial intelligence, promise to impact online data base markets dramatically within the next few years.

- Intensification of competitive forces within the industry is causing vendors to rethink the pricing, distribution, and promotion of their products, as well as their collaborative strategies.

This report confines its scope to the market for data base services in the US. For example, INPUT's forecasts include purchases in the US of data from international online vendors. Revenue to domestic vendors from sales abroad of data base services is excluded.

In addition, this study concentrates on the commercial sector of the US economy. Forecasts are derived primarily from corporate end-user expenditures on data base services. Government fees from the sale of these services to end-users are not included in the market figures.

B
Purpose

The purpose of this study is twofold:

- To provide a *quantitative* assessment of present and future online data base markets through estimates and forecasts of revenue to vendors in the industry.

- To provide a *qualitative* examination of the underlying forces shaping these markets and the surrounding competitive environment.

C
Methodology

This report augments INPUT's previous work on the online data base industry by employing a sampling methodology that combines interviews with selected vendors and industry experts with reviews of vendor-produced literature.

Revenue forecasts are based primarily on end-user expenditures by industrial companies and financial institutions on online data base services. These services consist of:

- Data base lease and royalty payments to data base producers.
- Expenditures on data base access and related services paid to data base services vendors.
- Expenditures on telecommunications services offered by infrastructure companies.

The report examines the online data base industry in five sections, preceded by an Executive Overview:

- Section III discusses definitions and some general background on the industry.

- Section IV considers the industry's structure and dynamics.

- Section V examines the key technological, economic, market-related, and other issues affecting the industry.

- Section VI includes estimates and forecasts of user expenditures on online data base services.

- Section VII presents the report's conclusions and major strategy recommendations.

Profiles of key vendors are included in the Appendix.

II

Executive Overview

II
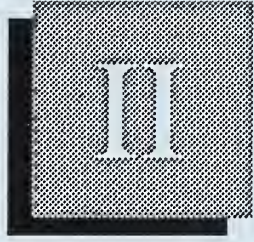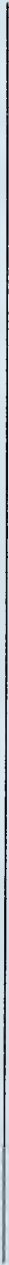
Executive Overview

A
Online Data Base Industry

There are approximately two million users of online data base services. Users range from individuals using financial data to make investment decisions, to doctors using medical information, to computer hackers having impromptu forums, to users of bulletin board services. Online data base users typically access the data base vendor of their choice via ordinary telephone lines through a modem attached to a microcomputer or computer terminal.

The number of data bases has grown to 3,350. Although this number continues to increase, most new data bases are niche oriented and contain industry-specific data that serve narrow market segments. New data bases can nevertheless offer vendors viable business opportunities since new data bases are typically offered at premium prices. Currently, there are some 500 online vendors reselling the data of approximately 1,500 data base publishers.

Exhibit II-1 summarizes the size of the online data base market in terms of vendors, publishers, and number of records.

The online data base industry is best understood as one of several key electronic information services.

B
Full Range of Services

The term "electronic information services" (EIS) is achieving acceptance as a label for the full range of user-accessible computer-based information services. Besides online data bases, these services include:

- Computer bulletin boards
- Optical media
- VANs
- Videotex

EXHIBIT I-1

ONLINE DATA BASE INDUSTRY
SUMMARY STATUS – 1987

- Two Million Customers

- 3,350 Data Bases

- Two Billion Records

- 1,500 Publishers

- 500 Online Vendors

Electronic information is highly "fluid" and not restricted to single distribution systems.

Electronically published material, unlike hardcopy, may be sent through any number of networks once it is in electronic form. Single sources of distribution thus offer little economic advantage over multiple sources to the electronic publisher. See Exhibit II-2 for the components of electronic information services.

EXHIBIT II-2

FULL RANGE OF SERVICES

ELECTRONIC INFORMATION SERVICES

- Online Data Bases

- Bulletin Boards

- Optical Media

- VANs

- Videotex

C
Major EIS Participants

The four major EIS market participants face the online data base industry with differing strategic objectives: See Exhibit II-3

EXHIBIT II-3

MAJOR EIS PARTICIPANTS

- Information Providers

- Systems Vendors

- Infrastructure Companies

- Commercial Services Sponsors
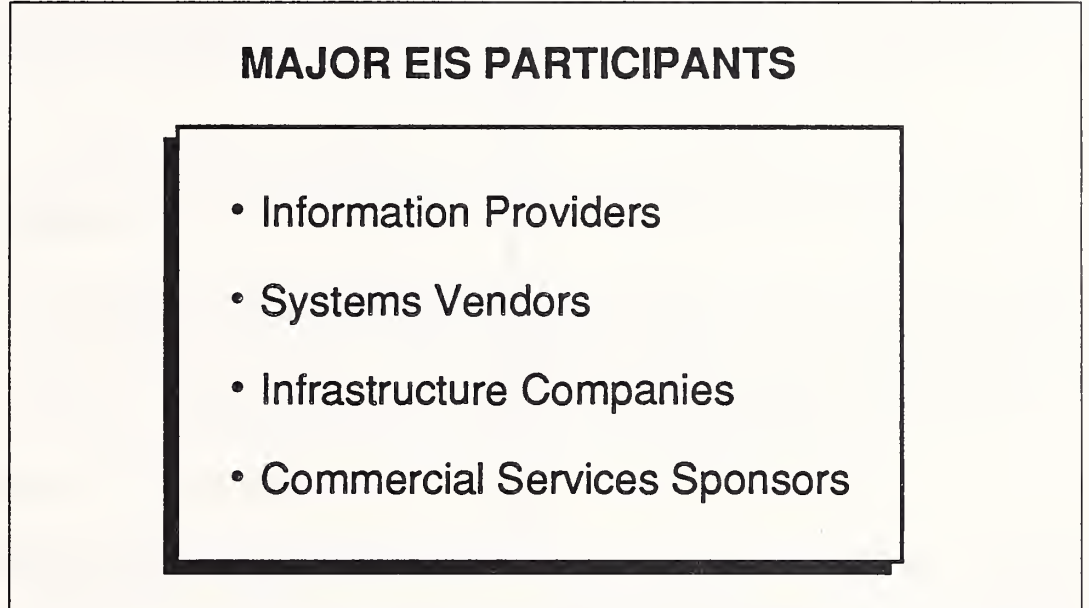
Information providers often find themselves in conflict with earlier commitments to print media. Providers' biggest problem is preventing EIS from cannibalizing print revenues. Steeply declining distribution costs are giving publishers more independence relative to data base vendors.

Systems vendors are seeing their revenues squeezed by: (1) publishers who are able to bypass vendors and sell directly to users, (2) competing vendors whose products are similar, and (3) infrastructure companies and service sponsors who are entering the data base business.

Infrastructure companies are constantly seeking new ways to stimulate demand for their core services. Companies face competition from other infrastructure companies and an uncertain regulatory environment.

Commercial services sponsors are seeking to use EIS to add value to vertical-market businesses. Some service sponsors in effect constitute a "second tier" of information providers with more freedom to innovate than traditional publishers.

D
Market Factors

Exhibit II-4 lists the major market factors affecting the online data base market

The online market is changing from a vendors' market to a buyers' market.

EXHIBIT II-4

ONLINE DATA BASE MARKET FACTORS

- Market Complexion Changing

- Grass Roots Usage

- Commodity Orientation

- Regulatory Issues

- "Local" Media

- Innovations Still Possible

Vendors are eager to expand their market beyond the small core of heavy users. Vendors are attempting to attract more customers with ease-of-use innovations: gateways, thematic bundling of data bases, and differing price structures.

The elusive mass EIS markets may be materializing at last.

Computer bulletin boards are proliferating in the US, and several videotex installations are booming overseas.

The fluidity of EIS encourages its eventual commoditization.

The erosion of the once-booming stock quote services market niche exemplifies how quickly competition among new entrants can result in price erosion and marginal profitability. Survival in the business now belongs to the lowest-cost producers. In such an environment, advertiser or commercial sponsorship of data bases remains a possibility.

Regulatory changes affect the fortunes of many online data base industry participants.

Significant portions of the online industry's future remain in the hands of Washington politicians and bureaucrats, whether the issue is national security, access charges, or regulations concerning the Bell operating companies.

"Local" media such as CD-ROMs alter the user's economic relation-ship with data bases.

CD-ROMs enable data base users to avoid the "pay-per-view" pricing associated with "remote" online data bases. For the user, remote media are to local media what a taxi meter is to a Eurail Pass. The impact of these media on the online industry is only beginning to be felt.

Another wave of innovations may soon sweep through the online industry.

Beyond optical media, there are other technologies that hold promise for the online industry: for example, (1) massive front-end processing com-bined with AI templates as an alternative to keyword searching; (2) the eventual emergence of image-based data bases, and (3) the introduction of "hypermedia"-like nonsequential text-organizing abilities.

E
Online Data Base Market, 1987 - 1992

The online data base market is projected to grow at an annual rate of 18% over the next five years. Industry-specific online data base expenditures, now about 72% of the total expenditures, are expected to make up 67% of total expenditures in 1992. Cross-industry expenditures will expand proportionately. The NEWS sector is expected to lead the cross-industry segment with a growth rate of 30% per year.

Exhibit II-5 summarizes the market size and growth over the forecast period.

EXHIBIT II-5

ONLINE DATA BASE MARKET SIZE
1987-1992
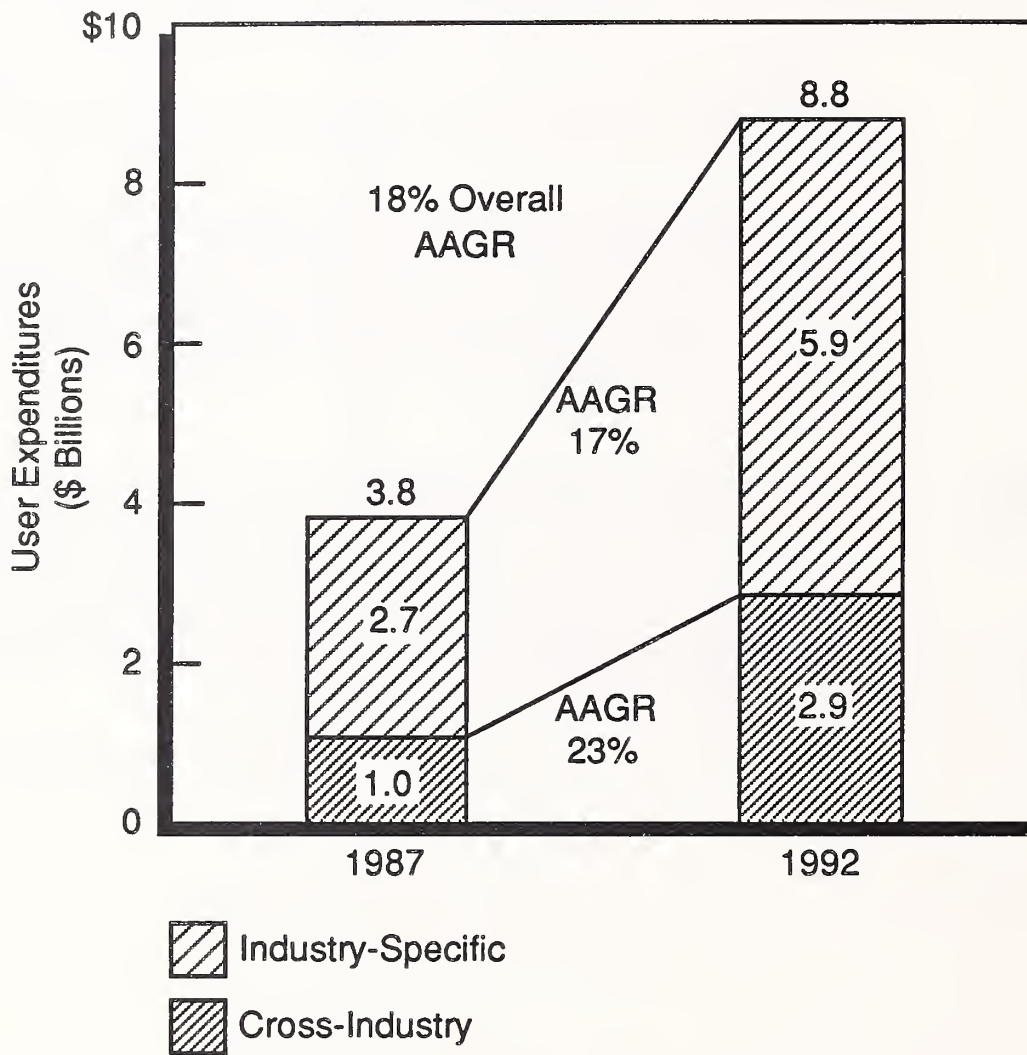
18% Overall
AAGR

AAGR
17%

AAGR
23%

Industry-Specific

Cross-Industry

Note: Due to rounding, numbers may not total exactly

III

Online Data Base Services in Context

III
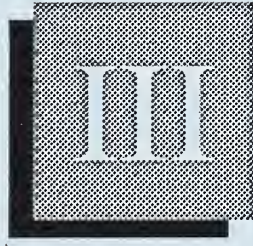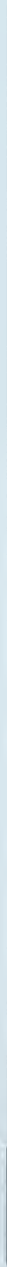
Online Data Base Services in Context

A
Evolving Definitions

The term "online data base" is no more permanent than the industry's technological underpinnings.

A "data base" typically refers to an organized collection of interrelated information covering a specific subject area. Data bases that are "online" are generally understood to contain machine-readable records available for retrieval via interactive (two-way) telecommunication channels, special software, and a computer terminal.

The term "online" dates back even further: if one unit (e.g., a computer) can be controlled by another unit (e.g., a computer terminal), then the first unit is said to be online to the second.

Evolving information-processing technologies are now dissolving many of these earlier distinctions between large and small machines:

• Increasingly, personal computers and workstations are replacing dumb terminals on data base users' desktops.

• Mammoth data bases now can be delivered to users' desktops (without the usual "pay-per-view" online charges) via optical storage media like CD-ROMs.

It thus becomes useful to distinguish between "remote" data bases that are available online in the traditional way, and "local" data bases that are available on media that run directly on the user's machinery.

Even these distinctions will blur as vendors begin to exploit the obvious synergy between frequently updated "remote" data bases and less-frequently updated "local" data base media.

The terminology describing participants in the "online data base industry" is also in flux.

The term "electronic information services" (EIS) is achieving acceptance as a more inclusive label to describe variations on the basic theme of user-accessible computer-based information services that have proliferated in recent years.

Examples of EIS that go beyond traditional online data base services include value-added networks, videotex services, and computer bulletin boards.

B
Online Data Base Typology

Like the data they contain, data bases themselves can be classified into a myriad of categories.

When distinguished by subject matter or by the function of their data, data bases may have a focus that is:

- A single subject   (e.g., chemistry)
- Multidisciplinary   (e.g., chemical & biological data)
- Problem-oriented   (e.g., environmental pollution)
- Mission-oriented   (e.g., space)
- Transaction-oriented (e.g., stock & bond trading)

When distinguished by the form of their data, data bases are often described as:

- Word-oriented   (e.g., bibliographic or full-text files)
- Number-oriented   (e.g., statistics or econometric data)
- Picture-oriented (e.g., maps or chemical structures)

Moreover, the data itself can be seen in terms of its level of refinement. For example, it may be:

- Raw
- Reduced
- Verified
- Quality-assured
- Quality-controlled
- Evaluated
- Certified
- Largely reworked

Another way to look at data base services is in terms of the media they employ. Consider the range of media that may deliver data to an end-user:

Media	*Form of Delivered Information*
Paper	Human-readable
Microfiche, microfilm	Microform
Magnetic tape, card, disk	Computer-readable
Electronic	Viewed on electronic display

When classified in terms of their users, major online data base services fall into two broad categories:

- Professional   (e.g., BRS, Dialog, Mead Data Central)
- General-purpose (e.g., CompuServe, Delphi, Source)

Sometimes these services are defined in terms of their basic market sectors:

- Corporate
- Government
- Academic
- Consumer

INPUT's forecasts of online data base industry revenues are derived mainly from data drawn from the corporate sector. The market is disaggregated into 14 industry-specific and 5 cross-industry sectors. See Section VI.

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IV

Industry Structure and Dynamics

IV

Industry Structure and Dynamics

A

Industry Structure

1. Historical Context

If reduced to a single metaphor, the online data base industry resembles the glass that is simultaneously half-full and half-empty.

The "half-full" perspective defines an industry that has evolved light-years beyond the 19th Century publishing origins of some of its most distinguished vendors (with date of founding): Dun & Bradstreet, 1841; Reuters, 1851; Dow Jones, 1887; and McGraw-Hill, 1891.

The industry's phenomenal growth becomes all the more apparent when contrasted with its modern beginnings a mere two decades ago amid a subculture of librarians, college professors, programmers, and scientists. Consider the following:

- Between 1980 and 1987 the number of data bases available online mushroomed over five-fold from 600 to over 3350.

- In the same period, the number of data base records grew eight-fold from 190 million to over 2 billion.

- By 1987, an estimated 2 million customers were served by over 500 online services and 1500 publishers.

The "half-empty" perspective illustrates at how far the industry is from fulfilling its potential. For example, Lockheed's Dialog, sometimes called the online industry's "General Motors," has a subscriber base of only about 80,000. In contrast with the growth statistics listed above, consider the following:

- Revenues generated by the industry during the 1980-1986 period increased "only" about three-fold to $3.15 billion.

- Most new data bases are used fewer than 200 hours during the first quarter they are online.

- In 1986, over 100 online data bases were withdrawn by vendors or producers, indicating increased industry retrenchment.

2. Industry Segments

Like most other industries, online data base publishing can be segmented into producers, distributors, and consumers.

However, it is the online data base industry's principal product—*electronic information*—that distinguishes it from traditional publishing as well as from most other industries. Electronic information is highly fluid and not restricted to single distribution systems.

An industry segmentation model called "The Data Base Use Chain," first proposed by online observer Martha Williams (University of Illinois), captures some of this fluidity.
The model, outlined in Exhibit IV-1, traces the value-added refinements to electronic information through nine stages, beginning with the original author and ending with the ultimate user.

EXHIBIT IV-1

DATA BASE USE CHAIN

PARTICIPANT	STAGE
• Author/Generator	1
• Publishers	
- Primary	2
- Secondary	3
- Tertiary	4
- Quaternary	5
• Broker	6
• Users	
- Intermediary	7
- Consolidator	8
- End User	9

The stages of use are:

1. Generator or author of the information/data that is published.

2. Primary publisher of the information/data.

3. Secondary publisher, who reworks the information/data and provides it in another kind of publication.

4. Tertiary publisher, who reworks the information/data and provides it in another kind of publication.

5. Quaternary publishers, or intermediary system, which serves as a channel to facilitatE the searching of multiple online systems via interfaces.

6. Broker, who buys from (5) or (4) and resells the information to users.

7. Intermediary searcher who searches data bases on behalf of users.

8. User who may augment downloaded information with additional information to create and market a new data base.

9. Ultimate end user.

Stages (1) through (5) in the use chain are "push" mechanisms for distributing information, whereas stages (6) through (9) are "pull" mechanisms, representing user demand. As one descends through the chain, the value of information at each stage increases, while the ability of predecessor groups to control the information decreases.

The fluidity of electronic information, in combination with new production and distribution technologies, is unleashing forces that blur the boundaries between groups in the user chain.

The interaction between these groups becomes more evident when the "push" side of online data base publishing is examined as part of the whole electronic information services (EIS) industry.

Exhibit IV-2 below divides the EIS industry into four segments, lists the typical participants within each segment, and outlines their principal (though at times conflicting) business objectives.

EXHIBIT IV-2

ELECTRONIC INFORMATION SERVICES
INDUSTRY SEGMENTS

SEGMENT	PARTICIPANTS	PRINCIPAL OBJECTIVES
Information Providers	Publishers Database Producers New Services Market Research Firms	To Increase Revenues from Customers. To Expand Markets. To Defend Turf against New Entrants.
Systems Vendors	Online Vendors Videotex Services Timesharing Services	To Add Value to Information Offerings through Packaging, Marketing, and Customer Support. To Protect Investments in Network Hardware.
Infrastructure Companies	Computer Manufacturers Telecom Companies Value-Added Networks Cable Television Software Companies	To Increase Demand for Core Businesses (e.g., Computer Sales or Telecom Services). To Extend Networks.
Service Sponsors	Financial Corporations Business Services Firms Manufacturers Distributors Retailers	To Use Information to Differentiate and Add Value to Products. To Improve Productivity of Basic Functions like Marketing or Support.

More detail concerning the changing strategies of participants in these sectors is available below and in Section VI.

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B
Industry Dynamics

1. Strategic Perspectives

In their own variations on the half-full-glass metaphor, participants in each of the four EIS sectors approach the online data base industry with differing strategic perspectives.

- *Information Providers* often find their objectives at odds with earlier and stronger commitments to print media.

- *Systems Vendors* are seeing their revenues squeezed by publishers who are able to bypass traditional networks and reach end users more directly.

- *Infrastructure Companies* are threatened by increasing competition from other infrastructure companies as well as changes in government regulations.

- *Service Sponsors* are looking at data base markets as vehicles for extending their existing vertical market services into new areas.

2. Joint Activities

Joint ventures and other strategic alliances are one manifestation of the competitive forces at work in the online data base industry.

Since alliances often represent a firm's earliest attempts to develop new products or enter new markets, alliances can be excellent advance indicators for revealing company strategies or market trends.

This is especially true for dynamic, high-technology industries such as those producing or distributing electronic information.

Alliances come in all shapes, sizes, and levels of commitment. Below are examples of typical EIS industry cooperative arrangements:

- *Joint ventures involving large companies.* These are less popular now than they were a few years ago. Witness the collapse of IBM and Merrill Lynch's 22-month Imnet venture, the AT&T-Quotron alliance in financial services, the demise of several major videotex ventures, Time's withdrawal from Covidea, CBS's departure from Trintex.

- *Product development agreements.* Joint product developments enable companies to share development costs and risks as well as stake out emerging markets. Most online industry alliances observed over the last year have aimed at the development of either:

(1) "user-friendly" software for data base searching, or

(2) CD-ROM products.

- *Joint distribution agreements.* These are often used by infrastructure firms to interconnect networks, or by data base publishers to reach wider markets. For example, within the last year, CompuServe and MCI signed an electronic mail interconnect agreement, while Dow Jones News/Retrieval agreed to distribute legal data from West Publishing.

Those who regularly follow EIS activities will find it useful to remain alert for cross-industry relationships that deviate from familiar patterns. More link-ups between information providers and commercial service sponsors, for example, would be of particular concern to systems vendors.

3. Consolidation

Mergers and acquisitions (M&A) are more intense forms of alliances, generally requiring longer, deeper, and more costly commitments.

For most industries, M&A activity is a primary indicator of increasing consolidation. But beyond indicating *how fast*, acquisitions and equity investments—like their less formal counterparts—can also reveal much about *how* an industry is changing shape.

Some territories where M&A activity is reshaping the EIS industry include boundaries between:

- *Hardcopy and online information providers.* Many of the major publishers are accelerating their moves into electronic publishing with aggressive acquisition programs. For instance, McGraw-Hill was active in 1986 with purchases in financial data (Money Market Directories) and transportation data (Numerax).

- *Information providers and system vendors.* The demarcations between data base publishers and data base vendors have been eroding for years now. In 1986, one of the best examples of this trend was Pergamon's acquisition of System Development Corp's Orbit service.

- *Infrastructure companies and information providers.* Computer manufacturers and other infrastructure companies are joining the parade of integration publishers and vendors. Lotus Development Corporation is one of the latest entrants into this marketplace with its 1987 acquisition of CD-ROM publisher Datext.

Beyond the cross-territorial moves, the EIS industry still has its share of intramural consolidations. Two recent examples are the Uninet-Telenet network combination (following the United Telecom-GTE merger) and the acquisition of Chase Econometrics by its smaller rival, Wharton EFA.

4. Foreign Entry into US Market

Though most of the world's data base publishers and vendors are concentrated in North America and Europe, electronic information respects national boundaries no more than do global telephone networks.

Concern in previous years over transborder data flows and offshore data entry has been supplanted by official worry over how online data bases compromise national security. Entry by foreign firms into the domestic EIS marketplace is also of concern.

Some examples of foreign penetration include: the Pergamon acquisition of Orbit, British Telecom's takeover of ITT's Dialcom (developer of the X.400 electronic mail standard), and Swiss vendor Data-Star's opening of a U.S. office.

Recent connections between CDC and Philips (optical disk development), CompuServe and Nissho Iwai (distribution), and Western Union and Telecomet Japan (marketing) are useful reminders that global market penetration is more than a one-way issue.

20

V

Key Issues

V

Key Issues

A
Technological Issues

The online data base industry is technology-dependent, but not technology-driven. A need for data bases was recognized long before high-speed, low-cost computer equipment and communication networks made them both technically and economically feasible.

The technologies that facilitate the production, distribution, and use of data bases can be viewed as along a spectrum that resembles the data base use chain presented above.

Present and near-term technological improvements at the publisher's and vendor's end include:

- Advances in optical character recognition (OCR) and full-page scanning, automated indexing and abstracting, and speech processing that assist with data input.

- Mass storage and processing speeds that make it possible to handle efficiently ever-growing reservoirs of data.

- A proliferation of new media, like optical disks, that increase the variety of possible distribution channels.

Technology-based advances at the user's end of the spectrum include:

- Greater machine-embodied intelligence on the desktop, in the form of higher-speed, more "user-friendly" personal computers (PCs) and workstations.

- More sophisticated search assistance software, some with "artificial-intelligence-based" learning abilities.

- PC-compatible mass memory devices such as disk drives for optical storage media.

- Cheaper high-speed modems, some as standard equipment on PCs, that will increase in number beyond the current level of 1 modem for every 10 computers.

- Greater integration of more capable output devices, including wide-screen monitors, laser printers, and facsimile hardware.

One indication of how rapidly the microcomputer revolution is proceeding is the following prediction from computer industry guru James Martin: he predicts that in about five years, 98% of all MIPs (Millions of Instructions Per Second—a means of measuring computing power) will be on the desktop.

Over that period, certain technology-related issues are more likely than others to impact the course of the EIS industry and online data base markets. What follows are short examinations of eight such issues.

1. Standards

Without some minimum level of standardization, technology-dependent markets can deteriorate into chaos. The lack of industrywide search standards is often cited as a reason why more users have not yet plugged into online services.

EIS industry standards issues go deeper than this, however. Standards begin with machine-level input and output, extend through the telecommunications networks, and finally surface at the user interface.

A glance at various EIS standards illustrates their variety:

- The venerable ASCII character set, for instance, has evolved as the de-facto standard for text-based data.

- Videotex vendors supported the NAPLPS standard early, but this standard apparently was too early for customers.

- CD-ROM publishers look to the "High Sierra" standard to get their industry off to a smooth start.

- Through alliances and new protocols, Electronic mail carriers are gradually reducing the babble of incompatibility that currently exits in their industry.

- The ISDN voice/data integration standard promised by tele-communications companies hovers mirage-like on the horizon as more field tests proceed.

- Dialog, among others, has labored mightily for years to simplify the power of Boolean search techniques into a system comprehensible to the average searcher.

What new users need, according to industry critics, is a standard methodology and language to search any data base, from any data base publisher, from any information retrieval service, as easily as possible.

Hope may be in sight. An end-user searching standard proposed in mid-1987 by The National Information Standards Organization (NISO) promises to standardize commands for logging on, logging off, specifying a file, etc. The proposed standard is called the "Common Command Language for Online Interactive Information Retrieval."

2. Videotex Services

The current definition for "videotex services," provided by the Videotex Industry Association (VIA), is "interactive, easy-to-use electronic services."

This definition sounds remarkably close to where NISO and others are hoping to lead the online industry. Indeed, the gap between these two branches of EIS is again narrowing. Distinctions between them used to be based on the sophistication of their respective graphics.

These distinctions collapsed several years ago as the early NAPLPS market failed to materialize. ASCII-based online services that targeted "consumer" markets (e.g., CompuServe and The Source) were embraced as bona fide videotex vendors only shortly before the demise of Knight-Ridder's (Viewtron) and Times Mirror's (Gateway) videotex efforts.

Disarray in the consumer market has sharpened the debate about whether videotex is an application or a technology. In contrast with the elaborate user interfaces of most online services, the variations—like public-access videotex—make only one demand on the user: elementary literacy.

Videotex presently has three basic manifestations:

- *Consumer-oriented services.* These typically are user supported, require a PC and modem, and furnish information of general interest. Services sometimes include electronic shopping, home banking, interactive games, and electronic mail.

- *Private services.* These may be either standalone or networked systems. They usually supply proprietary information to groups of paying customers (e.g., stockbrokers) or in-house information for dissemination within a corporation or government agency.

- *Public access services.* These often take the form of advertiser-supported public kiosks that offer directory and shopping information. Sometimes they also dispense coupons.

Some observers think that videotex in the US is poised for a resurgence. Reasons cited for this optimism include:

- There are currently over 40 fee-based videotex systems accessed by over 700,000 subscribers.

- Both CompuServe and Dow Jones' News/Retrieval each have customer bases in excess of 300,000.

- There are numerous examples of successful corporate and private systems.

- Major computer hardware vendors such as IBM and Wang are providing videotex hardware support.

- Thriving overseas systems—especially Minitel in France—demonstrate that consumer-oriented videotex can find a market, given sufficient government encouragement.

- Geisco's GEnie service and Living Videotext's Delphi are small but growing steadily, and several promising regional systems like US Videotel have begun recently.

- IBM and Sears' Trintex (now over 500 employees) is scheduled to make its public debut in early 1988.

- Audiotex, a telephone-based videotex variation (also called "voice information services") promises growth in applications such as reporting stock prices and weather.

3. Electronic Bulletin Boards

In terms of user accessibility, an electronic bulletin board system (BBS) lies somewhere between videotex and more intense data base applications.

BBSs have been called "people's data bases." They are an outgrowth of the microcomputer revolution, the first one appearing in the mid-1970s. Estimates place the number of BBSs now in the US at over 10,000.

Electronic bulletin boards can be public or private, fee or no-fee, interactive or read-only. Bulletin boards can be assembled with only rudimentary microcomputer equipment and software. They can download or upload files or software, marketing information, sales reports, research data, community news, or virtually any other kind of message.

BBSs have several attributes unique to EIS applications:

- *Versatility.* BBSs currently address a vast range of topics; BBSs serve corporations, government agencies, community groups, investment clubs, and forums on almost any imaginable theme.

- *Low initial investment.* The minimal hardware requirement is of a microcomputer, a modem, and a telephone line. The software required to operate a PC-based BBS can be acquired for under $100.

- *Low operating costs.* BBSs can run unattended for days, although eventually a system operator ("sysop" in the jargon) is needed to perform housekeeping functions.

- *Low usage costs.* Some public-domain systems are free to the user, some ask for a registration fee, and others are subscription-based. In comparison with most commercial data base services, BBSs are a bargain.

- *Fast dissemination.* With a well-run BBS, dissemination can be faster, more accurate, and require less labor than newsletters or competing systems.

These attributes help explain why electronic bulletin boards are making inroads into businesses and government agencies ranging from Coca-Cola Foods to the Department of Commerce.

BBSs are also growing more elaborate as their popularity spreads. Byte Magazine's BIX and Whole Earth Catalog's WELL are two new systems that have flourished independently of BBS systems offered on consumer-oriented online services.

In the future, the greatest power of BBSs may lie in their role as social learning devices: they are giving thousands of new users "hands-on" familiarity with the esoteric world of computer networks.

4. Value-Added Networks

Few can agree on exactly what a value-added network is, but the general idea is that a VAN producer will add some value to the transmission and switching services it purchases from the telephone company.

Electronic data bases are an obvious example of a VAN: a user dials up a computer via a modem and extracts information about the stock market or the weather. Value has been added to that telephone call.

Other types of VANs include:

Electronic mail.
The VAN operator's computer sorts and delivers messages from computer to computer via the public telephone network. A common set of standards and interconnection agreements between vendors are at last giving the E-mail business a boost.

Packet-switching services.
This is the archetypal VAN—essentially an electronic mail service for computers—that has grown into a $400 million market out of defense

R&D of the 1960s. Outgoing voice or data communications are condensed into "packets" electronically addressed to their intended recipient and routed there by the VAN operator. The principal advantage of a packet-switched network lies in its ability to use shared facilities efficiently.

Closed user groups.
Also a variation on electronic mail, a closed user group provides restricted access to the network. Users can screen out all but specific callers of a predetermined group. Closed user groups basically act as private networks with the advantages of a public network.

Videotex services.
In some parts of the world, VANs are being used to support videotex systems that include home banking, electronic shopping, and personal networking services.

The distinction between "basic" and "value-added" services takes on special significance in the US market where the Bell operating companies must walk a fine line around Department of Justice regulations.

As infrastructure companies, VANs have been in a unique position to innovate with online delivery services. Gateways and cross-vendor searching are examples of VANs' influence. In the next several years, VANs are likely to become even more deeply involved in electronic services.

5. Artificial Intelligence

A hatchling from university R&D labs, artificial intelligence has been described as the computer industry's newest apparent contradiction. At times, AI has managed to rise above the hyperbole that surrounds most of the industry and find its way into some usable applications.

Online searching, with its foundations in Boolean algebra, would seem ripe for the application of knowledge-based expert systems. Selection of the appropriate data base is another area where users often require assistance, preferably through transparent systems that anticipate what data the customer is seeking.

Most of the successes in AI have been in problem areas that have very specific logic structures. Many data bases are not so conveniently arranged. Searching is still very much an art, as the customers of information brokers readily acknowledge.

Attempts to create AI shells for searching are very much underway, despite all the problems. One product from aerospace company TRW could be a harbinger of more to come. TRW's Fast Data Finder software package jettisons traditional key-word searching altogether. It relies instead on massive front-end processing of full-text electronic files using "smart" selection templates specified by the user.

Such systems, if proven cost-effective, could threaten with obsolescence vendor equipment built around more conventional approaches.

6. Optical Media

CD-ROMs have commandeered much of the media attention in the online industry over the last couple of years. Stuck with the awkward acronym meaning "Compact Disk Read-Only Memory," they are an electronic cousin of the audio compact disk and a descendant of the laser videodisc.

The excitement concerning CD-ROMs focuses on their prodigious storage capacity (capable of packing 600 megabytes of data on a single disk 4.7 inches in diameter) and their potential as software media for personal computers. They might be the key, according to optimists, that finally unlocks the information treasure trove for the masses.

Moreover, CD-ROMs are relatively cheap to produce. A master disk can cost between $4,000 and $12,500. Reproduction costs can be to as little as $2.50 per disk (in quantities) once the master is made.

For participants in the online data base industry, CD-ROMs present new opportunities and challenges:

- Information providers welcome CD-ROMs as a more direct route to end users, with a bonus of greater editorial control.

- Systems vendors see CD-ROMs as a mixed blessing that could threaten the online services *medium*, but not necessarily the online *business*.

- Customers find CD-ROMs attractive because CD-ROMs offer unlimited searching at a single subscription price, free of open-ended access and telecommunications charges.

CD-ROMs are not for everyone. Lacking the updatability of online data bases, CD-ROMs best serve users needing access to huge quantities of less-than-up-to-the-minute information. Examples are medical, legal, directory, and reference applications.

Almost every major publisher and vendor has announced its entry into the CD-ROM business. Dialog cautiously entered the marketplace in 1986 with the first of its "OnDisc" series. BRS and Mead Data Central have also joined the parade. The scramble to get CD-ROM products to market also has resulted in flurry of joint development alliances and equity investments.

There remain a few obstacles to impede the CD-ROM juggernaut. For example;

- Establishing the new medium will take time. As yet, there is a very small base of CD-ROM products available.

- CD-ROM drives occupy the narrow end of the market pipeline. Although their price (now around $1000) is dropping, the installed base is still very small. Some analysts have estimated a base of a million drives by 1990. Eventually, CD-ROM drives may handle a variety of optical media and assume "mini-jukebox" configurations.

- Uncertainty about standards and the capabilities of future mass storage media cloud the CD-ROM horizon. Already an alphabet soup of competing options are emerging. They include CD-I (Compact Disk-Interactive), DVI (Digital Video Interactive), WORM (Write-Once, Read-Many), and erasable optical disks.

The key to establishing an optical media beachhead on the users' desks, most everyone agrees, will be imaginative products. Software publisher Microsoft has high hopes for its Bookshelf, a product that bundles several reference works into one disk, and archrival Lotus has several CD-ROM products in the works.

As outlines of the optical disk market emerge, system vendors can be expected to respond with a barrage of pricing and product-bundling alternatives, including special online files dedicated to CD-ROM updates. Broad user acceptance of local media could even persuade vendors to price their data bases more like optical disks: i.e., having users pay a one-time fee for unlimited access.

7. Image-Based Data bases

Until now, almost every publicly accessible data base has been either word-oriented or number-oriented. Picture-oriented data bases are still in an embryonic stage.

The advent of much cheaper and more capable computer graphics hardware and software, as well as optical disks, brings the prospect of image data bases tantalizingly closer. Present restrictions on graphics transmission caused by narrow bandwidths will be eased by data-compression advances and eventually overcome by fiber-optics networks.

Several numeric data bases currently offer the capability to plot time-series or econometric data, and many videotex applications use graphics as a presentation medium. But most of the world's image-based data is presently stored on maps, X-rays, film, and computer-compatible tapes, not online.

Once again, events in the microcomputer world (e.g., clip-art exchanges) are providing some of the impetus toward image-based data. It is reasonable to expect significantly more activity in this area over the next five years, particularly from data base publishers on optical media.

Disciplines where image-based data bases are likely to be greeted with enthusiasm include the following:

- Architecture, design
- Business graphics
- Education
- Geography, urban planning
- Media: advertising, film & video, newspapers
- Military
- Medical, scientific
- Real estate
- Travel

8. Hypermedia

"Hypertext" is a nonsequential text-organizing system postulated first by Ted Nelson (with inspiration from Douglas Engelbart) in the 1960s. Hypertext is now reaching buzzword status amid microcomputer software *aficionados*.

If Apple Computer and others are correct, today's generation of machinery is becoming capable of making primitive forms of hypermedia—the generic form of hypertext—a real possibility. This development has implications for the online industry for several reasons:

- In theory, hypermedia offer a very powerful tool for organizing and extracting information from memory-rich environments.

- Hypermedia also are said to offer an appropriate interface for data bases on optical media.

- Because they link interrelated data, data bases with hypermedia shells could become marketing bridges to additional products.

Two early moves toward hyper-environments include:

- BRS recently introduced an "expand & zoom" command, which allows users to move back and forth in a retrieved document.

- HyperCard for the Apple Macintosh, though not genuine hypertext, promises to raise public consciousness on the subject and spawn waves of derivative products.

B
Economic Issues

Information typically is priced by value, not by pound. Yet for information providers who are also involved in hardcopy publishing, there is little incentive to develop electronic services at the expense of core businesses. Consequently, many publishers favor "value pricing" their electronic media at a premium over print.

The leverage on electronic publishing can be tremendous once business exceeds a certain volume. Development costs are almost always high, but marginal costs can approach zero over wide ranges of usage.

Those producers with early offerings in the right market niches can gain near-monopoly power. But given the fluidity of electronic information, such power can be short-lived. High margins also invite intense competition, as recent experience in the electronic stock quote market demonstrates.

Systems vendors are usually indifferent to what services end users access. These vendors tend to favor ease-of-use features and unambiguous pricing so users are encouraged to switch freely between services. Because the marginal costs of delivery are so low, vendors try to develop pricing strategies that optimize vendor returns across different levels of use.

In the markets serving professionals, vendors traditionally have structured their prices around "price-insensitive heavy users." Factors prompting vendors to deviate from this approach include:

* Increasing competition in broad online markets.
* Challenges posed by "local" media like CD-ROMs.
* A more sophisticated population of heavy users.
* A desire to extend services to populations that include more "casual users."

A pricing dilemma is created as vendors reach beyond their existing markets in an attempt to build usage without jeopardizing their revenue base. Some responses by major vendors have included:

* Price increases, particularly in display or printing charges (e.g., Newsnet boosted access charges significantly in early 1987).

* Retrenchment and removal of data bases from online status (e.g., over 100 were removed in 1986).

* Consolidation of similar data bases into larger files (e.g., Dialog's Business Connection).

* Creation of second versions of established services at lower cost but with fewer features (e.g., Dialog's Knowledge Index).

* Extending off-hour rates to more users (e.g., CompuServe's day-rate reduction of 300-baud service).

Compounding these changes is an estimated 25%-per-year projected rate of improvement in the price-to-performance ratio of data processing and communications technologies. Rapidly declining distribution costs give advantages to smaller producers who can afford to serve smaller-niche markets.

Optical media are beginning to affect pricing strategies as well. There is reason to expect that a proliferation of disk-based data bases will encour-

age online vendors to return to subscription fee policies. Pricing will then have moved full circle since its origins as an adjunct of subscription-based print products. The era of hourly fees and display charges for online "hits" could be moving into the realm of nostalgia.

The entry of commercial service sponsors into the online industry will further accelerate and complicate the industry's evolution. Advertiser-supported information is customary in videotex but has yet to impact online services.

An indicator of advertising's effect can be seen in print and broadcast media industries. In these industries, vendors are able to reduce the costs of their information products and services by a factor of two or more.

C
Use Issues

Relatively few people tap into data bases. This is an industry self-criticism periodically raised at online conferences. The allegation that the industry offers "privileged information" has merit when one considers that the overwhelming bulk of online users are professional searchers supported by corporate research budgets.

Barriers to the use of online data bases are legion. For many potential users, online data bases are just another data source that competes unfavorably with volumes of free, subsidized, or advertiser-supported information. In addition, the high-tech variety of online data bases requires that users:

- Overcome their computer phobias.
- Understand the rudiments of modems and communications software.
- Master basic Boolean search techniques.
- Tolerate steep prices and complicated billing systems.
- Accommodate system quirks and nonstandardized command structures.

"Ease of use" are thus words that have a special meaning in the online industry. Some vendors, like Dialog, sponsor extensive user training programs to boost users—novices and professionals—up the online learning curve.

Beyond training, an ease-of-use innovation that has grown very popular is the "gateway." These are essentially networks interconnecting multiple vendors' online services in a way that is transparent to the user. In effect, gateways dissolve the distinctions between online vendors. The last two years have seen a "gateway gallop" with agreements between such services as:

- ALANET and EasyNet.
- EasyNet and CompuServe.
- Pergamon and BRS.
- West Publishing and Dow Jones, Dialog, PHINet, and IBM Information Network.

Cross-vendor searching is another variation on the gateway theme. Western Union's InfoMaster, a version of EasyNet, the service developed by gateway pioneer Telebase Systems, provides menu-driven access to more than 700 data bases hosted by companies such as BRS, Dialog, NewsNet, VU/TEXT, and Pergamon InfoLine. Users can tap into one of InfoMaster's bundled services such as Computer Scan at an $8 rate, payable only if the search yields results, plus $9 per hour online charges.

Ease-of-use thinking has also spawned front-end search software such as MenloCorp's Pro-Search, Mead Data's SearchPro, I.P. Sharp's Infomagic, and the National Library of Medicine's Grateful Med. Most are packages that shepherd the searcher into the service through a series of user-friendly menus.

Local media take the ease-of-use concept a step further by unburdening the user from the intricacies of online communication. Investment in CD-ROMs or diskette-based data alters the economic relationship between user and data.

For the user, remote media are to local media what a taxi meter is to a Eurail Pass. In other words, users can explore local data bases at their own pace, much as they would with any software.

D

Regulatory Issues

Regulatory issues come and go in cycles. In past years, attention was focused on online industry issues such as transborder data flows, information haves and have-nots, privacy, and privatization. Recently, the hot issues have been national security leaks, access charges, and regulation of the regional Bell operating companies (RBOCs).

Responsibility for online-related regulatory issues in the US is shared by many agencies—federal, state, and local—but most of the headlines are dominated by four groups:

* Department of Commerce (DoC)
* Federal Communications Commission (FCC)
* Department of Justice (DoJ)
* US Congress

The Pentagon has also entered the regulatory arena. In late 1984, President Reagan issued National Security Decision Directive 145, which lay dormant for two years until then-National Security advisor John Poindexter brought it to life. He called for a broad, new security classification for government information: "sensitive but unclassified."

Science and technology data bases were the principal targets of the directive, contributing to what Administration officials termed a "massive giveaway" of sensitive reports to US adversaries.

Mead Data Central, among other vendors, responded by dropping NTIS and DOE files from their services. Later, after intense online industry

lobbying and Dr. Poindexter's forced retirement, the classification was shelved. But Directive 145 still remains official policy.

Another serious regulatory battle was initiated in mid-1987 when the FCC proposed regulations that would help prevent "uneconomic bypass." The rules call for packet-switched data network providers such as Tymnet and Telenet, and online vendors like The Source and CompuServe, to begin paying access charges to telephone companies. Costs would undoubtedly be passed along to online users, whose bills would increase at an estimated $4 to $5 per hour.

Online lobbyists protest that access charges, if implemented, would devastate the industry—especially many fledgling business as well as the many bulletin board networks.

Amid talk of the big chill over the online industry and "modem marches" on Washington, there is the very real possibility that access charges could hasten user exodus from remote media in favor of local media (like CD-ROMs) that come without a telephone company attached.

Telephones companies are also the subject of a recent decision from trial judge Harold Greene, who has overseen AT&T's divestiture since 1982. Essentially, the decision reaffirmed the earlier settlement that effectively bars RBOCs from making their own equipment and from lucrative information services markets, which include:

• Voice and data storage, processing, and retrieval.
• Videotex services.
• Electronic mail.
• Transactional services.

The RBOCs are now permitted to transmit such services, however. This loophole could be large enough to initiate collaborations that bring the RBOCs closer to online territory. For example, Ameritech, one of the seven RBOCs, recently joined Bell Canada and Telenet in a Canadian online partnership called INET. More such deals could alter the industry landscape, given the Baby Bells' Brobdingnagian proportions.

E
Market Issues

Five years ago, electronic information services were going to revolutionize the way people lived and worked. Some regard it as a paradox of the Computer/Information Age that this future has been slow to materialize.

Those pondering why similar unfulfilled expectations exist within the online data base industry have developed explanations like these:

• End users still suffer from computer phobias.
• Customers are not yet sophisticated enough to fully utilize online data.
• The costs of online searching exceed budgeted allowances.
• The industry has failed to accommodate its biggest revenue-producing market: corporate America.

This final explanation may seem unlikely at first since over half of the industry's revenues are derived from the use of financial and credit-related data bases. But examination of the online industry's history suggests that vendors may indeed have been slow to target the business market. Key past and present online data base service segments include the following:

- *Government niche.* The federal government is where some of the earliest data bases originated. DOE, ERIC, Agricola, and others are examples. They began their lives within government agencies and have migrated to commercial systems such as Dialog.

- *Bibliographic niche.* Dialog, BRS, and Wilsonline are the top vendors in this area, a favorite of librarians.

- *Catalog utility niche.* OCLC and RLIN are two vendors in another niche that has particular appeal to librarians.

- *Full-text niche.* Mead Data Central (MDC) is the leading vendor in this category, followed by Dow Jones. Full-text records are a mainstay of the legal profession and newsmedia.

- *Regional newspapers niche.* Knight Ridder's VU/TEXT and Data-Times are the leading vendors specializing in full-text coverage of regional newspapers. Canada's InfoGlobe is also making headway in the US market.

- *Newsletter niche.* NewsNet exploited its near-monopoly position here by recently raising its prices. New electronic mail services like ALANET, Dialcom, and Minet are moving into this market with cross-vendor searching.

- *Legal niche.* This field is dominated by MDC's Lexis, but Westlaw is close behind. The legal data base market is able to command premium prices.

- *Financial niche.* Dow Jones, Dialog, and DunSprint are the leading vendors in this area. CD-ROM publisher Datext (now owned by software vendor Lotus) is heavily targeting this niche.

- *Numeric data niche.* DRI and Compustat are the principal vendors of numeric data, along with Dialog and Canadian vendor I.P. Sharp. This is one of the few online areas in which experimentation with graphics has taken place.

From its origins as a supplier of data to government and library markets, to its belated entry and success in business markets, the online data base industry is now reaching a new watershed: the buyer's market.

Industry watchers concede that even the hot business information market is becoming glutted with data bases. No longer are vendors able to run the online show.

Dialog, for example, in response is becoming more selective about what it includes in its data base commissary. Reportedly, only 20 new products are selected out of the 200 or so data bases it evaluates each year.

A parallel trend is the continuing profusion of small data bases. Products are repackaged to serve smaller and smaller niche markets. In addition, the declining costs of producing and distributing information is at last giving the smaller publishers a break.

Entry into the industry, either directly or through alliances by commercial services sponsors and the Bell operating companies (as distributors), will be likely to accelerate trends toward a fractionated users' market.

VI

Market Forecasts

VI
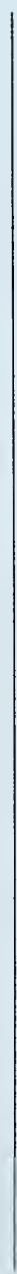
Market Forecasts

INPUT has developed forecasts for user expenditures on online data base services in the U.S. market. These forecasts are based on data drawn primarily from the corporate sector and consist of:

- Data base lease and royalty fees paid to information providers.

- Expenditures for data base access and related services paid to systems vendors.

- Expenditures for telecommunications services offered by infrastructure companies.

Exhibit VI-1 shows the online data base market from 1987 through 1992 as segmented into the major groups, industry-specific and cross-industry. This Exhibit shows the cross-industry segment growing at a faster rate than the industry-specific (23% AAGR versus 17% AAGR), with an overall growth of 18%.

The online data base services market is disaggregated into segments consisting of 5 "cross-industry" sectors and 14 "industry-specific" sectors. Exhibit VI-1 shows how the overall market (as measured by user expenditures) is expected to change over the next five years.

Total market size in 1986 is estimated at nearly $3.8 billion. Forecasts for 1992 place the total market size at nearly $8.8 billion, approximately equal to an 18% average annual growth rate (AAGR) between 1987 and 1992. In Exhibit VI-1, the cross-industry segment is shown growing at a faster rate (23% AAGR) than the industry-specific segment (17% AAGR).

EXHIBIT V I-1

ONLINE DATA BASE MARKET SIZE,
1987-1992
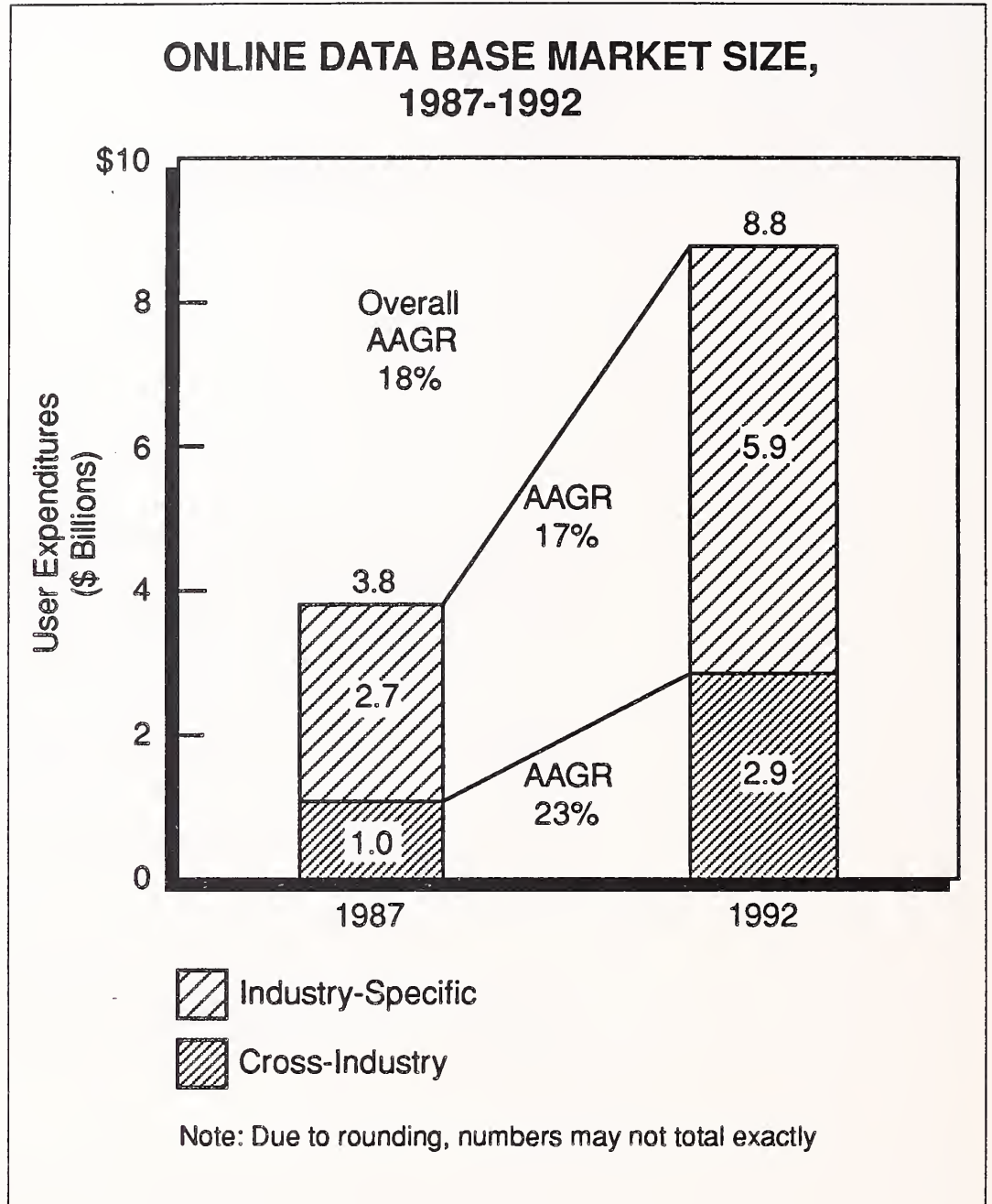
Exhibits VI-2 through VI-5 present user expenditures in years 1986 and 1992 for individual sectors within these segments. The sectors correspond with those used in INPUT's 1984 report on the industry, as well as those served by information services vendors as described in other INPUT reports.

EXHIBIT VI-2

EXPENDITURES FOR ONLINE DATA BASE SERVICES BY INDUSTRY SECTOR, 1986

INDUSTRY SECTOR	EXPENDITURES ($ Millions)	PERCENT OF TOTAL EXPENDITURES (Percent)
Banking and Finance	876	28
Services	299	9
Distribution	235	7
Process Manufacturing	200	6
Discrete Manufacturing	149	5
Medical	149	5
Insurance	92	3
Telecommunications	75	2
Transportation	67	2
Other Industry-Specific	65	2
Education	56	2
Utilities	28	1
Federal Government	16	1
State & Local Government	14	-
Total	2,321	73

EXHIBIT VI-3

EXPENDITURES FOR ONLINE DATA BASE SERVICES BY CROSS-INDUSTRY SECTOR, 1986

CROSS-INDUSTRY SECTOR	EXPENDITURES ($ Millions)	PERCENT OF TOTAL EXPENDITURES (Percent)
Credit	274	9
Securities	183	6
News	180	6
Economic/Other	104	3
Text/Bibliography	92	3
Total	833	27
Grand Total (Industry & Cross-Industry Sectors)	3,154	100

EXHIBIT VI-4

FORECASTED EXPENDITURES FOR ONLINE DATA BASE SERVICES BY INDUSTRY SECTOR, 1992

INDUSTRY SECTOR	EXPENDITURES ($ Millions)	PERCENT OF TOTAL EXPENDITURES (Percent)
Banking and Finance	2,124	24
Distribution	747	9
Services	670	8
Medical	483	5
Discrete Manufacturing	416	5
Process Manufacturing	408	5
Telecommunications	265	3
Insurance	182	2
Other Industry-Specific	167	2
Transportation	155	2
Education	107	1
Federal Government	60	1
Utilities	50	1
State & Local Government	41	-
Total	5,875	68

EXHIBIT VI-5

FORECASTED EXPENDITURES
FOR ONLINE DATA BASES
BY CROSS-INDUSTRY SECTOR, 1992

DATABASE SECTOR	FORECASTED EXPEDITURES ($ Millions)	PERCENT OF TOTAL EXPENDITURES (Percent)
News	906	10
Securities	747	9
Credit	585	7
Economic/Other	376	4
Text/Bibliography	278	3
Total	2,892	33
Grand Total (Industry & Cross-Industry Sectors)	8,767	100

Note: Due to rounding, numbers may not total exactly

In 1986, about 3/4 of user expenditures were directed toward the 14 "industry-specific" data base sectors. The rest of the expenditures went to the 5 "cross-industry" data base sectors. In five years, industry sectors are expected to capture only 2/3 of user expenditures, reflecting an expansion in the news and securities markets.

Exhibit VI-6 illustrates relative changes in user expenditures on data base services between 1986 and 1992, forecasted on an industry-by-industry basis. Year-by-year forecasts by each market segment are expressed as a percentage of total user expenditures.

EXHIBIT VI-6

COMPARISON OF ESTIMATED AND FORECASTED EXPENDITURES OF ONLINE DATA BASE SERVICES BY MARKET SEGMENT, 1986 VERSUS 1992

MARKET SEGMENT	1986 TOTAL EXPENDITURES (PERCENT)	1992 TOTAL EXPENDITURES (PERCENT)
Industry-Specific		
Other Industry Specific	2	2
State & Local Government	-	-
Federal Government	1	1
Services	9	8
Education	2	1
Medical	5	5
Insurance	3	2
Banking and Finance	28	24
Distribution	7	9
Telecommunications	2	3
Utilities	1	1
Transportation	2	2
Process Manufacturing	6	5
Discrete Manufacturing	5	5
Total Industry-Specific	73	67
Cross-Industry		
Economic/Other	3	4
News	6	10
Text/Bibliography	3	3
Credit	9	7
Securities	6	9
Total Cross-Industry	27	33

VII

Conclusions & Strategy Recommendations

VII

Conclusions & Strategy Recommendations

Demand for electronic information services has been increasing at roughly four times the U.S. Gross National Product.

Despite optimistic forecasts that the value of computer-based information products will begin to exceed the value of hardcopy by the early 1990s, online publishing is at present subordinate to hardcopy publishing.

Exhibit VII-1 shows the value of online publishing shipments compared with other types of publishing.

A
Production-Level Trends

Electronic publishing dramatically alters the economics of scale so important to traditional publishing. This becomes a revenue cannibalization problem for electronic publishers who are still heavily based in print media.

Consider how hardcopy publishing locks information into print through a costly process of typesetting, printing, and binding before entering distribution channels. Publish too many newspapers, magazines, or books and someone ends up with excess inventory; publish too few and someone has to decide how worthwhile it is to print additional copies.

In electronic publishing, there is a much more flexible relationship between information and the delivery system. Once in electronic form, information may be sent out through any number of networks. In other words, single sources of distribution offer little economic advantage over multiple sources.

This altered relationship between information and delivery has profound implications for industry participants:

- Information providers are becoming less willing to accept exclusive contracts with systems vendors.

EXHIBIT VII-1

VALUE OF U.S. PUBLISHING PRODUCTS
($ Millions)

INDUSTRY SEGMENT	1981	PERCENT OF TOTAL	1986	PERCENT OF TOTAL	AVERAGE ANNUAL CHANGE 1981-1986 (Percent)
Newspapers	19,850	49	28,941	47	7.8
Periodicals	9,600	23	15,743	25	10.4
Books	7,665	19	11,235	18	7.9
Miscellaneous	2,948	7	3,575	6	3.9
Online	683	2	2,255	4	27.0
Total	40,746	100	61,749	100	8.7

Sources: 1986 and 1987 U.S. Industrial Outlook, U.S. Department Commerce;
Knowledge Industry Publications, Inc.; Wall Street Journal.

- Information providers are demanding from vendors a greater portion of the revenues generated by their information.

- Some information providers are bypassing systems vendors by developing their own distribution systems.

Beyond information providers' relationship with distributors, the major strategic question facing providers is how to move into electronic media without jeopardizing their revenue base from other media. This dilemma can occur at two levels:

- The revenue impact of EIS on hardcopy media.

- The revenue impact of "local" media (e.g., CD-ROMs) on "remote" EIS services.

Information providers must confront still other dilemmas, both now and in the near future:

- *How to differentiate EIS products.* An overabundance of data bases in certain subject areas is forcing information providers to retrench and pursue vertical market strategies.

- *How to respond to new competitive threats.* A "second-tier" of information providers is emerging from services sponsors who (1) lack the revenue cannibalization problems of older publishers, and (2) are willing to underwrite their EIS activities with revenues from commercial sources.

- *How to develop innovative products cost-effectively.* Opportunities are opening up for publishers able to endow their products with new capabilities made possible by optical media, artificial intelligence, computer graphics, and nonsequential presentation.

- *How to pursue a successful international strategy.* The entry of more international players into the US online market is just one manifestation of increasing EIS market globalization. Other key "global" issues include how to form mutually advantageous overseas marketing alliances and the impact of scanning and speech processing technologies on offshore data entry.

B
Distribution-Level Trends

Two decades of growth in electronic information services have been accompanied by a proliferation of distribution channels. This proliferation presents systems vendors with their major problem: how to handle information products that are becoming unhooked from existing delivery systems.

Technological change has strengthened the role of the information provider with respect to the systems vendor. Back in the 1960s, systems vendors were sole possessors of the critical expertise and computer hardware needed for the distribution of electronic information.

No longer is this the case. Now the tools to disseminate information electronically are available to almost anyone, as the electronic bulletin board phenomenon demonstrates.
In other words, many can vend information, but only a few retain the ownership rights.

"Local" EIS media, like the ubiquitous CD-ROM, present a parallel challenge to systems vendors. For anything but the most current data, local media can offer an attractive option to users seeking to reduce their time on "pay-per-view" systems.

Some large-systems vendors have responded to the trend toward local media by offering portions of their services in optical media format. Dialog is one example. The vendors recognize they are entering uncharted pricing territory here and can be expected to act with caution.

Yet another major challenge comes from the information cornucopia of other vendors: how to differentiate products. Product offerings in some areas (e.g., stock prices) may already be pushing against market saturation.

The response among the larger-systems vendors has been to redesign their pricing and product-bundling strategies. They profess similar objectives of (1) bringing together the most relevant information services and (2) presenting them in the most usable forms.

Maintaining vigilance over publishers, new technologies, and other vendors' product mix is only part of the management concerns of systems vendors. Managers also need to be alert for impacts on their business from other directions:

- *Infrastructure companies.* Uncertainty over the Bell operating companies' role in EIS has been only partially addressed by Judge Greene's recent decision restricting them to information transmission. Other companies, such as computer firms and cable TV operators, have also expressed interest in EIS involvement.

- *Commercial systems sponsors.* The involvement of new, heavily capitalized entrants in the EIS marketplace could further destabilize the system vendors' position. Banks, airline reservations companies, and product distribution firms are among those that see electronic services as a means of gaining competitive advantage.

- *Evolving distribution technologies.* Future EIS distribution options will be impacted by a wide variety of changing technologies. Candidates include facsimile, electronic mail, cable TV, satellite communication, fiber optics, and ISDN.

An additional uncertainty for systems vendors to ponder is whether EIS markets will continue to mature along the so-called "heavy-user niches" that have developed so far. The enormous variety of electronic bulletin-board niches may give a clue.

C
User-Level Trends

The end-user is becoming the prize for which information providers and systems vendors are competing. There are several influencing factors:

- The fluidity of electronic information encourages its eventual commoditization. Stock quote services are a good example. Although they once had the highest margins in the industry, intense competition among new entrants soon resulted in price erosion and marginal profitability. Survival in the business has become a matter of low-cost production.

- Users are becoming more sophisticated EIS consumers. Thanks are due partially to the microcomputer revolution, consumer online serv-

ices, bulletin board systems, videotex, and other interactive technologies. Consumers are more willing to pick and choose between information products and vendors.

- A vision of how end-users interact with electronic information is central to publishers and vendors. Increasingly, both groups are providing the user with *packages* of services. Some information providers are now developing their own product bundles and encouraging vendors to pass them directly to their end users. At times, providers bypass the systems vendors entirely.

In contrast, systems vendors see themselves evolving into service organizations that add value to publisher's products through additional software and support. To this end, vendors are acquiring their own alternative information resources.

Until now, the most successful services have focused mainly on heavy-user niche markets. Composed of corporate researchers, securities traders, and the like, these markets are relatively price-insensitive. Yet the heavy-user group is very small relative to the population as a whole or even to those with access to computer equipment (about 20 million in the U.S.).

Among the barriers often cited to greater EIS market penetration are people who:

- Are technically unsophisticated or resistant to computer use.

- Are not motivated to embrace more-productive patterns of information use.

- Are accustomed to receiving free or highly subsidized information.

- Have diffuse and unpredictable information needs.

There is reason for optimism that past rigidities are gradually dissolving as more people develop familiarity with electronic information. The elusive mass markets for EIS may be materializing at last if, for example, the French success with videotex is an indicator.

How a significant market expansion would affect the fortunes of existing players depends on user perceptions and user assessments of competing media. Price certainly will be a much larger factor than it has been up until now. So will new technologies—especially optical media—that have the power to radically transform existing EIS use patterns.

If and when the EIS market approaches maturity, it is fair to speculate that users will have much more control over the industry than has been the case so far.

D

Strategies

Stripped to the essentials, revenue-building strategies for firms in the online data base market involve variations on four basic themes:

- *Expand the customer base.* The greatest challenge for most industry veterans is to expand their existing base of heavy users.

- *Expand the per-customer use of the service.* This expansion can be a problem with customers whose use declines as they become more proficient at finding what they want.

- *Increase prices on existing products.* This is a difficult option if there are competing products at comparable prices.

- *Add new data base products.* The eternal question is discovering what products users value highly.

These themes can be amplified to identify additional options. For example, take product and pricing policies:

Product differentiation. Data base publishers and vendors have considerable latitude for differentiating their offerings. Products can be distinguished by:

- Subject matter
- Delivery modes
- Geography
- Specific industries
- Professions

Pricing. The big question for most vendors is how to use pricing as an expansion tool. Pricing becomes all the more critical when moving beyond heavy-user markets. Also, there is the problem of pricing competing products to avoid revenue erosion. Some options include:

- use simplified pricing schemes.

- use simplified billing arrangements that give the user a single bill for all services received.

- use reduced rates for off-hour use.

- create a second version of service with fewer features and a lower cost than primary service.

- price electronic products as a premium over print.

- seek underwriting from commercial sponsors.

- create a second version of service with fewer features and at lower cost than primary service.

The appropriateness of any particular strategy mix depends on a firm's perspective within the industry. Typical strategic issues and approaches for the four major EIS segments are as follows:

1. Information Providers

Central strategic issue:

- How to avoid revenue cannibalization of print media by EIS.

Approaches:

- Price electronic services at a premium over print.

- Avoid exclusive deals with systems vendors.

- Develop new distribution channels either independently or through joint ventures.

- Publish on a variety of electronic media.

- Sell electronic services wholesale to corporate networks.

2. Systems Vendors

Central strategic issue:

- How to differentiate services in the face of electronic information fluidity.

Approaches:

- Eliminate or consolidate services with low market potential.
- Bundle services in packages attractive to vertical markets.
- Emphasize attractive billing arrangements.
- Add analytical services to products.
- Invest in promising information publishers and infrastructure companies.

3. Infrastructure Companies

Central strategic issue:

- How to stimulate demand for core services.

Approaches:

- Encourage the construction of private information networks either independently or through joint ventures.

- Invest in promising information providers or other infrastructure companies.

4. Commercial Services Sponsors

Central strategic issue:

- How to use EIS to add value to vertical market businesses.

Approaches:

- Underwrite or sponsor new EIS services.

- Create alliances with or invest in promising information providers and infrastructure companies.

A

Appendix

A

Appendix

The Appendixes A and B are provided to complete this report. Appendix A describes in a profile format some key vendors and provides recent events or issues affecting the company. Appendix B provides the INPUT data for the Online Data Base Service User Expenditures by Market Segment, 1986-1992.

A
Key Vendor Profiles

1. CompuServe

CompuServe Information Service (of CompuServe, a subsidiary of H&R Block) is the largest online information retrieval service in the US, offering some 400 data bases to over 300,000 individual customers.

Access to an additional 700 data bases is available through the new IQuest service.

Services provided include news, financial information, home shopping, banking, airline reservation, message delivery, electronic bulletin boards, and new entertainment services. The Executive Option Tier offers business users enhanced financial, marketing, business, and wire services.

As a result of the company's first overseas foray in 1986, CompuServe Information Service is now available in Japan.

An agreement with MCI Communications Corp has resulted in an interconnection of the two companies' electronic mail systems.

Revenues for 1986 were $85 million.

Pricing of CIS is as follows:

- $39.95 sign-up fee.
- $7 per search.
- Executive Option Tier: $10 per month.
- Connect charges:
  $12 per hour during business hours
  $6 per hour during off-peak hours.

2. Dialog

The world's largest information retrieval service in scope, Lockheed's Dialog Information Services, offers its 80,000 customers approximately 250 data bases covering a broad spectrum of subjects, including business, law, science, technology, news, economics, medicine, and the humanities.

1986 revenues are estimated at $70 million.

Recently introduced products include:

• Dialog on Disc, a CD-ROM line.

• Dialog Business Connection — a vertical-market, menu-based service offering competitive information to businesses.

• Dialog Classmate, a teaching aid introducing online information retrieval to elementary: and high-school students.

Dialmail, an electronic messaging system, offers bulletin board and computer conferencing capabilities.

Pricing varies according to the data base used. Dialog charges are as follows:

• $25 annual service fee.
• $8 to $11 per hour telecommunications fee.
• First password: no charge. Each additional password: $25.
• Volume discounts available.

3. Dow Jones

With more than 300,000 subscribers to its Dow Jones News/Retrieval, Dow Jones Information Services is the second largest online information supplier in the US. Its revenues for 1986 were $125 million.

News/Retrieval is available directly from Dow Jones, as well as through 12 vendors, to investment, corporate, and home-based customers. Use in school and colleges is especially encouraged by the company.

Over 40 other data bases are offered, of which 16 are produced by Dow Jones itself. Dow Jones also publishes information and portfolio-management software.

QuickSearch, a service providing complete reports on thousands of companies, can be downloaded for $39 with a single command.

Dow Jones owns 65% of Telerate, one of its major vendors with a strong international network.

The Dow Jones News Service ("Broadtape") disseminates information through 36,000 teleprinters and video terminals.

Pricing varies according to the service offered. For the Dow Jones News/ Retrieval, prices are:

- $49.95 corporate membership fee.
- $29.95 individual membership fee.
- $12 annual service fee (waived for the first year).

4. Dun & Bradstreet

Dun & Bradstreet is the nation's largest business information publisher, and a producer as well as vendor of several business and financial data bases.

Through its DunsPrint on-line service, D&B Credit Services provides 30,000 customers with credit information on more than 8 million US businesses.

Official Airlines Guide electronic edition, part of D&B's Publishing Services, has been growing rapidly and currently serves 30,000 direct subscribers and numerous indirect users who access it through other services.

D&B's Marketing Services provides direct-marketing services through R.H. Donnelley, and audience measurement services through A.C. Nielsen.

D&B's Business Information Services-related revenues exceed $1.1 billion, constituting about one-third of the company's total revenues.

Pricing for DunsPrint varies with the data base accessed. OAG Electronic Edition prices are:

- $50 one-time subscription fee.
- $6 per connect hour.
- $0.20 for schedule screen.
- $0.30 for fare or fare-limitation screen.
- $0.20 for nearest airport screen.

5. GEISCO

General Electric Information Services Co. possesses one of the world's largest teleprocessing networks, over which it offers online data base services to businesses and consumers.

GEnie, a personal computer end-user network, launched in October 1985, now provides more than 40,000 subscribers with such services as electronic bulletin boards for various special interest groups (SIGs), encyclopedias, and airline reservations.

The GEnie-based Vestor data base evaluates more than 6,000 securities and provides investment portfolio management advice.

Through Mark-Net, a network of value-added services, GEISCO distributes to 6,000 customers about 40 files on economics, chemistry, energy, construction, industry, currency exchange, shipping, and corporate financial results.

Pricing structure varies according to the data base used. GEnie prices are:

- $18 sign-up fee.
- $5 per hour outside business hours.
- $35 per hour during business hours (8am-6pm, Mon-Fri).

6. McGraw-Hill

The publisher and its subsidiaries, Data Resources Inc. (DRI) and Standard & Poor's Corp., are major producers and vendors of various online data bases. The latter are offered on Dialog, Dow Jones New/Retrieval, and other commercial services as well as on M-H's own networks.

S&P provides comprehensive business, financial, investment, and marketing information. Some of its services are:

- Compustat. Financial information on more than 6,500 US and Canadian public companies.

- MarketScope and S&P OnLine. Market activity and analysis for brokers, bankers, and institutional investors, with 24,000 customers.

Other M-H electronic services include:

- *X-Press*. Satellite-delivered news and information service for cable subscribers (1,000 at present).

- *BYTE Information Exchange (BIX)*. Electronic teleconferencing service for readers of BYTE magazine (approximately 12,000 users).

- *X-Change*. A consumer version of X-Press.

- *Market Navigator*.

- Computers and communications services.

- Building/construction data bases.

M-H's first CD-ROM product, introduced in 1987, is the Science and Technology Reference Set.

1986 revenues from M-H's Information Systems Co. amount to $366 million, whereas revenues from S&P approach $312 million.

Pricing for M-H services varies greatly according to service provided.

Marketscope—

Dedicated terminals:
- $100 minimum per-location fee.
- $48.50 per-month fee for the first 4 terminals.

PCs:
- $100 per month for 500 pages.
- Telecommunications charges.

X-Press—

- $19.95 per month.
- Basic cable subscription.
- $225 hardware/software fee.

X-Change—

- Free to basic cable subscribers.
- $100 hardware/software fee.

BIX—

- $25 for BYTE subscribers.
- $39 for nonsubscribers.
- $9 to $12 per-hour usage fee.
- Tymnet charges.

7. Mead Data Central

With 1986 revenues approaching $200 million, Mead Data Central (MDC) is one of the top ten online information distributors.

LEXIS is the world's leading online legal research service.

NEXIS is considered the most extensive full-text news and business information service.

MEDIS, introduced in 1985, is a medical data base providing the full text of more than 60 leading medical publications and medical reference data bases.

200,000 customers use these three data bases.

Other online services include specialized investment and accounting-related data bases.

MDC's acquisition of Micromedex in 1986 has moved it into microfiche and CD-ROM publishing.

1986 international sales of $2.5 million represent a 71% increase over 1985 sales of $1.4 million.

Pricing consists of three separate charges (e.g., for LEXIS):

- $125 per month.
- $13 to $22 per file.
- $10 per-hour usage fee.

8. Telerate

A major provider of online financial data, Telerate offers real-time quotes on numerous investment vehicles to traders and corporate customers in 50 countries.

Data is provided via 45,000 desktop terminals.

Broadcast delivery to personal computers was introduced in 1986.

With more than a third of its business already coming from foreign sources, Telerate is planning to continue expanding this sector. Additions may include service to the Middle East, as well as a new service in the Japanese language.

A new PC-based service for institutional traders combined analytical capabilities with current data.

Revenues in 1986 exceeded $200 million.

B

Appendix

B Appendix

ONLINE DATA BASE SERVICES USER EXPENDITURE FORECAST BY MARKET SEGMENT, 1986-1992

SEGMENTATION	1986 ($M)	1986-1987 Growth	1987 ($M)	1988 ($M)	1989 ($M)	1990 ($M)	1991 ($M)	1992 ($M)	AAGR 1987-1992 (%)
Industry-Specific									
Discrete Manufacturing	149	19	178	209	257	291	348	416	19
Process Manufacturing	200	16	231	278	305	364	385	408	12
Transportation	67	10	74	85	99	114	133	155	16
Utilities	28	14	32	33	38	43	46	50	9
Telecommunications	75	27	95	121	138	175	215	265	23
Distribution	235	26	296	363	444	538	634	747	20
Banking and Finance	876	15	1,010	1,217	1,381	1,647	1,869	2,124	16
Insurance	92	12	103	114	132	151	165	182	12
Medical	149	27	189	213	267	309	386	483	21
Education	56	11	62	69	75	84	94	107	12
Services	299	13	337	390	434	488	571	670	15
Federal Government	16	25	20	25	30	36	45	60	25
State & Local Government	14	36	19	23	27	31	36	41	17
Other Industry-Specific	65	25	81	100	122	148	157	167	16
Subtotal	2,321	17	2,727	3,240	3,749	4,419	5,084	5,875	17
Cross Industry									
Securities	183	30	237	300	377	509	615	747	26
Credit	274	18	322	362	407	467	523	585	13
Text/Bibliography	92	20	110	133	159	191	231	278	20
News	180	35	243	312	380	525	688	906	30
Economic/Other	104	28	133	176	222	272	320	376	23
Subtotal	833	25	1,045	1,283	1,545	1,964	2,377	2,892	23
Grand Total	3,154	20	3,772	4,523	5,294	6,383	7,461	8,767	18