

Chapter 6

**Technology, Intellectual Property,
and the Operation of
Information Markets**

Contents

	<i>Page</i>
Major Findings.	157
Introduction	158
Technology and the Emerging Economic Characteristics of Information.	158
Information Distribution and Economies of Scale	159
Information Production and Economies of Scope	162
Private Investment and Information Resources	165
Government Policy and the Diversity of Information-Based Goods	170
Problems in Framing Policy To Promote Information Diversity	171
Proprietor Concerns, Government Policy Tools, and the Diversity of Information . .	171
Problems in Selected Markets for Intellectual Works	174
Print Technology and the Functioning of Copyright in Book Markets	174
Motion Pictures, Videocassettes, and the First Sale Doctrine	176
Information Services, Electronic Databases, and Derivative Works	180
Computer Software, Market Size, and the Cost of Contract Administration	182

Tables

<i>Table No.</i>	<i>Page</i>
6-1. Production Costs for PBS Television Programs	159
6-2. Selected Information Markets: Costs, Profits, Revenues, and Economies of Scale	160
6-3. Representative Charges for On-Line Database Access	168
6-4. Primary Activities of Information Industry Association Members	180

Figures

<i>Figure No.</i>	<i>Page</i>
6-1. Decision Tree for Communications Regulation Under Computer Inquiry III.	166
6-2. Representative Release Sequence for a Major Theatrical Feature	177
6-3. Feature Motion Picture Releases.	179
6-4. A Shrink-Wrap License Contract	184

Technology, Intellectual Property, and the Operation of Information Markets

MAJOR FINDINGS

New technologies are causing information to assume economic characteristics that make it significantly different from other commodities in the way markets develop and operate. These economic characteristics—economies of scale and scope in production and distribution, and reusability and expandability as a resource—are further complicated by information's social and political significance. Therefore, government intervention, through intellectual property laws or other government policy mechanisms, is a particularly critical factor in the operation of information markets.

Policymakers currently have little objective, quantitative data with which to make policy judgments about information markets. The data problem stems, in part, from the rapid changes in information markets attributable to technological change. As well, data collection in this area of the economy is not yet institutionalized in government. Often, the available data are fragmentary and are supplied by stakeholders in the policy debates. As a result, policymakers face a high level of uncertainty about the impact of decisions on the cost and availability of specific varieties of information.

The effects of policies designed to govern transactions between sellers and buyers of information are becoming more complicated. It is likely that a decision made to affect one variety of information may be ineffective or inappropriate if applied more generally. Moreover, more people are making a living by creating, distributing, and using information, so these policies are becoming more important in regulating the economy as a whole. The marketplace rules that intellectual property policy establishes will need to evolve, and perhaps become more subtle and complex, as information markets change.

Intellectual property law is increasingly outdated in providing appropriate incentives for the production and distribution of many information-based goods. Because of this, markets may increasingly fail to provide economically and socially efficient varieties of information. In trying to remedy information-market failures, policymakers face trade-offs among interests with high stakes in intellectual property debates. When they enact changes in intellectual property law they may be required to make some explicit decisions about the actual nature, content, and distribution of goods based on information.

It is clear that changes in intellectual property policy alone will not remedy all the market failures to which information-based goods are subject. Communication, antitrust, public information, education, tax, and government R&D policies, and perhaps others, can be expected to interact more and more with intellectual property policy in their impact on the operation of information markets.

Although the information industry is relatively unconcentrated today, this may change in the future: economies of scale and scope, the requirements for large capital investments, and market power and high profits that may come through control of communications and content resources are potentially strong incentives to ownership concentration. Considering the social and political importance of information in a democracy, Congress may consider it important that the information industry remain less concentrated than other industries. Intellectual property rules affect the distribution of wealth and opportunities in society; therefore, they must be carefully crafted to maintain a balance between private and public interests in information.

INTRODUCTION

Intellectual property law is based on the premise that intellectual works differ from other commodities traded in free markets. The U.S. Constitution authorizes Congress to enact intellectual property law, recognizing that “writings and inventions” require special treatment.

Intellectual works are taking on greater significance for society. Information’s value as a commodity and as a source of productivity and wealth is rising; the range of available information-based products and services is expanding; the technologies through which these products and services are created and distributed are changing; and the number of people whose livelihood depends on information production, trade, and use is increasing. Because of these changes, the markets that determine the supply, variety, price, and availability of different kinds of information are in flux.

The operation of markets for intellectual works is of particular interest because all citizens require many kinds of information to make political choices and to become productive members of society. Because an informed and free citizenry is essential to democracy, the first amendment requires that the Federal Government value and defend freedom of expression: the exchange of information unencumbered by government. The government has intervened in information activities where policy makers concluded that private enterprise, acting on its own, would not provide citizens with the full range of information that they deemed necessary for society.

The Federal Government has along history of involvement in the production and dissemination of information. The government has

produced information when private enterprise saw no advantage in doing so or when the information was vital to government operations. The government has also used a variety of strategies, including intellectual property law, to encourage private investment and markets in intellectual works.

The mechanisms of intellectual property law were originally designed to counteract a basic economic characteristic of information: It is much more costly to originate valuable information than to reproduce it. Thus, the law gave producers limited control over reproduction and dissemination in the form of copyrights, patents, and trademarks. The grant of such marketplace control was intended to induce producers to continue producing and disseminating works by allowing them to gain enough income to cover their costs and earn a profit. In this way, the public interest in learning was made to coincide with the economic interests of creators and publishers. In the marketplace for printed works, governed by copyright, the incentive to produce was linked to the incentive to disseminate printed copies as widely as possible; for selling copies was how producers generated income.

As technologies for creating and marketing information change, as new uses for information are developed, and as information takes a more central place in the economic and social life of the Nation, information is beginning to display a number of characteristics that alter the incentive structure for production and dissemination. This chapter examines some of these characteristics and explores how they affect the interests and the marketplace activities of producers, distributors, and users of different kinds of intellectual works.

TECHNOLOGY AND THE EMERGING ECONOMIC CHARACTERISTICS OF INFORMATION

An information-based good is a *package* that consists of an intangible *content* portion—the information itself—and a *medium* in which the

content is embodied and through which it is communicated. Information content is changing as people find new ways to use informa-

tion to entertain, educate, make decisions, and produce other goods and services. The media that make information available are also in the midst of rapid and profound change. In particular, technology is increasing the economies of scale and scope under which information packages are produced and disseminated; and information-based goods are emerging as basic and essential resources for the economy, the polity, and culture. These changes in the media, the content, and the uses of information are altering the operation of markets for information-based goods, and thereby stressing the intellectual property system.

Information Distribution and Economies of Scale

At the outset, intellectual property protection was a response to an economic characteristic of information-based goods in the print medium: origination costs are high in comparison to reproduction and distribution costs. Economists describe goods with this characteristic as having *economies of scale*. Modern media allow even greater economies of scale in information distribution, so that in some cases an information-provider marginal costs approach zero.¹ For example, radio and television broadcast stations incur no additional costs when additional people tune in; a computer database company can *serve* additional

Economies of scale exist when the initial investment needed to begin production of a good (fixed cost) is high relative to the cost of producing additional units of the good (marginal cost), and when marginal costs decline with increased production. In the case of electronic information-based goods, in contrast to other products, a distributor's marginal cost may involve only the cost of serving an additional customer, rather than the cost of producing an additional, tangible unit. In this way, information-based goods resemble services. With electronic distribution, one "performance" may serve all customers, as is the case in radio and television broadcasting. Thus, in contrast to other services, the marginal cost of providing information can be essentially zero. Electronic information is often mediated by a system. Part of the cost of establishing the system is paid by the provider (e. g., broadcast transmitters or database computers) and part by the customer (e.g., radio or TV receivers or personal computers). Thus, a significant portion of the cost of distributing electronic information must be "sunk" before any information is sent or received. See A. Allan Schmid, *A Conceptual Framework for organizing Observations About Parties Interested in Intellectual Property*, contract report prepared for OTA, February 1985,

users, within the limits set by their equipment, at very low incremental cost. This *is so* because many information-based goods that are embodied in and distributed through electronic media assume a basic characteristic of intangible information content: They are not necessarily depleted with use.²

However, with time, much information does become obsolete, or at least less interesting. Although information technology promises to improve the productivity of many aspects of information production, it is still expensive to originate movies, television programs, electronic databases, computer programs, and other valuable information because these activities are labor intensive, requiring human knowledge, creativity, and skill. Hence, the cost of originating information relative to the cost of distributing it is high and is likely to remain so. (See tables 6-1 and 6-2.)

The increase in distributional economies of scale achieved with modern information technologies affects the incentives for producing and disseminating information-based goods, and so influences the operation of information markets in three direct ways.

How marvelous it is that, once recorded, an intellectual work can potentially be reproduced and communicated an infinite number of times. The value of a given piece of information, as for example a weather report, may change or diminish over time. But the information itself can be used simultaneously or successively by many people without being consumed in the process. The value of information is a result of the *context* in which it is received and used. (Gregory Bateson defines information as "the difference that makes a difference." See *Mind and Nature* (New York: Bantam Books, 1979).) Context is essentially the knowledge possessed by the receiver of information that shapes its meaning. Thus, information actually *expands* and takes on new meaning as it is received and used by more people. See Harlan Cleveland, "Information as a Resource," *The Futurist*, December 1982, p. 36.

Table 6-1.—Production Costs for PBS Television Programs

Program	Cost of producing 1 hour episode
The Brain	\$556,000
The Constitution: That Delicate Balance	169,000
Mystery	76,000
Frontline	145,000
Nova	230,000

SOURCE Paul I Bortz

Table 6-2.—Selected Information Markets: Costs, Profits, Revenues, and Economies of Scale

	Creation (percent)	Conversion (percent)	Fixed costs (percent)	Variable costs (percent)	Economies of scale (percent)	Profit and taxes (percent)	Revenues (billion\$)
Television ^a	17	24	41	23	64	35	13.8
Recordings ^b	22	34	56	34	62	10	6.1
Movies ^c	26	18	44	31	62	25	4.1
Online service	17	33	50	39	56	11	3.1
Radio ^a	24	26	50	45	56	6	5.1
Print service ^a	30	10	40	46	47	15	11.0
Newspapers	16	16	32	52	38	16	29.4
Magazines	17	12	29	62	32	9	13.5
Documents ^a	12	15	27	70	28	4	0.7
Books	15	11	26	69	27	5	12.0

^aError in total percent due to rounding

^bThese numbers are based on revenue from the sale of both audio records and tapes.

^cThese numbers are based on revenue from theatrical showings only

NOTE **Creation:** Percentage of revenue that goes to initial production of a work, including royalties, artwork, and editing. **Conversion:** Percentage of revenue that goes to embodying work in reproducible form, i.e., typesetting, entering data into computer, film negative cost, master recording cost, etc.. **Fixed costs:** Creation costs plus conversion costs as a percentage of revenue. **Variable costs:** Percentage of revenue that goes to reproducing individual units and getting those units to end users, including reproduction, shipping, advertising and promotion and discount for retail houses. Does not include users' costs incurred in purchase and operation of equipment necessary to use a good, such as television sets, radios, VCRs, and computer equipment. **Economies of scale:** Fixed costs divided by the sum of fixed costs and variable costs. **Profit and taxes:** Percentage of revenue that goes to profit and taxes. **Revenue:** Estimated 1984 industry revenue

SOURCE Office of Technology Assessment, data from C Burns and P A Martin, *The Economics of Information*, prepared for the Office of Technology Assessment by Christopher Burns, Inc., contract #433.9520 0, 1985. tables II-1, II-2, II-3, II-4, II-5, II-6, II-7, II-8, II-10, and II-11

First, assuming he can charge each customer for access, and assuming that the cost of collecting payment from a customer, the *transaction cost*, is not higher than the price he can charge,³ a seller has an incentive to increase the number of customers for an information package. Of course, some kinds of information, such as stock-market tips, secret formulas, and entertainment with current "snob appeal" may be more valuable if only a small number of people have access. But for a wide range of information, proprietors find that even a small marginal profit can yield large returns when many customers are served. Conversely, *originators* may have *less* incentive to create or to publish valuable information if they do not share

³Transaction costs are those expenditures that a proprietor must make to negotiate and execute a transaction agreement. They include the cost of price setting and billing. In selling information-based goods proprietors may also incur marginal costs in monitoring and enforcing special transaction conditions, such as the exclusion of nonpayers and the prohibition of subsequent copy and transfer of the information. Thus, transaction costs serve as a check on providers' ability to exploit distributional economies of scale. Broadcast radio and television are two media with high economies of scale where it has been difficult to charge the consumers of information because the transaction costs would be so high. In these circumstances, advertisers have found it profitable to pay broadcasters for the opportunity to influence the purchasing behavior of the vast numbers of consumers of broadcast information.

in the profits being made through large-scale distribution.'

Second, rising economies of scale give information sellers a greater incentive to deny access unless they strictly control the conditions under which they offer it. In the world in which the printing press was the only mass medium for reproducing and distributing information, proprietors of intellectual works saw uncompensated use, such as in libraries or through users trading books, as possibly troubling but generally unthreatening. But since electronic information can be reproduced and disseminated so cheaply, the modern proprietor is much more interested in maintaining physical control over works, and in selling access only if users agree not to reproduce and distribute identical or similar works. Because electronic media make it costly and possibly ineffective to exclude nonpayers and compet-

—
This suggests that, in general, the increase in economies of scale reinforces the rationale for intellectual property protection: The profits made from the wide distribution of information should contribute to the cost of originating it. On the other hand, because the cost of disseminating information declines with increased economies of scale, the benefits given up by society through the grant of exclusive copyrights increases. See Competitive Enterprise Institute, "Intellectual Property and Copyright Laws," issue brief, 1985.

itors, proprietors may, more than ever, favor government intervention to help them enforce exclusion or collect payment. Alternatively, they may invest in more efficient “fences,” or private means to exclude unwanted users. This alternative is explored in detail in chapter 4.⁵

A third effect of increasing economies of scale on information markets is that ownership of distribution facilities tends to concentrate in fewer hands.⁶ Since the per-user cost of distribution declines as the number of users rises, a large network can price information lower than a small network and may eventually buy out or drive out the smaller business.⁷ This tendency is enhanced where the fixed costs of developing a network infrastructure are very high, as they are for launching communication satellites, laying cables, or securing broadcast licenses or other government regulatory approval.”

The potential of economies of scale to cause media concentration in electronic distribution is currently checked by the number and variety of distribution technologies.’ Newspapers compete with television in providing news and advertising; videocassettes compete with theaters and cable television to supply feature movies; newsletters and magazines compete with on-line computer database services to provide specialized information on a wide range of subjects.

Another alternative, adopted by television and radio broadcasters and also newspaper and magazine publishers, is to bundle the entertainment or news information with advertising. The advertiser may associate his message to buy with desirable aspects of the information-based good—e.g., the integrity of the news, or the pleasures of the entertainment.

⁵W. Curtiss Priest, *The Character of Information: Characteristics and Properties of Information Related to issues Concerning Intellectual Property*, contract report prepared for OTA, February 1985, p. 27.

⁶See Gerald Brock, *The Telecommunications Industry: The Dynamics of Market Structure* (Cambridge, MA: Harvard University Press, 1981).

⁷MCI spent \$10 million in regulatory and legal costs over an 8-year period to obtain approval for its first microwave long-distance telephone service. Brock, *The Telecommunications Industry*, p. 213. The facilities of television station KTLA in Los Angeles, and its FCC broadcast license, sold for \$510 million in 1985.

⁸See Benjamin M. Compaine, Christopher H. Sterling, Thomas Guback, and J. Kendrick Noble, Jr., *Who Owns the Media?* (White Plains, NY: Knowledge Industry Publications, 1982).

There will probably be uncertainty for some time over the most profitable ways to provide different types of information. Companies and research institutions are experimenting widely with new media forms, exploring whether one medium may have a competitive advantage over others.¹⁰ People consider a complex set of factors in choosing one medium over another for receiving a particular type of information.¹¹ Cost is a major consideration; it may drop slowly for a new medium as people adopt it and economies of scale come into play. While uncertainties rule, the ownership of media can be expected to fluctuate.

Fiber optic systems are being rapidly added to the mix of information-distribution technologies.¹² The single-mode fibers now being installed in the country’s telephone plants have communication capacities significantly greater than copper wire or coaxial cable. One fiber can carry the entire Encyclopedia Britannica from Washington to Baltimore in a second or 300 simultaneous television channels within a city. Laboratory results suggest that this capacity may rise 1,000-fold or more with improvements in signal transmission and detection equipment that can be used with existing fiber lines.

The economies of scale offered by fiber optics are certain to affect communication companies’ strategies as they learn to employ this technology profitably. Many other distribution technologies may prove much less economical. For a time, large businesses with great data communication needs will benefit the most from these economies.” Small businesses will

“Although technological innovations may cause cost changes that move slowly at first, their longer term effects can change cost ratios by orders of magnitude rather than by the few percentage points that constitute common static barriers to entry,” Brock, *The Telecommunications Industry*, p. 301.

¹⁰J. Dimmick and E. Rothenbuhler, “The Theory of the Niche: Quantifying Competition Among Media Industries,” *Journal of Communication*, vol. 34, No. 1, 1984, pp. 103-120.

¹¹See the OTA report *Information Technology R&D: Critical Trends and Issues*, OTA-CIT-268 (Washington, DC: U.S. Government Printing Office, February 1985), for a case study on fiber-optic technology.

¹²Many large companies that rely heavily on data communications, in particular, banks such as Citicorp, are installing their own fiber lines in buildings that house their offices and computers and between their facilities and long-distance telephone

(Continued on next page)

also benefit as they begin to use data communications for such things as credit-card verification and remote bookkeeping services.¹⁴

An unresolved question is whether peoples' needs to communicate to and from the home can support the high cost of running fiber-optic cable the expensive "final mile" to American residences. If this occurs, people at home will be able to receive and transmit everything from television shows to computer software to electronic mail over switched telephone lines, and be *billed*, and conceivably *bill others*, directly for use.¹⁵

One of the major advantages society gains from public communication media, such as the post office, is the ability to connect every citizen and organization with every other. Modern communication media and their inherent economies of scale can be made available to every citizen, as the post office and public roads have been, if efficient and equitable rules can be established for the development and use of these societal resources. To establish rules for information commerce in a public electronic communication system of the capacity of digital fiber-optic technology, policy makers will need to balance many interests: public and private, individual and corporate, economic and social. In the electronic information environment supported by technologies such as fiber optics, intellectual property rules will work hand-in-glove with rules that govern, for example, the operation of the local public telephone central-office switch.¹⁶

(continued from previous page)

access points. (See Michael A. Laviola, "The Citibank Fiber-Optic Network," *Telecommunications*, February 1984, pp. 86-94.)

¹⁴See, for example, "Bell Companies Race To Offer Local Data Services," *Data Communications*, April 1985, pp. 46-50.

¹⁵Some believe that even rural users and others on thin routes that cannot support the cost of fiber-optic lines may still be served by broadband telecommunication links with cellular radio and low-cost satellite earth-station gear. See Ithiel de Sola Pool, "User Interfaces," *The Information Society*, vol. 2, Nos. 34, p. 439.

¹⁶Given a broadband, public-switched telecommunication network available to all, Pool suggested that opportunities would abound for small, diverse information businesses to flourish in an electronic environment. *Ibid.*, pp. 433 and 441.

Information Production and Economies of Scope

Economies of scope are present when a producer, because he makes one product, has a cost advantage in making other products.¹⁷ The production of information-based goods clearly involves economies of scope.¹⁸ In writing a book, for example, the author builds skills, experience, and a reputation that afford him an advantage in producing and selling subsequent writings.

Electronic media establish an entirely new dimension for economies of scope in information production. Information content may be packaged in many forms to serve the particular preferences or requirements of different users. For example, a book may be produced with paper and ink, on audiocassette, or on optical disk; its content may be adapted into a television "mini-series" or an interactive game that can be distributed in a variety of forms. Users of information can gather content from many sources, analyze it, and rearrange it to produce new information. For example, daily stock market statistics may be processed very quickly to help investors adjust to changing conditions. Information may be extracted from a larger bundle and used in a new context. An artist, for example, can electronically pluck the image of an eye from a motion picture film frame and use it to create a magazine advertisement or a T-shirt logo.

Intellectual property concepts are fundamental in determining who may take advantage of the economies of scope inherent in information production. Serving as marketplace rules that govern the conditions under which information-based goods are traded, intellectual property laws specify what rights attach to a work, what rights are retained by the original proprietor, and what rights accrue to the purchaser when he buys the work. The rules that govern how purchasers may use a work in producing their own works are particularly

¹⁷For example, a steelmaker may have an advantage in producing coke, pig iron, specialty steels, or perhaps knives, cookware, or other finished products.

¹⁸Priest, *The Character of Information*, p. 27.

important. These rules strike a balance between the benefits of exclusive control as an incentive to innovate, and the cost of limiting others' ability to compete with a rights holder.

Until recently policy makers could allocate the right to exploit economies of scope fairly easily using relatively simple rules. Some rules have been passed down from antiquity in the customs of scholarship, which demand that users cite and credit originators for their contributions. The legal concept of derivative *use* was first formalized as a rule by the courts in giving authors exclusive rights to make and sell foreign translations. In response to technological change, this concept was later extended by the judiciary to give fiction writers a say in the making of movies based on their books. In 1976, rules based on derivative use rights were defined by Congress to govern a broad range of situations. Copyright now confers to a proprietor exclusive rights over all goods substantially based on an original work.

In parallel to the evolution of rules for derivative use, the concept of *fair use* has grown and evolved. Originally developed by the courts as an exception to exclusive copyright, it was designed to promote the scholarly use of intellectual works by suspending, under certain conditions, the rule that users obtain permission to use portions of protected works in building new works. Fair use was codified by Congress, also in the 1976 act, to apply to educational use of photocopying technologies.

Today, however, technology is complicating the allocation of rights in information. Modern information technologies force a fundamental confrontation between the two concepts of derivative use and fair use. With new electronic technologies, people have a host of new opportunities to create new information packages based on existing works; to serve new customers by manipulating and transforming works; to add value by placing existing information in new contexts; and, generally, to participate in intellectual work. These technologies have given scholarship—the building of human knowledge—a new set of tools and a broader field of operations. And as a result, the eco-

nomie, legal, and social questions involved in determining proper and efficient rules for controlling derivative use have become much more complex.

From the legal perspective, modern information technologies make it harder to define which commercial uses are *merely* derivative (that is, *copies*) and thus unfairly competitive. These technologies make it more difficult and costly to detect infringements and enforce derivative use rights. Furthermore, detection of infringement and enforcement are potentially more intrusive of personal privacy. These subjects are covered in chapters 3 and 4.

From the economic perspective, it is unclear whether, as a general rule, the right to control derivative uses encourages or inhibits the growth of knowledge. Because derivative works may substitute for and undercut markets for originals, they might diminish incentives to create or disseminate works. On the other hand, the threat of competition from derivations might spur the originator to make his own derivations or to create new works. When proprietors seek to inhibit derivative uses, as they might, for example, by building technical or contractual "fences" and suing infringers, they increase the transaction costs associated with distributing information. Such efforts reduce the benefits that society gains from the high economies of scale offered by electronic media. Moreover, if a user is not allowed to make his own derivations, society may be deprived of the unique contribution he alone could make. Thus, society could lose some of the benefit, in the form of economies of scope, that electronic information offers.¹⁹ Market-place rules based on the right of derivative use clearly affect the competition that proprietors of information-based goods face and the profit-making strategies that information providers pursue.

¹⁹There are two ways in which a person may be prevented from making derivations: 1) enforceable rules prohibiting derivation; 2) secrecy or technical protection schemes that physically prevent derivations. Both of these preventions may result in the costly and inefficient duplication of effort, which the intellectual property system seeks to minimize.

Operating under conditions of economies of scope, information providers often construct a variety of packages to tap markets for different combinations of media and information content. For instance, the movie industry offers the same content in a variety of media forms, including movie houses, free broadcast television, monthly subscription television, "pay-per-view" and "premium-channel" cable television, and videocassettes and disks. This repackaging of movies is designed to implement *price discrimination*, the setting of prices according to assumptions about how much users value the information package and their ability to pay, rather than on the basis of the marginal cost of providing the information.

Another set of information-providers operate in markets that cater to users' needs for very specific information content. For example, financial analysts, engineering consultants, market research specialists, and a growing array of information brokers use their expertise to select relevant content from masses of available information and construct highly customized packages.²⁰ These providers price discriminate on the basis of users' different content requirements, rather than on the basis of users' preferences for different media forms, as is the case, for instance, with movie distributors.

The effectiveness of price discrimination hinges on proprietors' ability to exclude competitors from offering similar packages. Providers must also know what information users need and what they are willing to pay for it. The feedback that information providers receive from their customers' purchasing behavior allows them to tailor both the goods they offer and the prices they charge.²¹

²⁰One may consider many traditional "professions," such as law, medicine, and engineering, as being in the business of providing highly customized information.

²¹A crude form of price discrimination, which requires relatively little control of derivative use or detailed knowledge about customers' preferences and requirements, is employed by other information providers. Publishers of newspapers and magazines, for example, "bundle" information and take advantage of the fact that some people value one feature or article enough to pay a price that exceeds the cost of the article and thus contributes to the provision of other items in the bundle.

Computer database technology promises information providers new opportunities to amass comprehensive collections of information, offer data processing services, constantly updated information content on a broad range of subjects, and precisely tailored packages in a wide variety of forms. They can do all these things through a self-service system for "one-stop" information shopping.^{22,23} These computerized delivery systems also offer proprietors greater potential to collect and analyze feedback, in the form of *transaction information*, on customers' information-use habits so they can implement price discrimination more effectively.²⁴

Computerized information-retrieval systems also make proprietors more vulnerable to uncontrolled derivative use of their resources.

²²Theoretically, any kind of information can be embodied in a computerized database. Currently, most information that is offered through publicly available databases is factual in nature—economic and financial statistics, bibliographic citations, etc. (See Martha E. Williams, "Electronic Databases," *Science*, Apr. 26, 1985, pp. 445-455.) More and more access to functional information is being offered, such as remote data processing for bookkeeping or statistical analysis. A number of ventures offering computer software transmitted to the user from a centralized collection have been tried, with mixed success. (See Download, January 1986, pp. 1-4.) Potentially, art can also be offered on a user-selectable basis, for example, full text of novels and other books, music in a form some have termed the "celestial jukebox," and "imagebanks" that contain content and software for making and manipulating pictorial works.

²³Electronic technologies also make the cruder form of price discrimination that relies on bundling less effective. Photocopy machines, videocassette recorders, and especially computers allow users to quickly and conveniently "unbundle" information, taking only those pieces that are valuable to them. Christopher Burns and Patricia Martin, *The Economics of Information*, contract report prepared for OTA, April 1985, p. I-7. This same unbundling capability threatens advertising revenues.

²⁴This transaction information has growing economic value as a marketing tool and a commodity in its own right. There is a potential conflict between the development of highly efficient computerized information markets and the right of citizens to privacy in their personal affairs. The Cable Communications Policy Act of 1984 places specific limits on the collection and use of personally identifiable data on subscribers of cable systems (section 631). The Videotex Industry Association has developed voluntary privacy guidelines for the use of transaction data collected in their operations. A spokesman for the on-line computer database industry says that, at present, it is too expensive to collect and use detailed transaction data from their operations. It may be possible to have computerized, electronic transaction systems that technically limit the collection and use of personally identifiable transaction information. See, for example, David Chaum, "Security Without Identification: Transaction Systems To Make Big Brother Obsolete," *Communications of the ACM*, October 1985.

Their competitors can employ these technologies to offer the same or similar information packages and compete for customers. Consequently, information providers may support strong intellectual property laws to protect their investments in originating, purchasing, and customizing information, and to achieve and retain market share. Although they now have legal rights over derivative uses, proprietors still have an incentive to strictly control access because legal enforcement is so difficult and expensive.

Economies of scope, like economies of scale provide incentives for ownership concentration.²⁵ Users of information want to go to the most comprehensive source. Suppliers of content have an incentive either to deal through large distributors with popular recognition and prestige (who may require contract provisions that exclude dealing through competitors) or to become employees of a large company and “work for hire. And proprietors of information resources have greater freedom to price discriminate if ownership is concentrated and competition is checked.

Proprietors of electronic information also have an incentive to *integrate vertically* to combine ownership of content resources and distribution facilities. In the current deregulatory climate they are freer than in the past to do so. Policy makers are particularly concerned about vertical integration among communication and information providers in situations where competition in distribution facilities is weak.²⁶ In these instances, a vertically integrated information provider has an incentive to favor its content over that of competitors by cross-subsidy, “predatory” rate discrimination, or outright refusal to deal. Common-carriage regulation, and the more recent efforts at structural separation, leased or equal access, and “Computer III” regulations are govern-

ment attempts to check the market power potential of vertically integrated communication entities.²⁷ (See figure 6-1.)

Private Investment and Information Resources

For individuals and for society, information is the raw material of knowledge and learning.²⁸ New information technologies are providing tools and techniques for capturing, creating, using, and sharing information in unprecedented forms and quantities. These technologies make possible a vast expansion of knowledge about the world, and they allow the establishment of information resources that people can draw on for many purposes. As detailed in chapter 5, by automating many of the tasks that artisans, scholars, and managers have traditionally had to master, they promise to raise productivity in creative and intellectual work. We also expect these technologies to enhance learning and amplify the social and economic benefits that come from knowledgeable people and an educated society.²⁹ Chief among these benefits, as seen in chapter 2, are opportunities for citizens to more fully participate in society—to develop and contribute their unique talents and insights to the economy and to the community.

Information-based products and the technologies that support them are also important as factors in the production of an expanding range

²⁵For overviews of the issues being addressed by the Computer II I inquiry see Andrew D. Lipman, “Taking the Competitive Plunge: The FCC Dives Into Computer II I,” *Telephony*, Oct. 7, 1985, pp. 48-49; and Edwin E. Mier, “Computer Inquiry III: The Emerging Monolith,” *Data Communications*, March 1986, pp. 51-58.

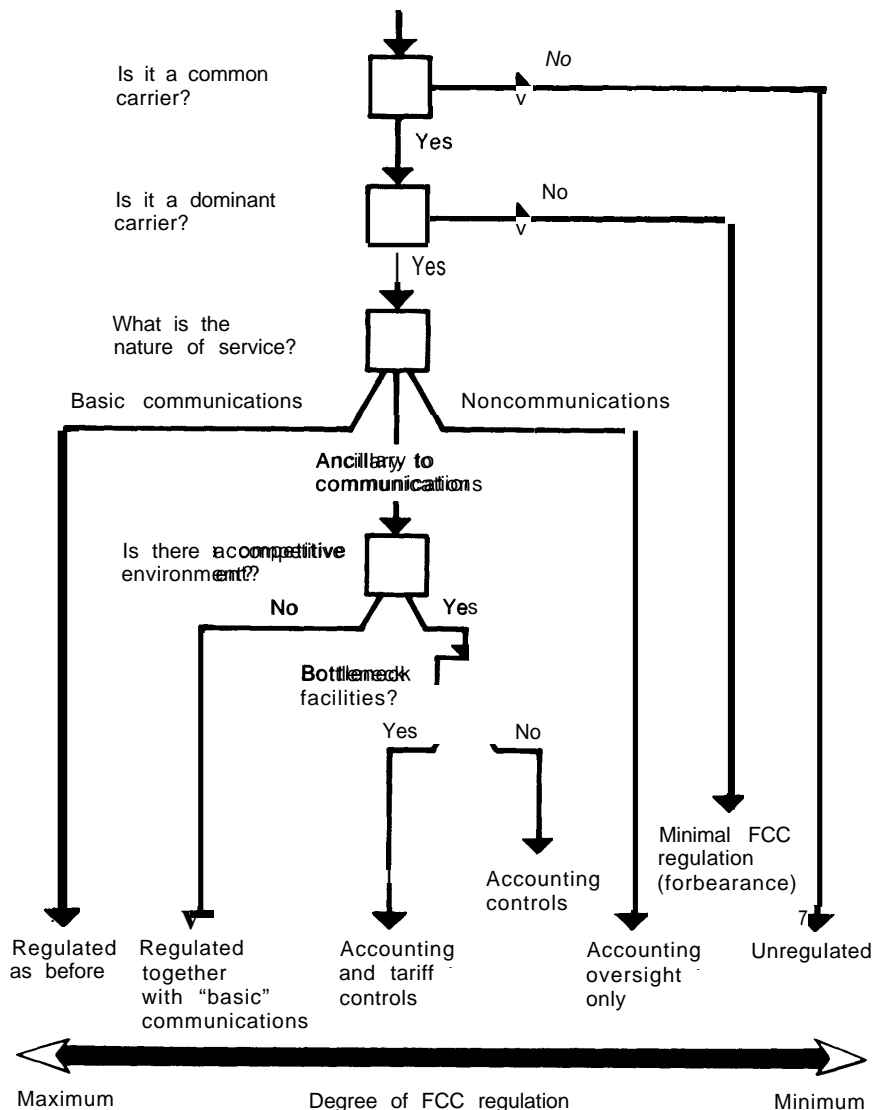
²⁶Information has been characterized as a *nondepletable resource*. For example, see Karen Levitan, “Needed Research in the Economics of Information Resources,” *proceedings of the American Society for Information Science*, vol. 17, p. 334; and “Information Resources as “Goods” in the Life Cycle of Information Products,” *Journal of the American Society for Information Science*, January 1982, pp. 44-54; see also, Cleveland, “Information as a Resource.”

²⁷In 1776, economist Adam Smith identified the skill, dexterity, and judgment of the labor force as primary determinants of economic and social well-being. See Adam Smith, *The Wealth of Nations* (New York: The Modern Library, 1937).

²²Priest, *The Character of Information*, p. 27.

²⁶“A firm with monopoly power over part of the system has an incentive to restrict access to its part in order to extend control over other parts. . . . With public systems, such actions can lead to a total monopoly. To have competition in a public system with some parts monopolized, it is necessary that nondiscriminatory access be maintained. Brock, *The Telecommunications Industry*, p. 301.

Figure 6-1.—Decision Tree for Communications Regulation Under Computer Inquiry III



SOURCE: From presentation by Pacific Bell to FCC Commissioner Dennis Patrick, September 1985

of goods and services.³⁰ Information technology increases productivity and contributes to the material wealth and well-being of society;³¹ and information itself imparts competitive advantages to those that possess it and can make good use of it.³²

³⁰See ch. 2 for a discussion of the importance of information to the economy.

³¹Charles Jonscher, "Information Resources and Economic Productivity," *Information Economics and Policy* 1, 1983, pp. 13-35.

³²Michael E. Porter and Victor E. Millar, "How Information Gives You Competitive Advantage," *Harvard Business Review*, July/August 1985, pp. 149-160.

Although information is essential to material production and social welfare, economists generally believe that private enterprise invests less in its production and distribution than is socially desirable or efficient.³³ The root cause of this inadequate private investment is *uncertainty*. Motivated by profit, individ-

³³See Yale Braunstein, "Information as a Factor of Production," *The Information Society*, vol. 3, No. 3, pp. 261-273. An increased amount of valuable goods and services could be produced with a given amount of land, labor, and capital resources if more were invested in information that is applicable to productive activities.

uals and corporations are uncertain whether they may benefit by investing in the development of information resources.

The producers, distributors, managers, and users of information, and the people that invest in these activities, all operate in an environment characterized by uncertainty.³⁴ Many originators of information, whether they are artists, scientists, or computer programmers, are working at the frontier of knowledge, so the outcome of their work is inherently uncertain. They may succeed or fail in accomplishing their goals, or the goals themselves may be poorly defined, deliberately ambiguous, or self-justifying. They often do not know in advance how much time will be required to meet their objectives, what the ultimate value of their work will be, or how much money they will make from a work.

Distributors of information face uncertainty because they have only imperfect control over the public dissemination and use of their products. Information is inherently “leaky,” so it is both expensive and difficult for them to exclude nonpayers and competitors from using it. Also, because users’ requirements and preferences are hard to define precisely and they change unpredictably, price discrimination is a trial-and-error process.

“The distinction between information distributors and managers is informed by an analysis by Charles Jonscher. (“Information Resources and Economic Productivity, pp. 18-19.) As Jonscher states, it is difficult to precisely ascertain the relative magnitude of effort accounted for by market allocation versus centralized management of information, but:

The distinction is quite fundamental, in that the extent to which economic [and information resource] management is centralized or left to the interaction of independent trading parties lies at the heart of the distinction between market and non-market allocation processes, and indeed between socialist and capitalist economies.

Jonscher estimates that in 1978 information management and distribution activities, which together account for more than 80 percent of total information economic activities, were carried out approximately half by distributors (39 percent of total activity) and half by managers working for firms or government bodies (42 percent of total). Intellectual property rules are fundamental to the operations of independent distributors, and thus crucial to market-driven allocation of information resources. In the absence of adequate incentives for independent distribution of information, it is reasonable to assume that private sector firms will be compelled to rely more on internal production and distribution and centralized management of information resources, and the need for government to provide publicly available information will rise.

The professional managers of information—employees of companies and government who obtain, organize, and provide access to information—also face large uncertainties. They must contend with increasingly complex media and information content, while continuing to meet organizations ever-changing information needs. Moreover, within corporate and State bureaucracies, the real cost of generating and managing information resources is generally accounted for very poorly or not at all, so there is often little ability or incentive to engage in rigorous “make or buy” decisions when information is needed.³⁵

Users, perhaps, face the greatest uncertainties of all. Economist Kenneth Arrow recognized a paradox in trying to determine the demand for information. “[The] value [of information] for the purchaser is not known until he has the information, but then he has in effect acquired it without cost.”³⁶ Of course, through experience and exposure to advertising, users build expectations about the value of information packages that they consider for purchase. They may browse through printed information in book stores and, if facilities and resources are available, at public libraries. But the user of electronic information is generally denied access unless he agrees in advance to pay. Therefore, he may be unable to compare one package with another. Moreover, because access to electronic databases is charged for by the hour or minute, the user is under the pressure of the clock.³⁷ (See table 6-3.) Also,

³⁴Marc Porat, “Information Workers Within Bureaucracies,” *Bulletin of the American Society for Information Science*, February 1984, p. 17. See also, Burns, *The Economics of Information*, pp. V-1-9.

³⁵Kenneth J. Arrow, “Economic Welfare and the Allocation of Resources to Invention,” *Economics of Information and Knowledge*, D.M.Lamberton (ed.) (Baltimore, MD: Penguin Books, 1971), p. 148.

³⁶Both of these factors sharply limit peoples’ opportunity to browse randomly and make the occasional serendipitous discovery. This is a complex subject that involves the design of computerized information-delivery systems and the methods used to index, access, retrieve, and charge for computerized information. Automated systems may yet be designed and offered that can promote the ability to make new connections among disparate pieces of information. But this capability is limited in present systems, and the pressure of a “running meter” further limits their use as general tools in knowledge building. The question of how information resources are to be structured to

(continued on next page)

Table 6-3.—Representative Charges for On-Line Database Access

Database (publisher)	Per minute access charge ^a
Academic American Encyclopedia (Grolier Electronic Publishing)	\$0.75
AP News (Press Association)	1.40
BLS Consumer Price Index (U.S. Bureau of Labor Statistics).	0.75
Books in Print (RR. Bowker)	1.08
Career Placement Registry (Career Placement Registry, Inc.)	1.58
Chemsearch™ (Dialog Information Services, Inc. and Chemical Abstracts Service)	2.42
CIS (Congressional Information Service, Inc.)	1.50
Claims™/U.S. Patent Abstracts (IFI/Plenum Data Company)	1.58
Compendex (Engineering Information, Inc.)	1.65
Laborlaw (Bureau of National Affairs)	2.00
Medline (U.S. National Library of Medicine).	0.60
Peterson's College Database (Peterson's Guides, Inc.)	0.90
Pollution Abstracts (Cambridge Scientific Abstracts)	1.40
PTS U.S. Time Series (Predicasts, Inc.)	1.90
Zoological Record (Biosciences Information Services)	1.30

^aDoes not include telecommunications charges, which run \$6 to \$18 Per hour

SOURCE DIALOG Price List, October 1985

unless public or shared facilities are available, he must buy equipment before he can receive electronic information, equipment that may subsequently fall drastically in price or soon become obsolete.

Investment in information production, distribution, management, and use is risky. Only

(continued from previous page)

meet different information needs is a problem that libraries constantly face. Public libraries are increasingly compelled to make either/or choices, in a time of shrinking budgets, among investments in different kinds of information resources for their patrons. The issue of charges for information services in public libraries is sparking great controversy, and the introduction of computerized retrieval systems is at the center of that debate. See, for example, Brett Butler, "Online Public Access: The Sleeping Beast Awakens," *Bulletin of the American Society for Information Science*, December 1983, pp. 6-10; and Jose-Marie Griffiths and Donald W. King, *Impact of Information Technology on Information Service Providers and Their Clients*, contract report prepared for OTA by King Research, Inc., July 1985, pp. 54-84.

a small portion of the total value that individuals and society gain from the use of information resources can be expected to be returned to producers and distributors through payments for use. This is because information is intangible and leaky, and its value expands unpredictably through new uses and the building of knowledge.³⁸ As a result of this discrepancy, the private economy allocates less land, labor, and capital to information resource production than is socially efficient or desirable.

Economists characterize those markets in which resources are unlikely to be allocated efficiently as exhibiting market failure. There are numerous types and degrees of market failure;³⁹ study of market failures associated with information began in the mid-1920s.⁴⁰ In their analyses, economists generally have included information in a class of goods called public goods. Others in this class are parks, lighthouses, and national defense." Because the pri-

³⁸Priest, *The Character of Information*, pp. 33-35.

³⁹See, for example, Francis M. Bator, "The Anatomy of Market Failure," *Quarterly Journal of Economics*, August 1958, pp. 351-379; and Robert H. Haveman and Julius Margolis (eds.), *Public Expenditures and Policy Analysis* (Chicago, IL: Markham, 1970).

⁴⁰Pigou recognized that knowledge provides benefits to society as well as to the purchaser. Arthur C. Pigou, *The Economics of Welfare*, 4th ed. (London: Macmillan, 1932). In 1962, Arrow wrote a seminal piece on the subject in which he recognized three forms of market failure associated with information: indivisibilities, inappropriability, and uncertainty. (Kenneth Arrow, "Economic Welfare and the Allocation of Resources to Invention.") More recent looks at information and market failure include: Yale M. Braunstein, "The Functioning of Information Markets," in *Issues in Information Policy*, directed by Jane H. Yurow, edited by Helen A. Shaw (U.S. Department of Commerce, National Telecommunications and Information Administration, February 1981), pp. 57-74; Michael D. Cooper, "The Structure and Future of the Information Economy," *Information Processing and Management*, vol. 19, No. 1, pp. 9-26; W. Curtiss Priest, "Characteristics of Information in Commerce and Transactions," working paper (Cambridge, MA: MIT Center for Policy Alternatives, Oct. 25, 1984); and W. Curtiss Priest, "Development of Economic Guidelines and Alternative Options for Public Investment Decisions in Scientific and Technical [formation]," working paper (Cambridge, MA: MIT Center for Policy Alternatives, Mar. 15, 1984).

"According to Samuelson, a public good has the attribute "that each individual's consumption of such a good leads to no subtraction from any other individual's consumption of that good . . ." Paul Samuelson, "The Pure Theory of Public Expenditure," *Review of Economics and Statistics*, vol. 36, 1954, p. 387. Actually, Samuelson uses the term "collective consumption good," but public good is now the commonly accepted terminology. Stanley M. Besen, *Economic Issues Relating to New Technologies and Intellectual Property*, contract report prepared for OTA, December 1984, p. 1.

vate economy underinvests in them, public goods are often provided or subsidized by the government.”

Given the importance of information resources and the fact that the private sector underinvests in them, the public policy question is: How might the government best encourage their growth and use? Can the government reduce the uncertainties faced by people engaging in information activities, and if so, how? May reducing the uncertainty of one group result in problems or expense for others? And, given that it costs more to originate information than to reproduce and distribute it, a corollary question is: How might the government best encourage the growth of the human resources that form the pool of knowledge, creativity, and skill from which valuable information originates?

Motivated only by financial profit, the private sector will produce and distribute those types and forms of information from which they can inexpensively exclude nonpayers and competitors, and for which they can collect enough revenue to cover their costs and realize a profit that is competitive with other investments.⁴³ To compensate for insufficient private investment, government could:

1. institute policies that help proprietors to

⁴³Since exclusion is difficult and may be socially inefficient, the use of tax-payer money to supply the good can often be justified. Economists and public administrators point out that government is not obligated to provide all public goods. There are situations in which the waste and distortion that government may incur in trying to counteract market failures associated with public goods may produce more inefficiency than it cures. See, for example Fritz Machlup, *Knowledge: Its Creation, Distribution and Economic Significance, Volume III: The Economics of Information and Human Capital* (Princeton, NJ: Princeton University Press, 1984), p. 157.

⁴⁴Fortunately, there are many motivations for producing and disseminating information aside from financial gain. See ch. 5, “The Creative Environment.” See also, Robert M. Hurt and Robert M. Schuchman, “The Economic Rationale of Copyright,” *American Economic Review*, May 1966, pp. 425-426.

exclude nonpayers and competitors, collect payment, or price discriminate;

- z. subsidize investment in the production or distribution of information that the private sector finds unprofitable; and/or
3. undertake the task of producing and/or disseminating information.

The latter two approaches require that government identify unprofitable kinds of information for which there is a compelling social need and public interest. Some of these judgments are straightforward. Public investment has long supported most basic scientific research, a large part of the applied research in fields such as medicine, agriculture, and energy, the bulk of economic and social statistics on which government policy is based, a large share of the cost of formal education, and many other information activities.

The first approach—helping private enterprise exclude, collect payment, and price discriminate—has been the traditional role of intellectual property policy and law. It has afforded three distinct advantages over government subsidy or direct investment in production. First, it minimizes the government need to make judgments about the specific value and uses of information. Second, it permits private markets to respond quickly to changes in consumer demand where profits signal investors to shift resources and where there are no substantial barriers to competition. Third, intellectual property protection has traditionally promoted both learning and private investments in the production of ideas.

Changes in technology that alter the incentives for producing and disseminating information may in some cases weaken the advantages of intellectual property protection. If unchecked, the incentive to control access and to concentrate ownership of media and content may undermine the promotion of learning and widespread participation in the development and use of knowledge and information resources.

GOVERNMENT POLICY AND THE DIVERSITY OF INFORMATION-BASED GOODS

A basic goal of intellectual property law is to promote a healthy diversity in the ideas, information, and knowledge available to society. In the age of print, diversity was fostered by granting individual creators the right to control the conditions under which their works were published, printed, and distributed in tangible copies. The questions of what rights attach to works embodied in tangible copies, which particular rights a proprietor retains, and which rights are transferred to a buyer of a copy of a work have been relatively easy to determine. The incentives to originate works and disseminate copies were clearly fostered by the limited controls afforded by copyright. Users' ability to employ existing works in learning and scholarship were supported by the legal limits of copyright control developed in the fair use and first sale doctrines.⁴⁴ Thus, a rich diversity of information, and the growth and use of knowledge, was promoted by a balanced set of rights over information.

As information is increasingly distributed in less tangible electronic forms, these questions of rights in information become more complicated. If one assumes that, in the information age, more people will make a living producing, distributing, and using information, these questions of rights become all the more important. As detailed in chapter 3, new technologies are blurring the boundaries defined by the traditional legal rights over information. Concomitantly, as seen in chapter 4, the enforcement of those traditional rights is increasingly difficult and troublesome. Works in electronic form take on a fluid character. Form and content are transformable and dynamic; separating idea from expression is a more arbitrary judgment; and information is an integral part of automated processes, as well as a conveyor of meaning to people.

⁴⁴The *first sale doctrine* states that ownership of a copy of a work passes to the purchaser of the copy. The purchaser may then sell or otherwise dispose of his copy (section 109). The first sale doctrine allows the development of trade and rental markets out of the control of the copyright owner and thus limits his potential market power.

Alongside changes in the character of information as a technical package, as an economic and social good, and as a cluster of legal concepts, the structure of incentives for originating, disseminating, and adding value to information is undergoing change. To maintain a balance in the rights over information, new definitions that correspond to the emerging technical, economic, and social characteristics of electronic information must be developed. In particular, the definition of rights should clarify the ways purchasers may use works: What are the rules for using protected works in producing and distributing information? How may one compete with his source of information or with sellers of similar works?

For some types of information, especially works *of fact*, proper inducements to add value may be as important in the information age as incentives to originate works were in the age of print.⁴⁵ For other types of works, especially *art*, rules that help creators preserve the integrity of their contributions may be most appropriate. New types of art that arise from collaborative or interactive processes may require new kinds of corporate arrangements. *Functional works* may require new administrative mechanisms to assure that proper, policy-consistent controls are placed both on infringements and on the market power inherent in patent-like protection.⁴⁶ In these ways, intellectual property law may continue to foster the creation and dissemination of emerging information-based goods, a healthy diversity of works, and the profitable trade of information in open markets.

Historically, many other government policy mechanisms—communications regulation, antitrust enforcement, R&D management and support, the development and promulgation

⁴⁵Burns, *The Economics of Information*, pp. 111-17-18.

⁴⁶See Carroll Pursell, *Historical Case Studies of the Influence of Intellectual Property Laws on Technological Change*, contract report prepared for OTA, August 1985, for a discussion of the history of market power derived from patents in a selection of information technology industries.

of technical standards, special tax provisions, the funding of education, and public information production and dissemination—have also had significant effects on the development of information markets. As markets change in response to new media and the expanding role of information in economic life, policy makers may need to think about how all of these mechanisms interact in their affect on the diversity of available information.

Problems in Framing Policy To Promote Information Diversity

Designing policy to promote diversity in information is fraught with difficulty. Few efforts have been made to collect adequate data to make policy judgments about information markets based on strict, quantitative criteria.⁴⁷ The data that exist reveal little about how different kinds of information are produced and used, about the factors that guide producers and users in their investment and purchase decisions, or about how to measure the influence of different kinds of information as factors in the production of subsequent information or other goods.⁴⁸ Moreover, much of the available

⁴⁷Two comprehensive efforts at collecting data on the information economy have been undertaken and published. The first, Fritz Machlup's *The Production and Distribution of Knowledge in the United States*, published by the Princeton University Press in 1962 and since extended in three additional volumes, *Knowledge and Knowledge Production, 1980*, *The Branches of Learning, 1982*, and *The Economics of Information and Human Capital, 1984*, presents data on aspects of the production of some varieties of information. The second, Marc Porat *The Information Economy*, published in 1977 by the Department of Commerce, Office of Telecommunications, is a snapshot of information-related economic activities for the year 1967. A third study, which updates some of Machlup's work, is scheduled for publication in 1986: Michael Rubin and Mary Taylor Huber, *The Knowledge Industry in the United States: 1960-1980* (Princeton, NJ: Princeton University Press, in press). The Copyright Office has begun to produce a series of studies on the size of the copyright industries, the first of which was presented to the Senate Judiciary Committee in December 1984. Many economists and other writers use a wider array of industry-level statistics in analyzing the operation of information markets. It is often the case that these data are incomplete or may even be inappropriate to the analytic questions under consideration.

⁴⁸A strong argument can be made that this new kind of capital [knowledge capital] is more critical to the growth of the American economy than is money capital. But knowledge capital does not show up in the numbers economists look at (or quote) when evaluating capital formation. From "Gnomons, Words and Policies," a speech given by Walter B. Wriston to the Executives' Club of Chicago on May 8, 1985, as quoted in *Harper's*, September 1985, p. 22.

data is supplied by stakeholders in the policy debates, and thus may be biased. At present, the available data are inadequate to directly and objectively test hypotheses about investment in and supply of different kinds of information.

Another problem is that the optimal diversity of information-based goods is difficult, if not impossible, to specify. Each person's needs for information are unique; and individuals place different value on information depending on the uses to which they plan to put it. In some cases, the information package may be most valuable if it is standardized, as, for example, is information on the toxicity of chemicals. Other kinds of information are most valuable when they are simultaneously available to a wide audience, as, for example, is news coverage of a historic event. Other information is uniquely prepared for, and only valuable to, a single individual, as is the financial analysis of one's estate. Therefore, the intellectual property goal of fostering a balanced diversity of information is difficult to achieve, given the vastly different kinds of content and the wide range of media that are needed to efficiently serve audiences ranging from one to millions of users.

Proprietor Concerns, Government Policy Tools, and the Diversity of Information

The actual diversity of information-based goods available to individuals and society depends on a complex set of factors. Because of economies of scale and scope, proprietors' choices of profit-making strategies will be guided by whether, and to what degree, they can *select the audience for a given information package*. They select customers focusing on three major criteria: exclusion (of nonpayers and competitors), collection, and price discrimination. Government policy interacts with proprietor concerns and their strategies for selecting audiences on a *technical level* and a *transactional level* to affect the diversity of available information.

Technical Concerns

Information providers must select a distribution medium with technical characteristics suitable for their particular variety of information content. For example, a broadcast television signal requires a dedicated portion of radio spectrum; a publicly available computerized database information service requires computer hardware, software programs, and a public switched telephone network.

Government support for and promulgation of technical standards will fundamentally affect the development and operation of communications media. The regulation and licensing of radio spectrum affects the operations of information providers who use broadcast or private radio channels (including terrestrial microwave and geosynchronous satellite links) to distribute goods. The development of Integrated Services Digital Network (ISDN), which will rely heavily on fiber-optic lines, is currently the subject of a worldwide, but loosely coordinated, standards-making procedure. The resulting system will have major and long-lasting effects on markets for information-based goods.”

Technical standards are also of fundamental importance in regulating the content of certain kinds of information, particularly *factual* and *functional* information. The National Bureau of Standards (NBS) has been interested for some time in establishing “Data Quality Indicators” for scientific and technical information that could help universities, businesses, and government agencies by increasing the

reliability of factual information distributed by computer databases. “These indicators would provide the user with enough information to determine the utility and suitability for specific purposes.”⁵⁰ Such information, many believe, could yield substantial productivity improvements in research, development, and manufacturing in a wide range of fields, and increased safety for workers and for the public. NBS is also at work on technical standards for computer software to improve government operations. These efforts may affect the nature of computer programs used by the private sector as well.

Because of technical differences among media, the difficulty of excluding, collecting, and price discriminating will vary according to the medium. For example, many goods published in tangible copies, such as books, are available to everyone at more or less identical prices. They are paid for in individual transactions, and require a visible capital investment to be competitively reproduced for sale. Information broadcast over radio and television is, by and large, available to all and paid for by advertisers, and competing broadcasts are easy to recognize and exclude from competition.⁵¹

Information-based goods may also be leased or exhibited to consumers on a per-use basis. Movies shown in theaters, pay-per-view television, and electronic databases are paid for in this manner. Many goods are provided by subscription on a more or less continuing basis. Information packages offered by lease or subscription vary widely in terms of how proprietors can exclude, collect, and price discriminate. Some of these packages and transaction mechanisms are looked at in detail

⁵⁰See, for example, Michael D. Bander, “Pacific Bell Forsees Three-Phase ISDN Revolution,” *Telephony*, Mar. 24, 1986, pp. 44-53. In general, technical standards perform four basic functions in markets:

1. they provide information on terminology and test and measurement methods;
2. they promote minimum levels of acceptable quality, such as safety standards do;
3. they promote compatibility of components in systems to allow users to purchase components from multiple vendors; and
4. they promote reduction in variety to allow economies of scale to be realized.

John H. Young, *Effects of Standards on Information Technology R&D: Local Area Net works and Integrated Service Digital Network*, contract report prepared for OTA, November 1983.

⁵¹“National Bureau of Standards, *Workshop on Data Quality Indicators: Summary Report and Recommendations*. Gaithersburg, MD, Feb. 10-12, 1982, p. iii.

“Printed and broadcast information are increasingly vulnerable to advanced copying technologies. Proprietors’ ability to exclude private copying is a subject of heated debate, and is discussed in other sections of this report. At this point, it is important to consider the potential for private copying as one of the factors that all information proprietors must consider in their marketing strategies.

below.⁵² As technologies for storing, communicating, and processing information converge in computer-based systems, proprietors are increasingly concerned about the extent to which users may subsequently reuse or trade their works, and thus diminish proprietors' opportunities to collect for use and price discriminate.

Some forms of distribution and payment will encourage mass markets for goods and tend to restrict the diversity of the goods offered.⁵³ Other forms of distribution and payment will encourage highly diverse varieties of information that are tailored to individual needs and preferences.⁵⁴ Economic theory suggests that producers will use the feedback they receive, from observing how consumers purchase and use goods, to fine-tune products and services to serve consumer preferences. Information providers may also use this transactional information to improve price discrimination and thus increase their profits.

Transactional Concerns

A second factor a proprietor must consider in selecting distribution media and offering information content is the cost of administering business transactions with his customers. Transaction costs will depend on the technical characteristics of the media, the number of customers the proprietor must deal with directly, and government-derived rules that specify the legal conditions to which transactions must adhere. The information he receives from transactions will, in turn, provide the proprietor with feedback, allowing adjustments in products, services, and prices.

⁵²What we must do is to analyze the natural structure of the new systems of communication as they seem to be emerging to try to identify what systems of payment are enforceable and socially acceptable." Ithiel de Sola Pool, *Technologies of Freedom* (Cambridge, MA: Belknap Press, 1983), p. 5.

⁵³If the profitable provision of highly differentiated products can occur only where different prices can be charged to different customers of the same product, while undifferentiated products can be sold profitably at a single price, the differentiated products will not be offered even if efficiency would be increased by doing so." Besen, *Economic Issues Relating to New Technologies and Intellectual Property*, p. 4.

⁵⁴Ithiel de Sola Pool, "The Culture of Electronic Print," *Daedalus*, vol. 3, No. 4, fall 1982, pp. 17-31.

Intellectual property law and other government mechanisms may affect diversity by encouraging one form of distribution over another. For example, the enforcement of theft of service laws might make terrestrial microwave (MDS) more attractive than free broadcast television as away of distributing movies by making transactions with individual consumers profitable. Government-sanctioned mechanisms that aggregate transactions, such as the Copyright Royalty Tribunal or private collecting societies such as ASCAP, can reduce the cost of managing the transactions between proprietors and users. This may give media that are covered by such arrangements cost advantages in obtaining content for distribution. The aggregation of transaction arrangements may also affect ownership concentration and market power in the information industry. For example, eliminating the compulsory licensing provision for cable television retransmissions may give cable program suppliers increased incentive to merge with or buy out competitors.⁵⁵ Other regulations, such as those that govern common carriers and those called for in the Cable Communications Act of 1984, can require companies to offer leased access to channels on a competitive basis.

Government policy may also encourage investment in certain types of information content by affecting the risks producers face in transacting business. For example, tax credits and subsidies may discriminate among different types of information-based goods. Compul-

⁵⁵Priest, *The Character of Information*, p. 37. The current operation of the Copyright Royalty Tribunal (CRT) encourages programs suppliers to work together to settle royalty disputes so as to avoid the Tribunal's adjudication procedure. This requires suppliers to seek representation from powerful trade associations, such as the National Association of Broadcasters and the Motion Picture Association of America, who can afford the cost of presenting a case for remuneration to the Tribunal. The Copyright Act grants antitrust immunity for private agreements on the distribution of royalties by the CRT. There is no public record of how the trade associations decide to disburse funds to the copyright holders they represent. See *Cable Retransmission of Broadcast Television Programs Following Elimination of the "Must Carry" Rules* (Washington, DC: Office of Policy Analysis and Development, National Telecommunications and Information Administration, U.S. Department of Commerce, 1985), p. 7. Some private collecting societies operate under antitrust consent decrees that serve to inhibit price fixing and anti-competitive behavior. (See footnote 70, p. 281.)

sory licenses and royalty collection and distribution may affect the relative costs of rebroadcasting versus originating information content.⁵⁶ Government R&D and public information activities may make information-based goods available that can compete with goods produced or offered by the private sector. Rules limiting the transferability of intellectual property rights between creators and publishers may affect the transfer of risk. Common-carriage, cross-ownership, equal-access, and anti-trust rules can set limits on industry concentration and check anticompetitive transaction arrangements.

Private sector transactions may not provide all the information society requires because the profit motive may not allow for the production or distribution of some kinds of information. Some information may be of such critical importance to citizens and to the process of governing that policy makers may decide that no one should be denied access for any reason. Therefore, free or subsidized public information sources, such as libraries and public schools, and tax-supported public information content, such as the census, weather forecasts, and information on the operations of government agencies, may be reasonable and proper alternatives to reliance on private-

⁵⁶See *Cable Retransmission of Broadcast Television Programs Following Elimination of the "Must Carry" Rules*.

sector, profit-motivated information transactions.⁵⁷

At the most basic level, intellectual property law may specify which works are public information or are of such a fundamental nature that they are neither copyrightable or patentable. In this way, the law can prevent companies from discriminating in the selection of users or from employing *de facto* proprietary standards to exclude competition and exercise market power.⁵⁸ And, as discussed above, legal distinctions, such as those implied by the categories of art, fact, and function, may be useful in adjusting the incentive structure to the realities of electronic information production and distribution.

⁵⁷OTA has studied the question of the impact of changing technology on the provision of public information. See *Federal Government Information Technology: Management, Security, and Congressional Oversight*, ch. 7, pp. 139-158, February 1986, for an overview of policy concerns relating to government information.

⁵⁸The fact that electronic information is often available only through a *system*, that is, "a set of complementary products which must be used together to provide value" (Brock, *The Telecommunications Industry*, p. 16), the potential for attaining market power is enhanced. For example, a computer manufacturer may be able to restrict competition in markets for peripheral components by developing proprietary processor-interconnection standards (Brock, p. 17). Similarly, a company may employ copyright on *operating system software* to restrict competition for its hardware or applications software; and a communication company may restrict competition by refusing to provide competitors with connecting lines to customers.

PROBLEMS IN SELECTED MARKETS FOR INTELLECTUAL WORKS

Print Technology and the Functioning of Copyright in Book Markets

Traditionally, copyright law has been most concerned with the relatively simple markets for distributing information-based goods in printed form. Printing production technology is efficient on a relatively small scale; for example, printers may produce a fairly small number of copies of books at a per-copy cost that is not much higher than large-scale printing. Thus, there are more than 15,000 American book publishers, and most of these com-

panies are small.⁵⁹ But large advertising expenditures, buyouts of publishing houses by conglomerates that may be more adverse to taking risks,⁶⁰ and the concentration of book retailing⁶¹ have, some observers contend,

⁵⁹"The Book Business," *Editorial Research Reports*, June 28, 1985, p. 479.

⁶⁰Twelve publishing firms, all of them divisions of conglomerate corporations, garnered 45 percent of book sales in 1983. "The Book Business," p. 486. See also, Lewis A. Coser, Charles Kadushin, and Walter W. Powell, *Books: The Culture and Commerce of Publishing* (New York: Basic Books, 1982), p. 29.

⁶¹Although approximately 80 percent of the 9,500 full-line bookstores are independently owned, the volume of orders that publishers obtain from the major chains, Waldenbooks, B. Dal-

[continued on next page]

erected substantial and growing barriers for authors trying to publish their first book.⁶² Others contend that, “the cost of printing, off-setting, or photocopying a manuscript remains low enough that virtually anyone can publish anything.”⁶³ Thus, the problem for new authors may not be getting their books published, but getting them reviewed and widely read.

Not all publishing firms perceive of their business in the same ways. Some consider themselves to have an almost exclusive responsibility to maximize profits for owners and stockholders. Others feel they are primarily responsible to the educated public, to the general public, or to the cultural traditions of the Nation.⁶⁴

Publishers are increasingly influenced by the media industries and corporate world in which they must do business. The growth and resulting complexity of many publishing houses has, in some cases, caused a loss of contact between publishers and the writers, thinkers, and literary critics who previously were central to the publishing business. The integration of book publishing into conglomerate corporations also tends to divorce publishing decisions from purely literary criteria. Publishing contracts are more often negotiated with literary agents or lawyers rather than with authors.⁶⁵

Independent authors use copyright in negotiating the conditions under which publishers will offer their books to the public. In most cases, the author transfers his copyright own-

ership to the publisher in exchange for editing, typesetting, printing, distribution, advertising, and promotional services. The author may receive compensation in advance of the sale of copies. He also will receive a royalty, usually about 10 percent of the sale price, for each copy sold. Often, the advance payment is deducted from the author’s forthcoming royalties.

Currently, the players in the intellectual property community are debating the transferability of intellectual property rights, and the potential alterations in the bargaining positions of creators and publishers that might occur should the transferability of rights be changed. The transfer of rights is closely related to the transfer of *risk* between author and publisher. Some economists contend that a change in intellectual property law that limits the extent to which authors may transfer rights over their works will limit their ability to transfer risk.⁶⁶ Such a view assumes that “work for hire” is the extreme case in which a creator is so averse to risk that he exchanges all rights in his work for a salary.

Existing copyright law returns control of a work to an independent author after 35 years unless he renews the transfer contract.⁶⁷ Policymakers could shorten this term, taking into account the reasonable shelf life of different kinds of works, and so give independent authors more long-term control over their work without producing a large effect on their ability to transfer risk.

The work-for-hire situation is more complicated. Employers often supply hired creators with sophisticated and expensive equipment, and therefore claim ownership in the works produced in their shops. Another problem is that many works are produced by teams of creators, and it can be very difficult to divide rights in a work. In such cases, corporate ownership may be a more efficient way of orga-

(continues from previous page)

ton, Barnes & Noble, and Crown, give them a major influence over what gets published.

[T]he chains tend to reserve shelf space for guaranteed best-sellers by name authors, books that are hot at the moment (such as celebrity exercise books or diet books) and low-cost sale books called remainders [unsold hardcover books returned to publishers and wholesaled to chains at very low prices]. Many books that have been published in the recent past and sell in steady but low quantities, are difficult, if not impossible, to find at the discount chains.

“The Book Business,” p. 495.

“‘Will Books Survive?’” a discussion held at the American Booksellers Association convention in San Francisco, Lewis H. Lapham, moderator, *Harper’s*, August 1985.

⁶¹Paul Hirsch, “U.S. Cultural Productions: The Impact of Ownership,” *Journal of Communication*, vol. 35, No. 3, summer 1985, p. 114.

⁶²Coser, Kadushin, and Powell, *Books*, p. 15.

⁶³*Ibid.*, pp. 31-32.

⁶⁶Besen, *Economic Issues Relating to New Technologies and Intellectual Property*, pp. 30-33.

⁶⁷Generally, publishing contracts allow publishers, but *not* authors, to terminate the contract. Coser, Kadushin, and Powell, *Books*, p. 229.

nizing production, distribution, and rewards to creators. Thus, although modifying the rules about transfer of rights may foster the diversity of some kinds of information by encouraging independent authorship, other kinds of information production may be too complex for anything but corporate sponsorship and control.

Subsidiary rights to derivative works is another issue of interest in the negotiations between a creator of an intellectual work and a publisher. The law allows a copyright proprietor to exploit markets for a work other than those for the initial form in which the work is published. This raises the question of whether the creator or the publisher is to control the exploitation of markets for these works. When the subsidiary markets are known (e.g., a novel always has a potential to be produced as a play or movie), the contract between author and publisher can specifically address the control of subsidiary rights. However, given the rapid changes in information uses and distribution technologies, it is conceivable that new forms for distributing works will emerge that are not contemplated in current publication contracts. In this context, intellectual property law could specify which party owns rights in unanticipated markets if contracts are not explicit about subsidiary rights.

The questions raised by the issue of the transferability of rights between creator and publisher may be relevant to a wide range of situations. For example:

- the development of computer software, where the question involves the way in which the authors of software and firms that market and distribute their products divide the revenues from sale or lease;
- the production of motion pictures, where the questions involve the rights retained by producers and those transferred to a film's distributors;
- the production of television programs, where the questions involve the rights retained by producers and those transferred to the networks; and
- the invention of technical processes or new

products, where the questions involve the rights retained by the inventor and those transferred to the exploiters of the invention.

Motion Pictures, Videocassettes, and the First Sale Doctrine

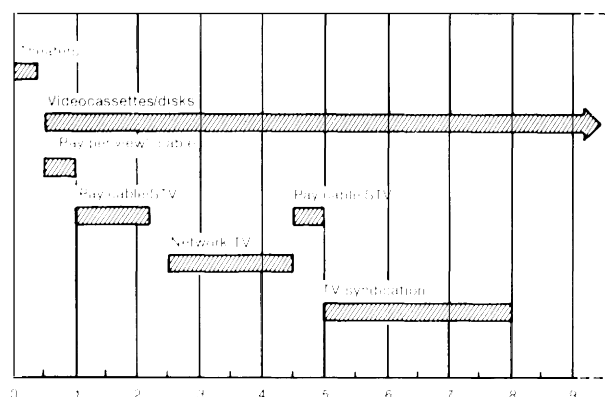
Motion picture production and distribution is a part of the information industry in which the definition of rights and the conditions under which those rights may be transferred are of growing importance. In this part of the information industry, intellectual property rules have a major influence on the diversity of products produced and made available to the public. The markets for motion picture products have expanded since the 1950s as television, followed by videocassettes, became alternative methods of distribution, augmenting traditional theater exhibitions.⁶⁸

The major motion picture distributors stagger the release of feature films in these markets to maximize the *per-viewer* net revenue they can obtain in each, and thus maximize their profits for each film.⁶⁹ (See figure 6-2.) The staggered or 'tiered' release strategy is away of implementing price discrimination. Those consumers who value early access to a movie are willing to pay a higher price than those who are content to wait for it to appear on pay television or those who can wait 2 years or more until they may expect to see the movie on free television.

⁶⁸The characterization of "scope" in movie products may be a subject of disagreement. To be characterized, on *a priori* grounds, as distinct markets for different products, the different forms of movie distribution would have to substitute very little for each other. In practice, there apparently is substantial substitution between at least some of the forms, in particular rented cassettes and pay television. Other forms, such as theater attendance and cassette sales, substitute less and may in fact be complementary products. See David Waterman, "Pre-recorded Home Video and the Distribution of Theatrical Feature Films," ch. 7, pp. 221-243, in *Video Media Competition: Regulation, Economics and Technology*, Eli M. Noam (ed.) (New York Columbia University Press, 1985). The Justice Department has specific guidelines for defining market scope in merger and antitrust actions that are based on the ability of producers to control prices. See U.S. Department of Justice, Antitrust Division, *Merger Guidelines*, 1984.

⁶⁹Waterman, "Pre-recorded Home Video and the Distribution of Theatrical Feature Films," p. 231.

Figure 6-2.—Representative Release Sequence for a Major Theatrical Feature



SOURCE Waterman & Associates, *Video Media Competition, Regulation Economics and Technology*. Eli M.Noam (ed) (New York Columbia University Press 1985)

The profitability of the tiered release strategy depends on the distributor's ability to control the timing, number of exhibitions, and price of the movie in each market. Such control allows him to coordinate advertising and promotion, and segment markets according to the cost of the various distribution media and the value of the product to different consumers.⁷⁰

Price discrimination in the sale of information-based products may promote efficient allocation of investment since the revenue returned to a producer more closely approximates the value of the good to consumers. The profitability of markets for different forms can alert producers and distributors to trends in consumer preference. However, extensive price control combined with barriers to market entry for potential competitors may reduce market efficiency by allowing producers to restrict supply and obtain monopolistic profits. Traditionally, movie distributors have almost completely controlled access to their products and the prices charged for access.⁷¹ This has been

I hid,

Marketplace controls by motion picture producers, distributors, and exhibitors have been the subject of antitrust litigation for many years. See, for example, *Paramount Famous Lasky Corp. v. United States*, 282 U.S. 30,42 (1930), *Schine Chain Theaters, Inc. v. United States*, 334 U.S. 110 (1948), *United States v. Paramount Pictures, Inc.*, 334 U.S. 131 (1948), and *United States v. Loew's Inc.*, 371 U.S. 38 (1962). These and other cases

possible, in part, because until recently movies were not distributed to end-users in individual, tangible copies. And lease agreements for theaters and television have strictly controlled the conditions under which movies may be exhibited.

The release of movies in videocassette form and the growth of the video rental market have loosened distributors' control over the timing, frequency, and prices charged for access to their products. The first sale doctrine is a major impediment to distributors' control over the cassette rental market.⁷² Because of this, the major distributors of feature movies support amendment of the first sale doctrine to allow distributors more income from videocassette rentals and to compel rental outlets to seek specific permission to rent cassettes.⁷³ Other cassette distributors who do not also distribute movies to theaters for exhibition oppose this change.⁷⁴

Amendment of the first sale doctrine could have mixed effects on the overall efficiency of the videocassette market. On one hand, distributors would probably try to raise prices for cassette rental. This would tend to push their per-viewer revenues on cassette rentals closer to those from the highly price-efficient pay-per-view cable and theater distribution modes and thus increase the major distributors' net revenues. The major distributors argue that this revenue would be used to finance the production of more movies to meet the increased demand for films fostered by the new distribu-

are analysed in Michael Conant, *Antitrust in the Motion Picture Industry* (Philadelphia, PA: Ayer Co., 1978).

"The fact that distributors choose to release movies on prerecorded software [video cassettes and disks] in spite of the [first-sale] doctrine is evidence that they increase their net revenue by doing so. Waterman, p. 236.

"The Motion Picture Industry Association and its member companies, Paramount, Columbia, MGM/United Artists, 20th Century Fox, Universal, Warner Brothers, Embassy, Orion, and Buena Vista (Walt Disney), who together controlled more than 89 percent of theatrical distribution and 90 percent of videocassette distribution in 1983 (data from Waterman, tables 1 I and IV) have been the major proponents of first sale doctrine amendment for videocassettes. Two bills to amend the first sale doctrine for audio-visual works were introduced in Congress and had hearings held on them in 1983 and 1984: H.R. 1029 and S.33.

"Statement of Austin O. Furst, Jr., before the House Judiciary Subcommittee on Courts, Civil Liberties, and the Administration of Justice, Apr. 12, 1984.

tion technologies.⁷⁵ They argue, moreover, that the prices for cassette purchases by users would decline because distributors could price discriminate between sales to rental outlets and to final consumers.

On the other hand, higher cassette rental returns to distributors may force many rental outlets out of business. The market for cassette rentals is in the process of consolidation and shake-out even with the first sale doctrine intact.⁷⁶ Any increase in rental prices that caused a substantial reduction in rental volume would be likely to cause further concentration and would work to the disadvantage of smaller outlets.⁷⁷ A reduction in rental outlets would tend to reduce price competition among the remaining outlets; a reduction in rental volume could force the outlets left to devote more shelf space to mass-market feature titles and less to titles appealing to smaller, more specialized consumer markets.⁷⁸

Some opponents of past attempts to amend the first sale doctrine for videocassettes are also concerned that modifications could lead to the imposition of "tie-in" or "full-line" sales requirements by distributors. In such arrangements, a distributor would require a rental outlet to purchase additional titles as a condition for obtaining one or more very popular works. If this were legal,⁷⁹ a distributor would have

⁷⁵"The Consumer Video Sales/Rental Amendment of 1983 Briefing Materials" (Washington, DC: Motion Picture Association of America, 1983).

⁷⁶Alex Ben Block, "Hard Dollars in Video Software," *Forbes*, June 17, 1985, pp. 128-131.

⁷⁷Statement of Nina W. Cornell, President, Cornell, Pelcovits & Brenner Economists Inc., before the Subcommittee on Courts, Civil Liberties, and the Administration of Justice of the House Judiciary Committee, *Economic Impacts of Repealing the First Sale Doctrine for Audiovisual Works*, Oct. 27, 1983, pp. 29-31.

⁷⁸Statement of Stuart Karl before the House Judiciary Subcommittee on Courts, Civil Liberties and the Administration of Justice, Apr. 12, 1984, pp. 13-15.

⁷⁹The Supreme Court has ruled that tying arrangements are illegal because they, "deny competitors free access to the market for the tied product, not because the party imposing the tying requirements has a better product or lower price but because of this power or leverage in another market. At the same time buyers are forced to forego their free choice between competing products." *Northern Pacific Railway v. United States*, 356 U.S. 1, 6 (1958). The amendment of the first sale doctrine proposed in H.R. 1029 may not specifically permit such tying arrangements, but it may lead to many situations in which liti-

more control over a rental outlet shelf space, and could compete with other distributors on bases other than the price and quality of his goods.

The conflict over the first sale doctrine among players in the videocassette market is especially interesting in light of the motion picture industry's overall current situation. Figure 6-3 shows the number of feature movie starts by major studios and independent producers. The steep rise in feature film production beginning in 1982 was predicated on the industry's perception of increased demand, fostered by the growth of the cable television and videocassette markets and by an infusion of more than \$1 billion in capital in 1984.⁸⁰ Some stock analysts consider markets for feature motion pictures to be facing an impending glut. They have cautioned investors not to expect impressive earnings from the major distributors.⁸¹ In fact, the major movie studios have recently cut production sharply.⁸²

The important policy question is whether the proposed amendment of the first sale doctrine will, as the major distributors claim, lead to increases in the number of films produced and make the films more valuable and available to consumers. Faced with impending market glut, the producers of feature films often react by cutting production. Alternatively, they may attempt various mechanisms to exact more revenue from the films they produce. Adver-

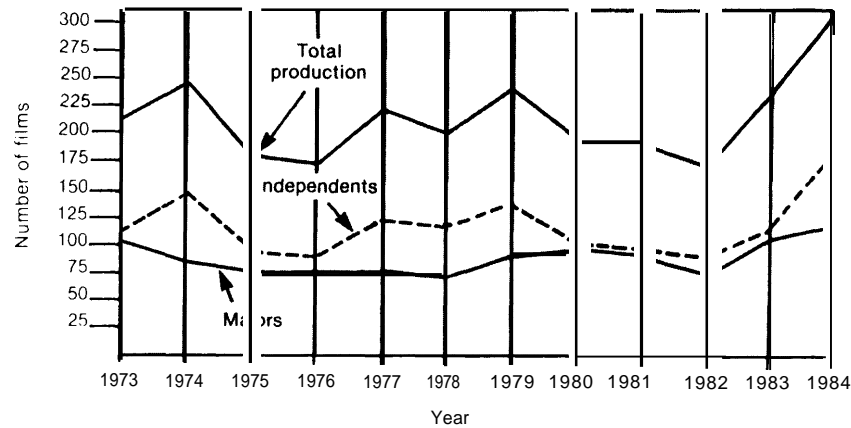
gation would be required to nullify cases of tying, whereas their likelihood is much less under the current video cassette market structure. See Statement of Jonathan Rose, Professor of Law, Arizona State University College of Law, before the Subcommittee on Courts, Civil Liberties, and the Administration of Justice of the House Judiciary Committee, Feb. 23, 1984. Generally, unlike the legal precedent in patent infringement cases, antitrust violations have not been treated as a valid defense of copyright infringement. See Robert A. Feitel, "Copyright Misuse and Cable Television: Orth-O-Vision, Inc. v. Home Box office," *Federal Communications Law Journal*, vol. 35, fall 1983, pp. 347-373.

⁸⁰Harold A. Vogel, "Glitterless Glut," *Entertainment Industry*, Merrill Lynch, Capital Markets Securities Research Division, Jan. 28, 1985.

⁸¹Vogel, "Glitterless Glut."

⁸²"A cut in production apparently improves the quality of films—and improves their chances to become hits by giving them more exposure." Ellen Farley, "The Movie Studios Hope Less Will Be More," *Business Week*, Jan. 13, 1986, p. 9.

Figure 6-3.— Feature Motion Picture Releases

SOURCE *Weekly Variety*, Jan 2, 1985

tising and promotion for individual films may increase. Concomitantly, distributors may try to increase the efficiency of price discrimination.

The amendment of the first sale doctrine, as we have seen, could be expected to aid the major feature film producers, at least, in doing this. Some have suggested other ways to increase price efficiency. One proposal is to give rebates to purchasers of cassettes to, in effect, discriminate between the sale-only and rental markets.⁸³

The industry is responding to market conditions in the absence of changes to the first sale doctrine. Distributors are beginning to use the broad retail market base that has sprung up from demand for cassette rentals to segment rental markets into more specialized and diverse video offerings. This trend is already evident in the growing popularity of educational titles and such specialty items as “Jane Fonda’s Workout.”

The videocassette market may represent an opportunity for independent film producers to market their movies without signing over con-

⁸³Rose, pp.32-33. The important factor in the success of this strategy would be the elasticity of demand for cassette purchases. Some evidence suggests that sales of some very popular titles can be increased dramatically by lowering the price to nearer the marginal cost. See Waterman, p. 235, and Cornell, pp. 19-21

trol of all distribution rights to the major distributors, as they have generally been obliged to do with feature motion pictures. The independent distributors are also beginning to use their revenues to finance the production of films.⁸⁴ The issue of first sale doctrine repeal may thus involve the question of whether the videocassette market is to be an ancillary market for feature films or a new means of offering consumers a diverse range of video products based on a new technology.

Implicit in the above analysis of the videocassette market is a policy question that may be particularly difficult to answer definitively: What level of investment on a given intellectual work does and should intellectual property law encourage? For example, should policy encourage movies that cost \$15 million to produce? This is not the kind of question that intellectual property law has heretofore been consciously concerned with. But decisions about intellectual property rules may have a major influence on the level of investment in a given work that is profitable. Because film makers compete for consumers’ *time* as well as money, a decision to uphold the first sale doctrine in the case of videocassettes may encourage investment in cheaper film projects *at the expense of investment in costlier*

⁸⁴Furst pp. 15-16

projects.⁸⁵ Thus, intellectual property policy-making may require hard, explicit decisions about the nature and content of some information markets, which may compel policy makers to make judgments about the social value of private investments in different kinds of works.

Information Services, Electronic Databases, and Derivative Works

The scope of the information services industry is illustrated by table 6-4 which lists the variety of activities carried out by member companies of the Information Industry Association. These companies find or create infor-

“At least one film-industry analyst disagrees strongly with this conclusion. He believes that the *number* of projects undertaken, and not the per-project spending or quality of films, will be reduced by upholding the first sale doctrine. David Waterman, personal communication, January 1986. However, another analyst cites the movie industry reaction to the introduction of television to argue that per-movie investment levels may decline in the face of competition from new technologies. Hirsch, “U.S. Cultural Productions,” p. 116; see also Paul Hirsch, “Processing Fads and Fashions: An organization-Set Analysis of Cultural Industry Systems,” *American Journal of Sociology*, January 1972, pp. 639-659.

mation and package it in forms most useful to their clients. They may obtain the information from government sources, nonprofit institutions, other private information companies, or they may originate it themselves. They add value to this information by packaging the most relevant, timely, and reliable information in its most useful form.

Within the information services industry, the impact of intellectual property law is a subject of great interest and some controversy. In particular, these markets are directly affected by the rules governing *derivative uses* of intellectual properties.

Many information service providers obtain information from several sources and then profit from distributing the package of information they create. Often, the information service company claims a property right on the package. In other cases, the service company administers the property rights of those who provided them with information content.

A producer's profits and leverage in attracting information from originators depend on his ability to exclude nonpaying customers from

Table 6-4.—Primary Activities of Information Industry Association Members

26 Document acquisitions and delivery (S)	15 Directories (P)	6 Forecasting services (S)
26 Periodicals-publishers (P)	13 Abstracting publishing (P)	6 Microform system design services (S)
25 Publishing (P)	13 Indexing services (S)	6 Micrographic services (S)
22 Consulting services (S)	13 International business information (S)	6 Records management services (S)
22 Databases—design and/or management (S)	12 Energy information (P)	6 Reprint publishers (P)
22 Databases—information (P) (publishers of information about databases)	11 Abstracting services (S)	5 Accounting information (P)
20 Indexing publishing (P)	11 Financial information (P)	5 Agriculture (P)
19 Databases—searching (S) (firms that carry out database searches)	10 Marketing services (S)	5 Book information (P)
19 Information systems—design and evaluation (S)	10 Software (S)	5 Bookselling services (S)
19 Market research services (S)	9 Scientific literature (P)	5 Chemical information (P)
18 Business information (P)	8 Audiovisual materials (P)	5 Computers-hardware (S)
18 Micropublishing	8 Cataloging services (S)	5 Conferences-information (P)
17 Current awareness services (S)	8 Engineering information (P)	5 Drug information (P)
17 Databases—vendors/lessors (S) (companies that produce or sell the use of databases)	8 Environmental information (P)	5 Education (P)
17 Government information (P)	8 Legal information (P)	5 Europe (P)
17 Literature searches (S)	8 Television information (P)	5 Financial Information (International) (P)
16 Corporate information (P)	7 Clearinghouse (D)	5 Information industry (P)
	7 Library Automation Services (S)	5 Looseleaf services (P)
	7 Medical literature (P)	5 Management information (P)
	7 Newsletters-publishers (P)	5 Patent information (P)
	7 Typesetting services (S)	5 Product development (S)
	6 Asia (P)	5 Social science literature (P)
	6 Economics (P)	5 Statistics (P)
	6 Electronics information (P)	

KEY (S) Service
(P) Product

SOURCE Carlos A. Cuadra, “The Role of the Private Sector in the Development and Improvement of Library and Information Services” *Library Quarterly*, vol. 50, No. 1, January 1980 p. 98

using his goods. Success also depends on whether he can prevent others from commercially exploiting his various packages, and whether he can prevent competitors from re-packaging his products. Such exclusion will affect his competitors' available sources of supply and the ways they may use the information available. Thus, the stronger derivative use rights are, the greater the potential for control a producer will have over the prices he charges and the exclusion of competition. But if derivative use controls are too weak, the producer may be unable to receive compensation adequate to cover the cost of constructing a particular package.

The information service providers' dilemma over derivative use rights is mitigated somewhat by the nature of their business. Their products are valued because they meet the specific needs of their clients. Thus, given some latitude in the derivative use of others' products, small companies can succeed by targeting a particular market niche and serving those customers well.

Since the products are highly customized, the market for a particular product may be quite small because the demand for additional copies is quickly exhausted. Thus, a service provider may be able to succeed by focusing his efforts to exclude competitors on a small group of people; and control over his products need only limit the ability of competitors to steal his customers. With no marketplace rules, competitors could do this by unfairly undercutting prices and competing without investing in finding and purchasing or developing their own information. The regulation of unfair trade practices may serve as well or better than copyright in this situation.⁸⁶

Electronic delivery of information services complicates the situation. Over the past 10 years, this segment of the information economy has grown to the point where there are now over 2,800 data files publicly available to

⁸⁶The formalities of copyright, registration and deposit of copies with the Library of Congress, may be especially burdensome to the producers of highly diversified and frequently updated information products.

users with the proper computer and communication equipment.⁸⁷ These services operate by making a very large file of information, such as scientific journal bibliographic citations or industry statistics, available with software that allows users to search the file and create a customized information product themselves. Competitors may copy the entire file or significant portions of it, construct their own search software, and exploit the original producer's market by undercutting prices. Thus, derivative uses of large electronic databases can be more attractive to competitors; and derivations may damage the original producer of a large database more than they would a company serving a small market niche. Conversely, producers of large electronic databases have economies of scale and scope not available to those who employ people directly in producing customized products. Thus, the on-line information service industry may have a greater tendency to concentrate than does its print counterpart, and large electronic database producers may have greater power to control the supply and price of information.⁸⁸

Another potential problem related to concentration in the electronic publishing industry concerns the question of private control over information in a particular field. Although it may be most efficient for consumers to be able to go to one source to obtain all the available information on a particular subject, the monolithic control thus afforded the proprietor of such a source may allow him to eliminate all effective competition—to corner the market for information on a subject—and thus set conditions on access and prices so as to earn monopoly profits.⁸⁹

⁸⁷Martha E. Williams, "Policy Issues for Electronic Databases and Database Systems," *The Information Society*, vol. 2, Nos. 3/4, 1984, p. 445.

⁸⁸The top four (out of 14 total) vendors of electronic databases in the U.S. information center library market accounted for 92.6 percent of the \$54.08 million in 1984 revenues in that industry. Two firms accounted for approximately 84 percent of 1984 revenues. Martha E. Williams, *Information Market Indicators*, summer 1985, pp. 1-2.

⁸⁹Martha E. Williams, "Policy Issues for Electronic Databases and Database Systems," *The Information Society*, vol. 2, Nos. 3/4, 1984, p. 411; and Pool, "User Interfaces," p. 441. Pool suggests that information resource monopolies are likely to be narrow and perhaps short-lived.

Computer Software, Market Size, and the Cost of Contract Administration

The dynamics of markets for computer software programs depend, to a large extent, on market size—that is, the number of users who may find a particular type of program useful to them. Many programs are so specialized that markets for them are quite small. In these cases, it is possible for distribution to proceed on the basis of contracts worked out with individual purchasers. Individualized contracts have the advantage of spelling out in detail the rights that a user purchases and the rights that a proprietor retains. For example, software for mainframe computers has largely been distributed under contract *lease or license arrangements* where the purchaser does not actually buy a copy, but instead buys rights to use and perhaps modify a program. The vendor often agrees to provide certain services, such as expert help in customizing a program for specific user requirements, provision of updated versions at favorable prices, or on-call response to problems that crop up in using the software. Often, the software distributed under contract is treated as a trade secret. Thus, when software is distributed under terms of individualized contracts, the government role may be confined to adjudication of contract disputes at the State level. Software proprietors may also seek Federal copyright for additional protection against programs that may compete as substitutes.⁹⁰

Computer software proprietors often face particular problems in controlling or excluding the marketing of programs that are potential substitutes for their programs. There is often a range of programs available that may provide similar value to users. These programs may have been developed in the course of government-sponsored R&D, and many are in the public domain. For example, the computer language called “Forth” was developed at the National Radio Astronomy Observatory. One company that deals in developing and marketing products based on Forth has to compete

with some programs in the public domain, and some that have been developed by hobbyists who are not especially interested in profiting from the use of their work.⁹¹ In such situations, users may see a wide disparity in the prices being charged for programs that may appear to have similar capabilities. A proprietor in commercial business, in these circumstances, will have to compete with such substitutes by advertising and offering superior service. Such competition can result in a healthy diversity of software products. But users can also be confused by this diversity, and they may be bewildered by the prices that commercial software providers charge.⁹² Thus, the software business can be particularly risky, and is often dependent on elaborate and expensive marketing techniques.

Software developers have tried a number of innovative marketing techniques for software programs. For example, one successful effort goes under the title “Freeware.” The concept of Freeware evolved of necessity, according to Andrew Flugelman, the program’s creator and developer.⁹³ Flugelman was searching for a way to share a program he developed for communicating among computers by telephone, and make money from his efforts at the same time. To protect his investment, he considered a software protection scheme, but he discarded the idea because he figured that it would be unpopular, ineffective, and would limit the use of his software. Having been a book publisher, Flugelman was well aware of both the high value and high cost of advertising a product and of setting up mechanisms to distribute it. Putting these two concerns together, he came up with the idea of offering his software free—first on electronic bulletin boards and later by mail. He anticipated that, once his method took

⁹⁰ Interview with Edward Conklin, FORTH, Inc., Apr. 19, 1985.

⁹¹ Software companies, like most information providers, have significant discretion in setting prices because, once a package is developed, reproduction and distribution costs are relatively low. They often set prices high under the assumption that a package with a high price is perceived as superior to one that serves a similar function but is much cheaper. Elizabeth Ranney, “The Puzzle of Software Pricing,” *Info World*, Nov. 4, 1985, pp. 35-39.

⁹² Interview with Andrew Flugelman, Apr. 15, 1985.

⁹³ See *SAS Institute, Inc. v. S&H Computer Systems, Inc.* (M.D. Term. 1985, nos. 82-3669 and 82-3670).

hold, users would themselves advertise and distribute his product. However, while Flugelman offered his software for free, he encouraged those who used it to pay a nominal fee to show their satisfaction with the product.

Several other software developers have used similar approaches to launch their products. Some, like Flugelman, have been successful in generating healthy revenues and in maintaining full-time businesses.⁹⁴ These approaches, however, have had their problems. Since software products often require extensive documentation and user support to be fully utilized, the costs of such support can grow uncontrollably. Furthermore, as Flugelman has noted, the Freeware concept appears to have worked most successfully with the individual user—the computer hobbyist, the home user, and the very small business man. With these users, the creator can appeal on a one-to-one basis to “the morality and basic honesty of the public.”⁹⁵ In the environment of large corporations, personal appeals are apt to get lost.

Software designers may indeed increasingly have to resort to approaches that rely on users to advertise and distribute software, because both advertising and distribution are beginning to constitute larger and larger proportions of software companies' total costs. Ashton-Tate, for example, spent \$4 million on advertising during the Democratic Convention and the Los Angeles Olympics. Similarly, other companies are aggressively pursuing a variety of advertising and marketing schemes in an effort to stay at the top of what is now a highly turbulent and competitive industry. To increase the sales and name recognition of their products, some companies are even offering their buyers coupons, trial samples, and trade-ins on previous models. In such a climate, a whole variety of new advertising and distribution schemes can be expected.

As personal computers have come into widespread use, the cost to software proprietors

⁹⁴See Larry Thompson, “Freeware and Freeware.” *Discover*, November 1984, pp. 87-89.

⁹⁵“Software: The New Driving Force: With Computers Becoming More Alike, the Action Shifts to Programs,” *Business Week*, Feb. 27, 1984, p. 74.

of managing individualized contracts and providing customized user services has risen dramatically. Proprietors have tried a number of strategies to lower these transaction costs. For instance, many software companies offer “site licenses” that authorize a purchaser, such as a company or government agency, to make a specific number of copies for multiple use within the institution. But site licensing may not be practical unless the proprietor deals with a relatively small number of institutions. This is because the proprietor must have frequent contact with the user institution, sending representatives to the site regularly enough to assure that the terms of the agreement are not being violated.” Moreover, when proprietors are dealing with very large institutions, site licenses may make the problem of enforcing compliance with the license extremely costly to monitor.

Another strategy adopted by the distributors of personal computer software is the “shrink-wrap” license. With these, vendors of mass-market programs, such as word processing packages, display a licensing contract on the cover of the container in which the software and its documentation are sold that specifies the exclusive rights that they retain. (See figure 6-4.) By opening the package, the purchaser tacitly agrees to the provisions of the contract. The legality of such “take it or leave it” contracts has been tested in only one State, Louisiana, which passed a specific statute validating shrink-wrap licenses.

Many computer program users are concerned about shrink-wrap licensing because it increases their uncertainty in making computer software purchase and use decisions. A user may decide after trying a program that it is not appropriate for his particular needs. There is also a question of what rights a purchaser might have should the software vendor go out of business. A purchaser may entrust valuable information that is critical to his business to the operation of a particular software system, and come to rely on vendor support. Industry is addressing this problem

⁹⁶Edward Warner, “Site Licensing Stirs Debate at Comdex,” *Computerworld*, May 13, 1985, pp. 1, 11.

to some extent by establishing “software escrow” systems in which a third party holds a program’s source code and development and maintenance documentation for release to

licensees should the vendor go out of business or terminate service on a particular program.⁹⁷

⁹⁷Liliane Choney, “Software Escrow and the Security Practitioner,” *Computer Security Journal*, summer 1984, pp. 67-76.

Figure 6-4.—A Shrink-Wrap License Contract

XYQUEST Program License Agreement
 YOU SHOULD CAREFULLY READ THE TERMS AND CONDITIONS OF THIS AGREEMENT BEFORE BREAKING THE SEAL OF THIS PACKAGE OPENING THE PACKAGE INDICATES YOUR ACCEPTANCE OF THESE TERMS AND CONDITIONS XYQUEST PROVIDES THIS PROGRAM AND LIENSES ITS USE IN THE UNITED STATES AND PUERTO RICO. YOU ASSUME THE RESPONSIBILITY FOR THE SELECTION OF THE PROGRAM TO ACHIEVE YOUR INTENDED RESULTS, AND FOR THE INSTALLATION, USE AND RESULTS OBTAINED FROM THE PROGRAM

LICENSE
 You may
 a) use the program on a single machine,
 b) copy the program into any machine readable or printed form for backup or modification purposes in support of your intended use of the program on a single machine.
 c) modify the program and/or merge it into another program on the single machine (Any Portion of this program merged into another program will continue to be subject to the terms and conditions of this agreement.); and,
 d) transfer the program and license to another party if the other party agrees to accept the terms and conditions of this Agreement If you transfer the program, you must at the same time either transfer all copies whether in printed or machine readable form to the same party or destroy any copies not transferred, this includes all modifications and portions of the program contained or merged into other programs
 You must reproduce and include the copyright notice on any copy, modification or portion merged into another program
 YOU MAY NOT USE, COPY, MODIFY OR TRANSFER THE PROGRAM, OR ANY COPY, MODIFICATION OR MERGED PORTION, IN WHOLE OR IN PART, EXCEPT AS EXPRESSLY PROVIDED FOR IN THIS LICENSE
 IF YOU TRANSFER POSSESSION OF ANY COPY, MODIFICATION OR MERGED PORTION OF THE PROGRAM TO ANOTHER PARTY YOUR LICENSE IS AUTOMATICALLY TERMINATED

TERM OF LICENSE
 The license is effective until terminated. You may terminate the license at any other time by destroying the program together with all copies, modifications and merged portions in any form It will also terminate upon conditions set forth elsewhere in this Agreement or if you fail to comply with any term or condition of this Agreement. You agree upon such termination to destroy the program together with all copies, modifications and merged portions in any form

Limited Warranty
 THE PROGRAM IS PROVIDED ‘AS IS’ WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, **BUT** NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE PROGRAM IS WITH YOU. SHOULD THE PROGRAM PROVE DEFECTIVE, YOU ASSUME THE ENTIRE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION. SOME STATES DO NOT ALLOW THE EXCLUSION OF IMPLIED WARRANTIES, SO THE ABOVE EXCLUSION MAY NOT APPLY TO YOU THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS AND YOU MAY ALSO HAVE OTHER RIGHTS THAT VARY FROM STATE TO STATE
 XYQUEST does not warrant that the functions contained in the program will meet your requirements or that the operation of the program will be uninterrupted or error free.

Limitations of Remedies
 XYQUEST’s entire liability and your exclusive remedy shall be:
 a) the replacement of any diskette not meeting XYQUEST’s Limited Warranty and which is returned to XYQUEST or an authorized XYQUEST distributor along with a copy of your receipt, or
 b) if XYQUEST is unable to deliver a replacement diskette which is free of defects in materials or workmanship, you may terminate this agreement by returning the program with all documentation and your money will be refunded. IN NO EVENT WILL XYQUEST BE LIABLE TO YOU FOR ANY DAMAGES, INCLUDING ANY LOST PROFITS, LOST SAVINGS OR OTHER INCIDENTAL OF CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE SUCH PROGRAM EVEN IF XYQUEST HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES OR FOR ANY CLAIM BY ANY PARTY.
 SOME STATES DO NOT ALLOW THE LIMITATION OR EXCLUSION OF LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU.

General
 You may not sublicense, assign or transfer the license or the program except as expressly provided in this Agreement. Any attempt otherwise to sublicense, assign or transfer any of the rights, duties or obligations hereunder is void. This Agreement will be governed by the laws of the state of Massachusetts.
 Should you have any questions about this Agreement, you may contact XYQUEST, **Software Sales** and service, P.O. Box 372, Bedford, Massachusetts 01730.
 YOU ACKNOWLEDGE THAT YOU HAVE READ THIS AGREEMENT, UNDERSTAND IT AND AGREE TO ITS TERMS AND CONDITIONS. YOU FURTHER AGREE THAT IT IS THE COMPLETE AND EXCLUSIVE STATEMENT OF THE AGREEMENT BETWEEN YOU AND XYQUEST WHICH SUPERSEDES ANY PROPOSAL OR PRIOR AGREEMENT, ORAL OR WRITTEN, AND ANY OTHER COMMUNICATIONS BETWEEN US RELATING TO THE SUBJECT MATTER OF THIS AGREEMENT .

SOURCE: XYWRITE II Program Materials, XyQuest, Inc. , 1983