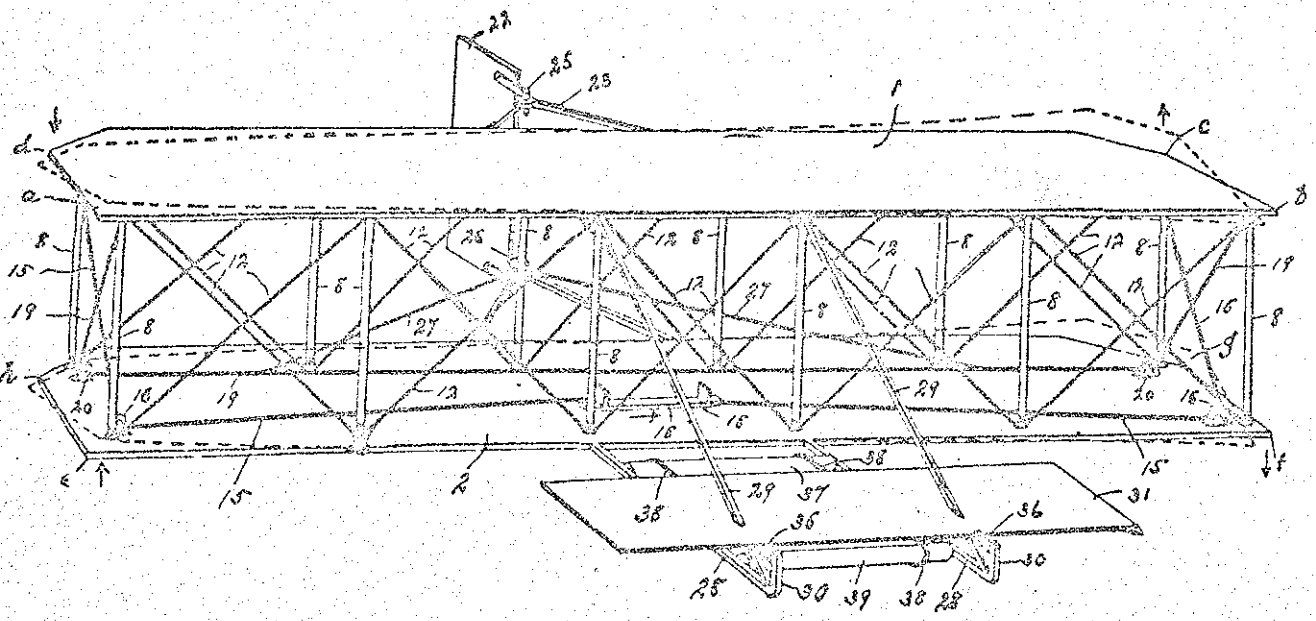
Legal Incentives and Barriers to Utilizing Technological Innovation

Prepared for the
National Science Foundation



HARBRIDGE HOUSE INC

Boston New York Washington Chicago Los Angeles London Paris Frankfurt am Main

LEGAL INCENTIVES AND BARRIERS TO UTILIZING TECHNOLOGICAL INNOVATION

Prepared for
The National Science Foundation

by
Harbridge House, Inc.

March 1974

HARBRIDGE HOUSE INC

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29 March 1974

National Science Foundation
Experimental Research and
Development Incentive Program
1900 Pennsylvania Avenue
Washington, D.C. 20006

Attention: Dr. Richard Block

Gentlemen:

Harbridge House is pleased to submit its final report on "Legal Incentives and Barriers to Utilizing Technological Innovation" in fulfillment of Contract No. NSF-C822.

The findings and conclusions of this background study relate the law to actual industrial behavior rather than to perceived barriers to innovation. Subsequent to experimental validation, recommendations derived from this study should provide an empirical basis for future federal policy on the utilization of technological innovations.

We would like to express our gratitude to the Patent, Trademark and Copyright Research Foundation of the Franklin Pierce Law Center, to the Association of Data Processsing service organizations, and to the many individuals and organizations in industry, education, and government whose time and talent made this report possible.

Very truly yours,

Richard Miller

Richard I. Miller
Principal

RIM:ak
Enclosure

What is happening in the law of intellectual property to affect the utilization of innovations in high technology? This background study to a series of proposed experiments examined the gray areas between patent and antitrust, patent and trade secret, and trade secret and copyright in order to find out.

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I. THE CONCEPT

"Just the place for a Snark! I have said it twice:
That alone should encourage the crew.
Just the place for a Snark! I have said it thrice:
What I tell you three times is true . . . "

--Lewis Carroll, "The Hunting of the Snark"

PART A
STUDY OBJECTIVES

The objectives of this study of the Legal Incentives and Barriers to Utilizing Technological Innovation grew, in large part, out of the findings of an earlier Harbridge House study. In 1968 Harbridge House submitted a voluminous report to the Committee on Government Patent Policy relative to operations of the Statement of Government Patent Policy issued by the President in October 1963. The Government Patent Policy Study was directed to three fundamental policy issues:

(i) What effect does patent policy have on industry participation in government research and development programs?

(ii) What effect does patent policy have on the commercial utilization of government-sponsored inventions?

(iii) What effect does patent policy have on business competition in commercial markets?

The findings of the study provided the foundation for a revised Memorandum and Statement of Government Patent Policy issued by the President on August 23, 1971. The principal thrust of the revisions was to mandate changes designed to increase the commercial utilization of government-sponsored research. The next step was the publication of regulations by departments in the executive branch complementing the Presidential Memorandum.

The effectiveness of the policy changes cannot be properly evaluated until the departmental regulations have been operative for at least several years. This study, therefore, does not pretend to be an evaluation of the revised governmental patent policy. It is, however, a sequel to the earlier work and expands upon the conceptual theme. Though broader in scope in some dimensions, it is narrower in others; in all respects, limitation of resources has restricted the findings of this study to a more modest data base.

A nagging problem that permeated the government patent policy study was the constant reminder that patents, although the star of the show, are not the whole show. The law of intellectual property includes more than patents. Government policy includes more than patents. Commercial practice includes more than patents. Why, then, was the earlier study--and, indeed, are most government studies--restricted to patents? For one thing, a good patent does, in fact, provide the strongest possible protection under the law for technological

innovation. For another, patent analyses are quantifiable. The number of applications filed and patents issued each year is a matter of public record. Finally, Congress has preempted patent law; thus developments in patent law are relatively easy to follow. On the other hand, the other members of the legal family which comprise the law of intellectual property are rooted in common law and are subject to state as well as federal jurisdiction. Consequently, they are somewhat more scattered. But they are there. They are significant. It is idle to presume that the effect of government policy regarding intellectual property can be measured by patents alone. [1]

Although the legal concepts under consideration in this study include the entire body of the law of intellectual property, the scope of inquiry has been narrowed. It is here concerned solely with commercial utilization, and not merely the commercial utilization of government-sponsored inventions, but with all technological utilization. It is not primarily concerned with industrial participation in research and development programs, nor in the effect of government policy on business competition. Yet all of these problems are so interrelated that a concentration on one aspect of the commercial utilization inquiry necessarily involves some comment about the others.

By the same token, the law of intellectual property cannot be totally isolated from the larger body of commercial, tax, and regulatory law which impacts upon the commercial development of technological innovation. All of the law has an influence on commercial development at all times. The most that can be pinpointed is that some bodies of law appear to exercise a greater influence at a given stage of development than others in the long journey a technical innovation takes in becoming an accepted commercial product or modification of such a product.

Considering innovation and market development as a continuous, interactive process, rather than regarding the former as an isolated exercise of intellect, a cycle may be projected which starts with research and which includes mileposts of experimental development and market introduction on the way to a product which is accepted in commercial markets. Market acceptance invites a continuous process of product modification and improvement (hence, back to research) in order to maintain, expand, and, if possible, dominate the market.

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[1] It is not an overstatement to say that the really significant problems in the law of intellectual property affecting utilization today are at the interstices of the various legal disciplines rather than in, say, patents or trade secrets per se.

In the early stages, the significant legal disciplines tend to be protective. The familiar cluster of protective disciplines identified with the law of intellectual property are:

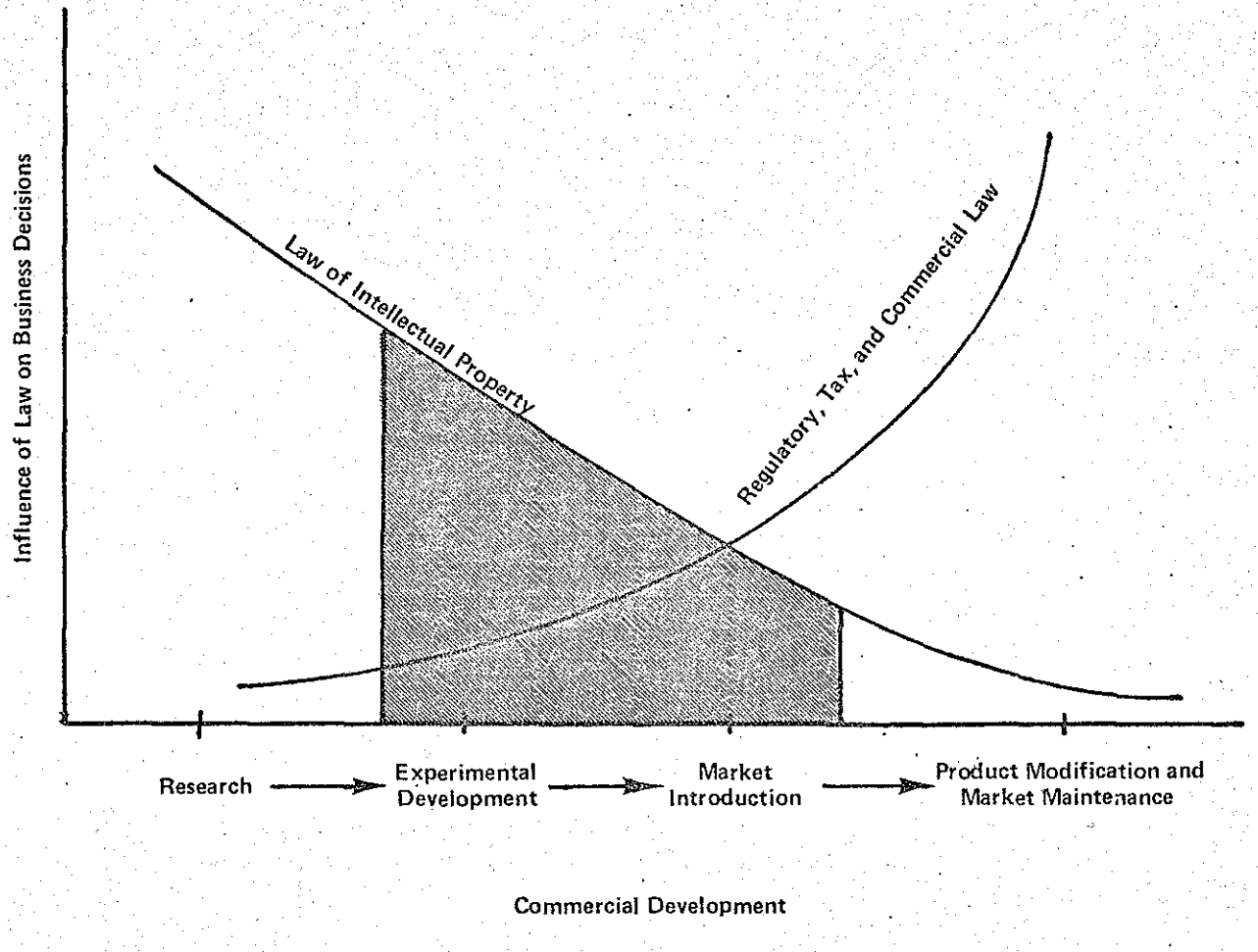
- Patent Law
- Trade Secret Law
- Federal Patent or Data Policies
- Copyright Law

On the other hand, the legal disciplines ordinarily identified with a later, exploitive phase are:

- Antitrust Law
- Taxation
- Trademark and Unfair Competion Law
- Federal Regulatory Law

We must keep in mind, however, that the legal disciplines which are characteristically identified with different phases of the innovation cycle tend to overlap and interact. Consequently, the findings of this study will concern intersecting issues. A graphic representation (Figure A-1) expresses the scope of the study. Utilization of a technological innovation is taken as that phase of product development which begins sometime after an innovation has been reduced to practice and which ends when marketable goods or services become commercially available.

FIGURE A-1
UTILIZATION AND THE LAW[1]



[1]Shaded area represents the scope of this study.

PART B
SUMMARY OF FINDINGS

Background studies performed under the National Science Foundation's Experimental Research and Development Incentive Program tend to define issues rather than recommend solutions. Typically, the end product is an experiment, or series of experiments, designed to empirically validate the findings of the study. Appendix A presents three sets of experiments suggested by the findings of this background study. One set of experiments pertains to trade secrets, a second to university patent exploitation, and a third to the implementation of government patent policy.

The data of the 1968 Government Patent Policy Study showed that patent rights play widely different roles in the business affairs of commercial and educational organizations. We fully expected, and were not disappointed, to have that finding confirmed by this study of legal incentives and barriers. The attitude of an organization toward patent rights is generally typical of its attitude toward the entire law of intellectual property. In both studies the widest divergence of opinion was found between educational and nonprofit institutions, on the one hand, which can achieve utilization of their inventions only by licensing others, and industrial firms, on the other, which are able to promote utilization through direct use and licensing. The broad statistical base of the patent policy study provided a perspective from which to evaluate the findings of the present study. Without this base, the findings of the legal incentives study would have to be regarded as anecdotal and peculiar to the scattered sectors of the economy from which they were drawn. Given the earlier work as a pedestal, however, we are able to survey the industrial consequences of the law over a somewhat broader landscape.

Briefly, the study findings are as follows:

- Innovations which are adequately financed and intelligently marketed are able to circumvent any inconveniences created by intellectual property law.

Industrial firms place differing weights on the extent to which the inability to secure exclusive proprietary rights acts as a barrier to commercial utilization. This weight is influenced, but not controlled, by whether they are heavily engaged in government contracting.[1] At one extreme are firms which

[1] The 1968 study was concerned exclusively with government-sponsored research. Most of the organizations in the present study did very little, if any, government contracting.

rely heavily on intellectual property rights and would hesitate to invest in an invention in which they could not obtain exclusive rights. At the other are firms whose markets are so secure that they attach little or no importance to legal protection of innovation and, in some instances, innovation itself. In between are firms for whom the law of intellectual property provides a variety of incentives, very few of which are concerned with commercial utilization. Regardless of the attitude of the firm toward legal protection, however, it appears that innovations which are adequately financed and intelligently marketed invariably circumvent any inconveniences created by intellectual property law. Generally speaking, the views of various firms considered in this study fall into one of five categories as described below.

- Adherence to the legal forms of protection of intellectual property does not necessarily imply any interest in substantive protection of innovation.

One group of firms showed a relative lack of interest in legal protection simply because they are not innovative (electric utilities, for example) or because the protection available is so inadequate that they have learned to survive without it (data processing companies, for example). In the data processing firms, it was found that the mode selected for protecting computer software is as likely to be governed by a desired characterization of their product for tax purposes as for safeguarding or transferring technology.

- Companies in established industries with a low level of innovation are more interested in establishing a market lead than in securing exclusive rights. There is no evidence that antitrust actions brought against such firms induce utilization of technology.

In a second group of firms high technology is secondary to broad technical and management competence in maintaining their position in commercial markets. This is true in the coal and steel industries and, to a degree, in the automotive industry. For large companies in established industries with a low level of innovation, the typical legal categorization of intellectual property is neither patent nor trade secret but industrial know-how. Inventions are not as important to these companies in sustaining sales or selling new products as is basic engineering management and production capability. Innovations are incorporated into product modifications or in new models with little consideration for legal protection. Getting a new idea into the marketplace first is regarded as more important than assuring that the company has exclusive rights to it. Antitrust actions brought against such firms may control monopoly and promote competition, but the utilization of technology opened by the consent decrees is negligible.

- Proprietary rights are far less important than marketing considerations and investment requirements.

A third group of firms considers proprietary rights as trading material for cross-licenses with competitive firms. Ownership of rights is a relatively minor factor for new product utilization compared with the market considerations and investment requirements associated with the commercialization of the innovation. This was true of the automotive industry and characterized the behavior of the aerospace contractors in one of the antitrust cases. At least with such firms, and perhaps for a larger group as well, antitrust actions which are intended to promote competition in research by preventing research pools simply do not have the same consequences as actions which prevent collusion in the marketing of developed products.

- The utilization of innovations is not necessarily influenced by the availability of legal protection to established firms.

A fourth group of firms actively seeks legal protection to establish and maintain a proprietary position in new technologies, as well as in established market areas. Invariably, however, estimates of market potential and corporate investment requirements are the major determinants of which products are developed. In the petroleum industry, for example, the influence of the law is of a very low order. Given a situation in which all other economic and technical factors are considered equal, an overwhelming majority of companies agreed that the availability of protection for intellectual property does not appreciably influence the utilization of innovations.

- The availability of legal protection may be critical to smaller firms and to larger firms entering marginal markets. In some instances, antitrust actions which increase competition and reduce monopoly may have a negative effect on utilization.

A fifth group of firms regards some form of protection as essential to their business activities. Just how essential this is tends to be a function of the extent to which new capital investment to finance innovation is a market requirement. Although it is not strictly related to the size of the firm, a greater sensitivity to the requirement for capital was found in the smaller firms in the study. In our sample the medical instrumentation market was supplied by relatively small scientific instrument manufacturers. It is arguable with regard to this industry that even when antitrust actions increase competition and reduce monopoly, they may actually have a negative effect on the utilization of innovations. (It may be somewhat disconcerting for some to discover that laws and rulings designed principally to break the monopoly power of large companies often have a deleterious effect on commercial utilization by small companies.)

Trade secrets as well as patents are highly regarded by the scientific instrument firms. However, it does not follow that the invalidation of patents will promote the use of trade secrets or that reducing the scope of state trade secret laws will increase the number of patent applications. The decision to file a patent application or treat an invention as a trade secret is more closely related to the technology involved, and to institutional and industrial traditions, than to the state of the law.

Utilization of technology means only that an innovative product or process has moved from the laboratory to the marketplace. It does not imply that a quality product is available to the buying public at a reasonable price. We found that the interests of competition, control of monopoly, and technology utilization do not always march in step. There must often be tradeoffs between competition and monopoly control, on the one hand, and utilization on the other. Unfortunately, policy decisions must frequently be made as to whether the advantages of utilization offset the risks of concentrating economic power, or conversely, whether the advantages of competition make it worthwhile to discourage utilization.

- The utilization of innovations may remotely depend upon an unspoken faith in the purposes of the law, but this faith bears little relation to the substance of the law.

Most of the firms interviewed expressed strong opinions regarding recent developments in the law of intellectual property, but then again, "firms" do not give interviews. People do. The executives and lawyers who discuss these topics are usually those who understand them, but their expressions of concern did not necessarily imply that their firms' industrial behavior would be equal to the measure of expressed concern. On the contrary, it would appear that although changes in the laws of intellectual property profoundly affect the rights of parties to disputes, they have little direct influence on the rate of utilization of innovations. For example, if state trade secret laws were invalidated by federal patent law, leaving an individual free to steal technology his former employer considered proprietary, it would be expected that a few Samuel Slaters might set up a few new textile mills[1]--a good thing for competition, but of small consequence to utilization. Similarly, if the life of a patent (currently 17 years) were reduced to 13 years from the grant or extended to 20 years from the filing date, the period of prosecution would be affected, but the influence on utilization will still be negligible. Changes in legal detail appear to affect utilization only in marginal cases and special sectors of the economy, such as universities and nonprofit research institutions.

[1] Reference to the theft of the Arkwright textile mill trade secret, which was stolen in 1769 by Samuel Slater, an apprentice in Great Britain who memorized the equipment and brought the industrial revolution to America.

- In general, the laws of intellectual property significantly affect the personal rights of parties to such property and the commercial rights of firms to innovations which have already reached the stage of commercial utilization.

The industrial world is primarily interested in technological content and is highly sensitive to technology utilization and transfer, irrespective of legal format or detail. Government policies which encourage utilization are those which actively promote technology. The curtailment or denial of exclusive rights to an innovation plays a marginal role at best, and only under certain market conditions. Reformers would do well to observe that these conditions more often prevail for small companies than for large ones. The law has a negligible effect either as an incentive or a barrier to the progress of an innovation from its reduction to practice until its commercial introduction.

PART C
LEGAL PARAMETERS

This part describes the legal parameters within which intellectual property is protected and utilized. The manner in which the law may be considered as either an incentive or a barrier to the utilization of technological innovation is discussed, and the various legal options for protection are introduced.

1. Incentives

In general, the law mandates some kinds of behavior and prohibits other kinds. Decision-making in a free society takes place between the extremes of the obligatory and the forbidden. If legal incentives are considered in the familiar context of economic and personal incentives--as attractive inducements to a desired determination--then the "incentive" of the law may be too subtle to measure.[1]

Generally speaking, one of the functions of a fair and equitable legal system is to help create and preserve a social system in which people will take economic risks which might otherwise not be undertaken. There are relatively few instances in which the law operates as a positive incentive. Taxation, which provides definite incentives to where and how capital shall be invested, is one notable exception to the general rule. Regulatory and antitrust laws, which by prohibiting certain behavior narrow the field of alternative behavior, are more questionable exceptions.

The law of intellectual property, per se, does not serve as an inducement either to create or to exploit. It is not believed that any technician ever pursued a line of inquiry because patent or trade secret protection was available. It is not believed that any business ever marketed a process or a product because it could legally protect them. The incentives to utilize technology are profit and recognition, to which intellectual property rights have only an indirect and tenuous relationship. Nevertheless, some would attribute greater powers of inducement to the laws of intellectual property than are found to operate in actual practice. For example, it is often argued that if all issued patents were rigidly valid, R&D budgets might be increased. Similarly,

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[1] But see B. F. Skinner, who argues in Beyond Freedom and Dignity that the distinction between the carrot and the stick is a semantic illusion.

some maintain that the limitation of antitrust laws to patent-licensing arrangements is required to provide greater financial incentives to innovation. Conversely, others argue that relaxation of antitrust laws is less likely to increase utilization than to encourage the use of patents to create monopoly and decrease competition.

All of these traditionally held beliefs are questionable, as revealed in the study. The availability of legal protection is not the mother of invention. On the other hand, the inability to secure legal protection may discourage the pursuit of a line of inquiry or cause the abandonment of potential utilization--but then the law is serving as a barrier, rather than as an incentive. That, at least, was taken as axiomatic in the present study, which accentuates the negative side of the equation because legal barriers are more directly amenable to study than legal incentives.

2. Barriers

It is not difficult to discover legal barriers in the law of intellectual property. When a patent or a copyright grants a monopoly to an inventor or to an author, it creates a barrier to the potential infringer. The infringer may feel that the legal monopoly inhibits utilization. The theory of the system, however, is that granting a proprietary right to some and denying it to others encourages utilization. When a court enjoins a former employee from divulging trade secrets to his new employer, from the defendant's point of view utilization is frustrated. From the plaintiff's it is assured.

Some have argued that the system itself frustrates utilization. The President's Commission on the Patent System faced that issue squarely in 1966 and determined that the patent system, albeit imperfect and subject to abuse, ". . . is capable of continuing to provide an incentive to research, development, and innovation."[1] In addition, the Supreme Court will confront, if not dispose of, the issue in its current term when it reviews the permissible scope of trade secret law in Kewanee Oil v. Bicron.[2] Suffice it to say, this study is not concerned with those barriers created by the law which conform to the spirit of legal protection of intellectual property. Rather, it is concerned with the less-than-

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[1] Report of the President's Commission on the Patent System (1966), p. 2.

[2] Kewanee Oil v. Bicron, No. 71-1041 (6th Cir., May 10, 1973). The rule of Kewanee Oil v. Bicron is that federal patent law precludes the trade secret option for patentable subject matter. The case is discussed more fully in Part G of this study.

wondrous ways in which the law bars, or is alleged to bar, the utilization of technology when in theory it should not do so.

3. Options for Protection of Intellectual Property

For purposes of delineation and exposition, this study has been organized according to the major subjects of the law of intellectual property, all of which are inextricably interrelated. The term "innovation" has been taken to mean simply an advance in the state of the art, without regard to patentability. (The term "invention" refers only to those innovations which are patentable.) Figure C-1 is a graphic representation of the relationships among the various options for protection of intellectual property discussed below.

If an innovation is patentable, the inventor has at least two (and in most jurisidictions, three) options:

(i) He may file a patent application within one year of first public use or disclosure.

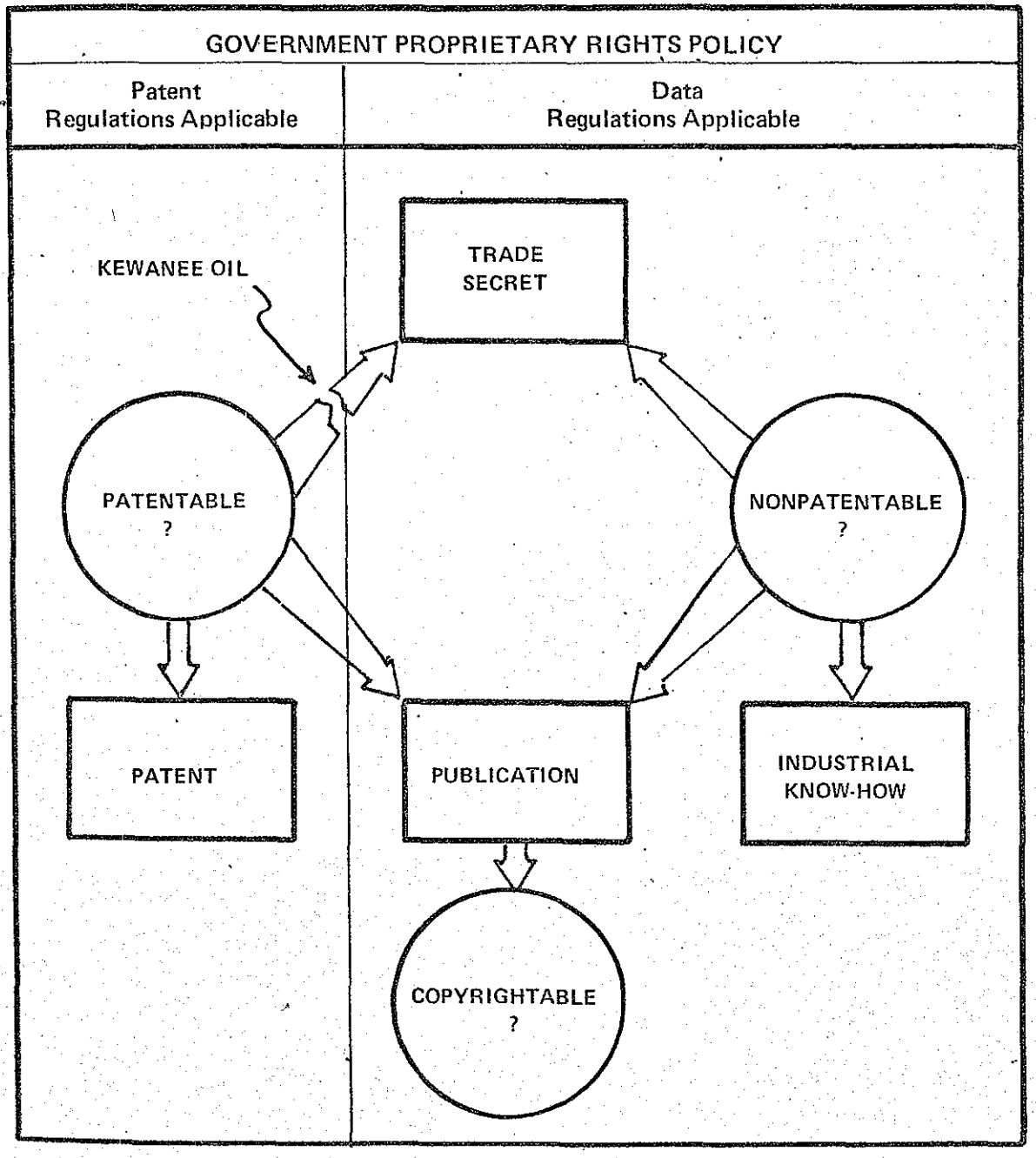
(ii) He may forgo the patent monopoly and elect to publish his invention. (A small category of inventions may be protected by copyright or design patent.)

(iii) Unless he falls under the jurisdiction of the Court of Appeals for the Sixth Circuit, currently controlled by the rule of Kewanee Oil, he may keep his invention a trade secret.

It is customary practice in some industries--chemical processing, for example--to elect to protect patentable inventions as secrets because it is difficult or impossible to detect infringement of patented property.

In ordinary commercial practice, if an innovation is not patentable, the innovator still has two of the three options available in the case of the patentable invention; that is, trade secret and publication. In at least one instance--computer programs (which are discussed at some length in Part H)--the copyrighted publication is a major form of protection. Generally speaking, however, copyright law is involved with the expression of ideas rather than the content of the ideas expressed. In some instances the nonpatentable innovation, although lacking the technical dignity of a trade secret, not to mention the aura of an

FIGURE C-1
LEGAL ALTERNATIVES FOR PROTECTION
OF INTELLECTUAL PROPERTY



invention, may nevertheless have considerable commercial importance as "know-how." "Industrial know-how" is a combination of technical and managerial processes, and is often regarded as proprietary in the world of commerce.[1]

All of the legal options, with the exception of patent, are encompassed in the regulatory concept of "technical data" that is used by some of the government agencies which sponsor research. The Department of Defense, for example, defines data as recorded information used to define a design and to produce, support, maintain, or operate equipment. It includes all modes of representation, whether textual, graphic, machine recorded, or even retained in a computer memory. Whether the technical information is otherwise protected or protectable by copyright, trade secret, or as industrial know-how is irrelevant to the data concept.[2]

The options expressed in Figure C-1 relate commercial and government terminology in the context of the lawyer's question: "How can this innovation be protected?" If the innovation is patentable, shall a patent application be filed, shall the invention be published, or shall it be protected as a trade secret? If published, is it dedicated to the public or can it be protected by copyright?

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[1] See Part G of this study, Trade Secret and Industrial Know-How.

[2] See DOD Instruction 5010.12.

PART D
RESEARCH METHODOLOGY

The folklore of intellectual property invariably includes tales of inventions which are suppressed by companies out of fear that an improvement will adversely affect sales of a marketed product or process. There are also stories of trade secrets so well kept that they never slip into the public domain and of masterpieces destroyed before they are published.[1] We are satisfied that there is a germ of truth behind the folklore; however, in a preliminary phase of this study hard evidence of permanent suppression of high technology was extraordinarily difficult to find.

Of far greater significance is the use of legal power to block the commercial utilization of disclosed technology which threatens the market structure of established industry. The removal of such blocks encourages the utilization of supporting technology and sometimes leads to the establishment of entirely new industries. Three modern classics from the background literature, discussed in Part E, Breaking the Barriers, are the telephone interconnect industry, the community antenna television industry (CATV), and the computer software industry. However, the issues of fact and law regarding intellectual property which these cases raise are, for the most part, problematical in nature. The birth of these new industries from the removal of legal blocks represents a relatively unique development in the laws of intellectual property.

The main thrust of this study is concerned with more prevalent questions associated with intellectual property rights and utilization of technology. The following sections describe the data collection methods in the three areas of intellectual property law into which the study has been organized. It should be recalled that these categories have been chosen for purposes of presentation of study findings. The categories are not neatly bounded, for the laws of intellectual property are intricately interconnected and overlapping.

1. Patent Policy

The discussion of patent policy, Part F, is addressed to two distinct areas: (1) the patent/antitrust interface and (2) government policy and patent licensing. A major proportion of the effort in this segment of the study is

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[1] The ubiquitous suppression of literature, which is the major subject of copyright law, is not included within the scope of the study. See page I-18, note 1.

devoted to the first area, in which the point of departure was selected antitrust cases in high technology related to national goals:

Lead Case	Specific Technology	National Goal
U.S. v. College of American Pathologists (The "Pathologists Case")	Medical Instrumentation	Public Health
U.S. v. Automobile Manufacturers Association, et al. (The "Smog Case")	Automotive Emission	Environmental Protection
U.S. v. United Aircraft Corporation (The "Fuel Cell Case")	Fuel Cells	Energy Conservation

In addition to general research and interviews, the methodology for the patent policy part of the study consisted of:

- Study of the pleadings and decisions in each of the above cases.
- Interviews with representatives of the industries involved to gauge the significance of the consent decrees.
- Validation of interview results by comparison with data from other phases of this study with the findings of other studies.
- Monitoring of licensing and developmental activity before and after the court cases.

Besides the three lead cases, which were uncovered through interviews with the Antitrust Division of the Department of Justice, an ongoing effort was made to discover relevant pending cases in the federal courts. Searches of federal court dockets were conducted in the District Courts of Boston, St. Louis, Chicago, the District of Columbia, and San Francisco. These searches were performed to uncover information about litigation involving patent cases (and other intellectual property cases under federal jurisdiction) which allege or imply that the operation of the law creates a barrier to the utilization of technology. The effort was abandoned for three reasons:

- The inconsistent manner in which federal court records are maintained in various districts required extremely time-consuming searches by staff attorneys.

- The information revealed in court pleadings was rarely so complete as to set forth any allegation implying frustrated utilization.

- Field data from other aspects of the study began to support a preliminary thesis which strongly suggested the improbability of finding such cases at all.

Negative propositions are not provable by a mere absence of data. However, even if one does not accept the questionable proposition that the failure to find a tree proves that no tree exists, it is certainly arguable that the failure to find a tree proves the nonexistence of a forest. Thus the research for the patent/antitrust interface area was confined primarily to the three lead cases.

At the same time that data coming from the patent/antitrust section of the study (and from the trade secret part below) seemed to indicate that the impact of the law of intellectual property on business decisions affecting technology utilization was trivial, data coming from the patent licensing section of the study pointed in the opposite direction. The methodology of this section consisted of:

- Review of the licensing policies and practices of 11 government agencies.

- Attendance at the NASA Patent Licensing Conference (New England region) and the annual meeting of the American Patent Law Association.

- Discussion of licensing developments with members of the patent bar and officers of the Licensing Executives Society.

- Review of university patent licensing practices.

- Interviews with industry representatives to gauge the significance of recent cases. (This research overlapped the patent/antitrust section.)

2. Trade Secrets and Industrial Know-How

Trade secret case data, which are set forth in Part G of this study, were investigated in six major industrial states: California, Illinois, Massachusetts, New York, Pennsylvania, and Texas. For the reasons noted above relating to the abandonment of federal court docket searches, state court docket searches proved equally nonproductive. A pilot effort in the Massachusetts Superior Court (the major trial court of general jurisdiction over trade secret cases in Massachusetts) convinced the project staff that the pleadings of unreported cases did not reveal sufficient substantive information for the purposes of the study. Since attorneys representing the litigants declined to discuss pending cases, the methodology was modified to use reported cases and to gain direct access to industry.

Although the subject matter of most trade secret cases arises under state law, many of the cases tend to find their way into federal court on the grounds of "diversity jurisdiction"--where the litigants are domiciled in different states. Many of the more important cases are therefore reported in the United States Patent Quarterly (U.S.P.Q.), which regularly reports all patent and copyright cases. All current cases in the First, Second, Third, Sixth, Seventh, and Ninth Federal Circuits in the following fields were searched.

U.S.P.Q.

68.901	Unfair Competition, Trade Secrets, General
68.903	Confidential Disclosure
68.905	Disclosure by Employees
68.909	Discovery by Fair and Unfair Means
68.911	Freed by Patent or Disclosure
68.913	Parties Bound

Five cases of possible interest, in addition to the lead case of Kewanee Oil Co. v. Bicron, arose during 1973. (Two of the five involved allegations of misuse of proprietary data by a government agency.) In addition to the cases reported in U.S.P.Q., the staff analyzed in detail the trade secret elements of the 217-page decision in the private antitrust action of Telex Corporation v. IBM handed down by the Oklahoma District Court in September 1973.

In addition to the case searches, a survey was conducted in collaboration with the Patent, Trademark and Copyright Research Foundation (PTC) of the Franklin Pierce Law Center (formerly of George Washington University). The PTC intellectual property questionnaire, and a companion interview program by

Harbridge House, were designed to determine the extent to which major industries relied on trade secret protection as preferable to patent protection (or vice versa).

Another principal data source for the trade secret phase of the study was a special inquiry into the treatment of trade secrets at the Federal Trade Commission (FTC). This consisted of interviews with a number of FTC attorneys who deal with matters of trade secret to uncover issues related to the law, FTC policies and practice, and FTC opinions on trade secret. In addition, the most recent cases were reviewed and literature on the FTC and trade secret was surveyed. The issue of confidential treatment of trade secrets has arisen more frequently in proceedings before the FTC than in proceedings before any other governmental agency. Consequently, while the practices and rules that have developed in FTC proceedings are not necessarily a model, they do serve as a repository of case law and administration, and form the basis for applications for protection in other agencies.

3. Copyright and Data

The scope of this study is limited to the utilization of technological innovation; thus it is much narrower than the full range of protection of copyright law,[1] but substantially broader than the technology encompassed by patent law. Copyright law is concerned with the mode of expression (including technological modes); patent law is concerned with the content of an innovation. In one unique instance of high technology, form and content are merged: that is, computer programming.

For the most part, the methodology used to uncover information on copyright and data consisted of a survey of the membership of the National Association of Data Processing Service Organizations (ADAPSO) to determine current industrial attitudes and behavior related to the protection of software.

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[1] The inadequacies of copyright law have led to universally acknowledged adverse commercial consequences which definitely affect downstream marketing of technology, if not "utilization" as defined here. Information technology regularly outstrips the development of copyright law. It took Congress almost 50 years to amend the copyright law so that it would apply to phonograph records. It has yet to begin to come to grips with the interaction of xerography and tape recorders with the "fair-use" doctrine. Thus, there is scarcely a major book publisher in the country who cannot point to some manuscript which remains unpublished because anticipated circulation would be too small to compete with unauthorized reproductions, or some record publisher who has not been hurt by bootleg tapes.

The copyright and data part of the study also discusses active and passive data policies of the federal government, with particular reference to the National Aeronautics and Space Administration (NASA) and the National Technical Information Service (NTIS) of the Department of Commerce. NASA's data policies were studied by means of a literature search and also through the attendance of members of the project staff at several NASA Regional Technology Utilization Conferences. NTIS data policies were uncovered through literature search and personal interviews with NTIS personnel.

PART E
BREAKING THE BARRIERS

Three events that occurred in the late sixties are illustrative of the way in which the law presumably acted to knock down barriers to innovation. That is, they involved situations where technology was developed but not (in terms of ultimate potential) widely utilized, and where a legal decision created a more favorable environment for diffusion. In two of the events, the decisions were judicial: Fortnightly Corporation v. United Artists Television,[1] a Supreme Court case, and the Carterfone case,[2] decided by the Federal Communications Commission. The third event, the IBM "unbundling" of computer services, was a management decision made under certain legal pressures.

In the Fortnightly case, decided in 1968, the Supreme Court had to consider, in the words of Justice Fortas, "how a technical, complex, and specific Act of Congress, the Copyright Act, which was enacted in 1909, applies to one of the recent products of scientific and promotional genius, CATV."[3] Fortnightly, the owner and operator of community antenna television (CATV) systems, was sued by United Artists for copyright infringement. The activities took place in Clarksburg and Fairmont, West Virginia, where because of the hilly terrain, residents could not receive broadcasts from outside the immediate area with ordinary rooftop antennas. Fortnightly erected antenna systems on the hills above both cities to provide its customers, through a cable service, with broadcasts from several larger cities. The broadcasts included motion pictures on which United Artists held the copyright. The originating stations were licensed by United to broadcast these movies; however, the licenses did not authorize, and in some cases specifically prohibited, carriage by CATV systems. At no time did Fortnightly obtain a license.

The trial court ruled in favor of United on the issue of copyright infringement, and was upheld in the Court of Appeals. The case reached the Supreme Court, and in the words of Justice Fortas, the parties:

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[1] Fortnightly Corp. v. United Artists Television, 88 S. Ct. 2084 (1968) [hereinafter cited as Fortnightly].

[2] Use of the Carterfone Device in Message Toll Telephone Service, 13 F.C.C. 2d 420 (1968) [hereinafter cited as Carterfone].

[3] Fortnightly, supra note 1, at 2091.

> "on the one hand . . . darkly predicted that the imposition of full liability upon all CATV operations could result in the demise of this new, important instrument of mass communications; or in its becoming a tool of the powerful networks which hold a substantial number of copyrights on materials used in the television industry. On the other hand, it is foreseen that a decision . . . [favorable to CATV] would permit such systems to overpower local broadcasting stations which must pay, directly or indirectly, for copyright licenses and with which CATV is in increasing competition." [1]

The Solicitor General filed an amicus brief requesting a compromise solution, which, in effect, asked the court to "stay its hand because . . . the matter is not susceptible of definitive resolution in judicial proceedings and plenary consideration . . . [might] prejudice the ultimate legislative solution."[2] None of the justices agreed, however.[3] Fortas, a minority of one, took the position that pending a legislative resolution of the complex, competing considerations of copyright, communications, and antitrust policy, the court should follow earlier precedents and hold that CATV used mechanical equipment to extend a broadcast to a significantly wider audience, and that this constituted "performance" of a copyrighted work within the meaning of the statute. The majority, however, in a five-to-one decision, reversed the lower courts, noting that broadcasters have been judicially treated as exhibitors (who "perform") and viewers as members of the theater audiences (who "do not perform"). CATV, it concluded, essentially did no more than enhance the viewers' capacity to receive; it did not broadcast or rebroadcast, but simply carried without editing whatever was received. Hence it fell on the viewers' side of the line and, accordingly, infringed no copyright. Largely as a result of this decision, CATV was launched as a viable industry.

* * * * *

The Carterfone case began as an antitrust action by Carterfone against American Telephone and Telegraph Company. The district court, while reserving antitrust jurisdiction, referred the matter to the Federal Communications Commission (as the agency of primary jurisdiction) for prior resolution of important issues in the field of telephone communications.

The "Carterfone" is a device designed to connect a regular telephone subscriber to a two-way radio at a base station serving a mobile radio system.

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[1] See Footnote 3, p. I-21.

[2] Ibid.

[3] The "legislative solution" is still pending.

The telephone user calls the base station, where an operator inserts the handset of his telephone into the Carterfone device. This device controls a two-way radio set which transmits when the telephone party is speaking and receives when the radio party is speaking. The base station operator can monitor the conversation and disconnect when the communication is finished.

The dispute centered around the legality of a part of the telephone company's tariff which provided that "no equipment, apparatus, circuit, or device not furnished by the telephone company shall be attached to or connected with the facilities furnished by the telephone company, whether physically, by induction, or otherwise . . . "[1] The Commission found that Carterfone filled a need and that it did not adversely affect the telephone system. The tariff cited above, in prohibiting the use of Carterfone devices, was determined to be unreasonably and unduly discriminatory in its application to Carterfone. (Since the tariff had originally been submitted by AT&T and not imposed by the Commission, the Commission declared it should be stricken and left the burden on AT&T to submit a revised one.) In short, AT&T policy constituted unreasonable interference with a subscriber's right to use telephone service in a way that was privately beneficial without being publicly detrimental.

AT&T argued (1) that it had to have complete control for maintenance purposes and (2) that development of telephone systems would be retarded, since independent equipment suppliers would tend to resist changes that would make equipment obsolete. The Commission was unimpressed with these arguments. On the first point, it stated that the telephone company could prevent practices that actually caused harm (there was no evidence of that in the Carterfone case) and set up reasonable standards. On the second point (which appeared to be speculation, with no evidence offered), the Commission stated that if independent suppliers offered products that might be made obsolete by AT&T system changes, this was simply a business risk.

AT&T's application for rehearing (based on independents "skimming the cream" and conceivable adverse economic effects on AT&T) was denied.[2] The effect of the decision was the creation of the telephone interconnect industry.

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[1] Carterfone, supra note 2 (p. I-20).

[2] 14 F.C.C. 2d 571 (1968).

International Business Machines Corporation announced in June 1969 that it would separately price most new computer programs and various systems engineering and educational services. Previously, these services had been available to IBM customers (purchasers and lessors of its hardware) without separate charge. At the same time, IBM reduced sales and rental prices for its machines. This policy change, involving separate pricing of computer hardware and related software, was called "unbundling."

Even though the computer software industry (that is, the complex of firms concerned with the technology of using computers) was thriving before 1969, the IBM decision was nevertheless similar in effect to the decisions in the Fortnightly and Carterfone cases; it paved the way for wider use of a developed technology. With services and hardware separately priced, there was greater incentive for independent firms to compete with IBM and other manufacturers in developing computer programs and in the overall design of information and data processing systems. It is possible that purely business considerations could have justified the IBM decision (under the theory that the services end of the business, by standing on its own feet; would become more efficient, more responsive to user needs, and hence more profitable). However, the fact that it was made when several lawsuits against IBM, alleging antitrust violations, were pending or imminent suggests that legal factors may also have had some influence on corporate policy.

These cases are generally credited with opening up the CATV, interconnect, and computer software industries. In all three cases, the technology had been developed and had enjoyed some utilization prior to the legal or (in the case of unbundling) managerial breakthrough. Although Fortnightly involved copyright law, all the cases veer toward the right side of the shaded area of principal interest discussed in Part A.[1] They are displayed in their own context in Figure E-1, below.[2] As such they should be regarded as important background to collected data.

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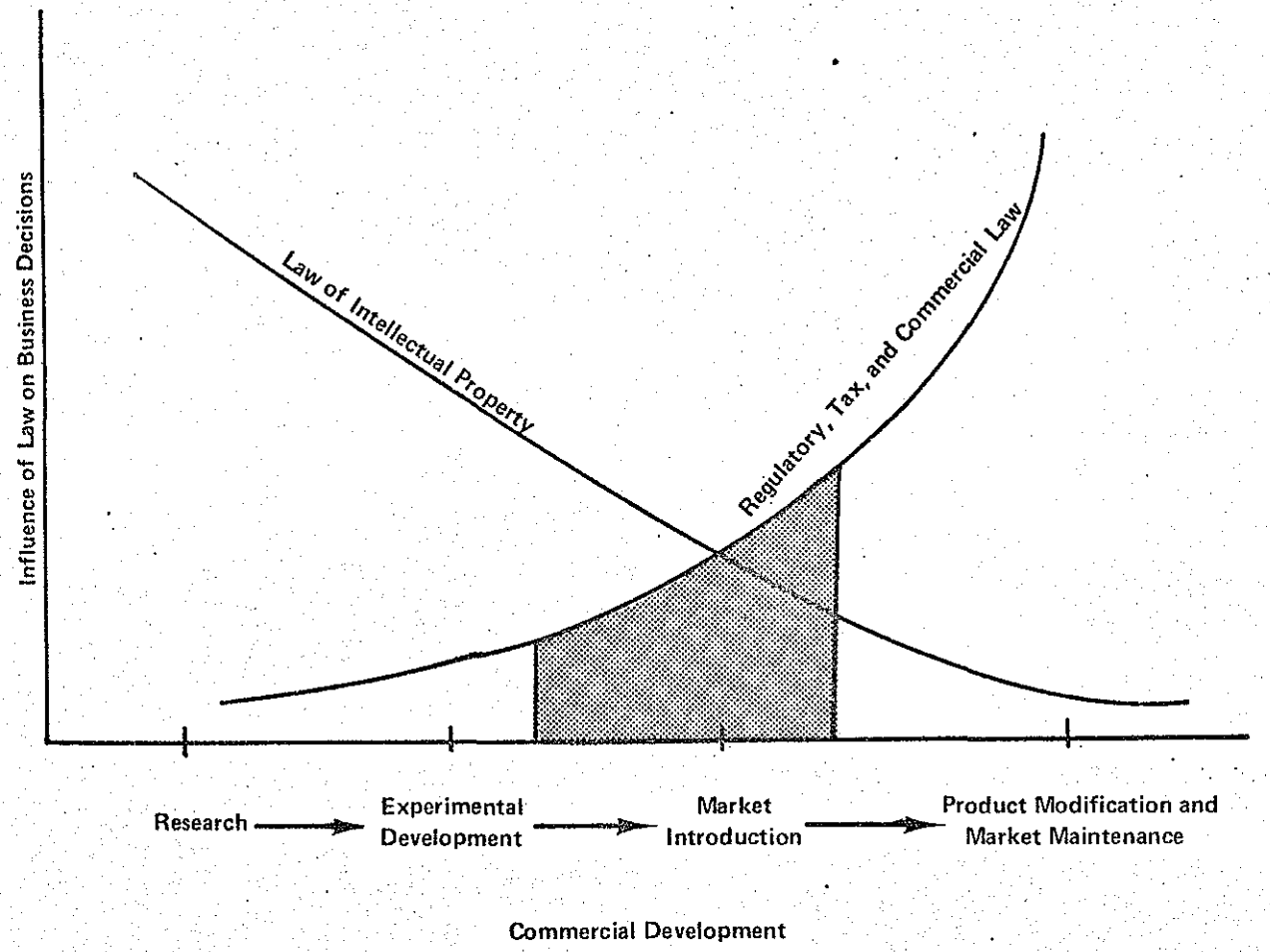
[1] See Figure A-1.

[2] Here the shaded area represents the relation of these cases to the scope of the entire study.

FIGURE E-1
BREAKING THE BARRIERS TO UTILIZATION



II. THE DATA

" . . . The Judge left the Court, looking deeply disgusted:
But the Snark, though a little aghast,
As the lawyer to whom the defense was entrusted,
Went bellowing on to the last."

--Lewis Carroll, "The Hunting of the Snark"

PART F
PATENTS

1. Patents and Antitrust Laws

A defendant's classical defenses to a patent infringement action are (1) to deny that his product or process infringes the plaintiff's patent; (2) to challenge the validity of the patent alleged to be infringed; and (3) to assert that the plaintiff is in violation of the antitrust laws. The antitrust defense usually consists of claims that the plaintiff is attempting to extend the scope of his monopoly beyond the monopoly legally authorized by the patent. The issue of conflict between antitrust laws and patent laws arises out of the fundamental fact that the purpose of antitrust laws is to prevent unreasonable restraint of trade. The purpose of patent laws, on the other hand, is to encourage inventions by providing a monopoly which inherently does restrain trade.[1]

The reconciliation of differences is made more difficult by the fact that patent laws create property rights and antitrust laws regulate commercial behavior. The conflict was not foreseen when the Sherman Act of 1890 was passed 100 years after the first patent act, and the two fields of law peacefully coexisted for half a century. Increasingly, however, the Antitrust Division of the Department of Justice felt that patent monopoly was being unreasonably extended by large corporations in restraint of trade, and consequently the patent bar has become concerned about the whittling away of the power of the patent. At the same time, the federal courts have invalidated 79 percent of all patents whose validity has been challenged on appeal. Small wonder, then, that patents have become mere "trading material" in antitrust actions in which a defendant agrees to dedicate a portion of its patent portfolio to the public if the government will agree to dismiss or modify its suit.

An antitrust action is concerned principally with monopoly and competition and only peripherally with the utilization of innovations. A defendant may have suppressed his technology as a device to secure monopoly power, but there is no law that requires the "working" of either patents or trade secrets in the United States. Even if a defendant has fully utilized his technology, he may still have improperly restrained others from entering the market. The issue of utilization may also fall somewhere in between these two extremes; that is, the speed of utilization may have been retarded by the defendant's

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[1] See, generally, Toulmin, Patents and the Antitrust Laws, and articles cited in the 1973 pocket part to Chapter 8.

monopoly position. In a fully exploited market, merely ordering a defendant to open his patents is not likely to reduce monopoly or increase competition. Consent decrees which include patent dedication are meaningful only if they increase utilization.

In order to determine the effect of antitrust consent decrees on the utilization of technology, the project staff held a series of conferences with the Antitrust Division. Three cases were selected for discussion: the first involved patents and trade secrets; the second was purely regulatory; and the third involved patents and know-how. The settlement of these cases ought to have resulted in the removal of barriers to utilization. However, as will be seen in the following sections, this did not happen.

2. The Fuel Cell Case

A fuel cell is a device for the production of electricity through a chemical reaction of fuels supplied from outside of the cell. Unlike a battery, which is exhausted when chemical energy is converted to electrical energy, a fuel cell will provide electricity as long as fuel is supplied to it. Around 1959, the United Aircraft Corporation acquired exclusive patent rights to an invention known as the "Bacon" fuel cell.

In 1961 both United and TRW, Inc., submitted proposals to NASA under the Apollo program. TRW, like United, proposed to use a fuel cell of the Bacon type. United and TRW were the only two bidders who submitted competitive proposals employing this technical approach. Each company was in constant communication with the other regarding their fuel cell "competition" during negotiation of the government contract. Eventually TRW dropped out of the negotiations. The award was made to United on the basis of its previous experience in the field and the fact that it had invested over $1 million of its own money in research. Twelve years later, in April 1973, the Antitrust Division filed an action against United to compel a public dedication of fuel cell technology.

The basis of the action was an allegation by the Department of Justice that United had effectively suppressed all fuel cell competition through collusion with TRW. The two companies were alleged to have agreed that all research and development work would be turned over to United and all data would become the exclusive property of United. An industry spokesman claimed, however, that the real basis for the action actually arose out of an investigation of the Aircraft Industry Association for alleged antitrust activities. Although that investigation wound up nowhere, the industry contends that the Department of Justice had to make some party account for all the time and energy that had

been invested in the matter. Suffice it to say, a consent judgment was entered 60 days after filing of the suit, ordering United to reveal its fuel cell technology. The Department of Justice regards the judgment as opening to the public a technology which may suggest new energy sources by 1980. The defendant believes that the consent decree was of little benefit to anyone and is not likely to affect the future development of fuel cell technology.

The decree itself enjoined the defendant from entering into confidential agreements concerning fuel cell technology, from using or threatening to use its economic power to prevent others from engaging in fuel cell research, and from acquiring a significant interest in any other company involved in fuel cell technology. In addition, United is required to grant a nonexclusive royalty-free patent to any applicant for any patented technology arising out of the Apollo contracts. Most significantly, United's technical data on fuel cells are to be licensed to any applicant who is willing to pay a one-time royalty fee of $25,000.

The original patent, of course, had only a few years to run at the time the Justice Department brought its action in 1973. It is of no small significance that by then at least 90 percent of the fuel cell technology was regarded by the defendant as involving industrial know-how rather than any high level of innovation. United's assessment was corroborated by one of the leading academic authorities on fuel cells, who revealed to the project staff that the technology had far outstripped the underlying scientific systems. He also stated that the failure of private industry, or the government, to invest in further basic research had resulted in an enormous investment in public and private funds with very little possibility of return. It is certainly true that, at least since the issuance of the consent decree in June 1973, there has been no great rush to secure royalty-free licenses from United, nor has anyone offered to pay the first $25,000 for a peek at the data. At this time there are only three companies known to be involved in any aspect of fuel cell technology: United, Exxon, and Westinghouse. (The latter appears concerned only with high-temperature fuel cells.)

There has never been any kind of promotion or policing of the decree by either the defendant or the Department of Justice. While it is still too early to pass final judgment on whether the opening of the patent and data portfolio has advanced the utilization of technology, thus far even the "one small step" is yet to be taken.

3. The Pathologists Case

The American College of Pathologists is a professional society of doctors of pathology. It determines educational standards and influences the

conduct and ethics of that branch of medicine, including the condition of operation of hospital laboratories, which are a principal market for medical instrumentation. The equipment in such laboratories, ranging from relatively simple centrifuges and autoclaves to extremely sophisticated spectrochemical and photometric devices, is manufactured by an energetic and innovative industry.[1]

One of the rules of the College was that all medical laboratories had to operate under the supervision of a fully accredited pathologist. Since there are many more laboratories than pathologists, it often happened that a doctor other than a pathologist, or even a senior medical technician, really supervised the laboratory. However, the exercise of "responsibility" on the part of the pathologists was an extremely profitable paper operation, and it allegedly restrained other qualified persons from opening new laboratories.

Under pressure of litigation by the Antitrust Division, the College finally dropped its requirement that medical laboratories be directed only by a physician who was a fellow of the College. Although the case did not directly involve the dedication of a patent portfolio, it might be expected that the destruction of a monopoly--and the restoration of a free market in which patents are aggressively pursued by the industrial suppliers--would invite increased use of medical instrumentation. On the contrary, however, the interviews with hospital and industrial personnel suggest that the decision had little or no influence on the medical instrumentation market.

To some extent, the medical instrumentation business has grown in spite of the consent decree rather than because of it. This has come about because analytical laboratories often employ innovation technologists, and thus there has always been a substantial amount of in-house development of instrumentation. If the consent decree had any influence on utilization of technological innovations (as measured by inquiries about new products as opposed to orders for known products) it appears to have been negative. When each pathologist was directing several hospital laboratories, he looked into every new analytical device that could be used to increase the laboratory output without increasing personnel. This interest seems less pronounced under local hospital administration of the labs. Even assuming that the pathologists case increased competition and reduced monopoly, it had little effect on utilization; what effect it did have was probably negative.

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[1] As will be noted in the intellectual property survey sample discussed in Part G, the industry tends to include many small businesses.

The medical instrumentation market is especially attractive to small companies because of the continuation of government funding (which has been drastically reduced in other fields in recent years). Not only have the scientific instrument companies been going into the laboratory business, but also the laboratories have been going into the instrumentation business. The pace of cross-fertilization was not affected by the decision, and the pathologists and their successors both welcomed the exchange.

The medical instrumentation industry enjoys a relative freedom from regulation which is not shared by its pharmacological counterpart in the public health field. Although patents play an unusually vital role in the innovative instrumentation industry, it is fear of government regulation, rather than the law of intellectual property, that is the potential barrier most viewed with alarm by representatives of the industry. In particular, concern was expressed in several interviews that the entry of the Food and Drug Administration into the field might force out small concerns which could not bear the cost of compliance with regulatory standards. Antitrust was only a remote consideration.

Patents are aggressively pursued by the medical instrumentation industry for traditional offensive (licensing) and defensive purposes. Interest in patenting is diminished, however, in those instances in which title passes to the government because the research was sponsored by HEW, or virtually any other U. S. agency. (Under the President's Patent Memorandum of August 23, 1971, all government agencies are obliged to vest principal or exclusive rights to the government on an invention related to public health.) Under such circumstances the inventor simply publishes a report of his innovation and fails to point out the technical threshold of "non-obviousness" which is the standard of invention. For example, the extremely creative head of one large hospital laboratory declared that without a right to title he was inclined to publish rather than to patent. The instrumentation companies would not invest in the unprotected invention, but at least he would receive recognition from the technical journals. However, when pressed to give examples of technology which, because of the government patent policy, were unmarketed, he referred to the general atmosphere rather than to specific cases. Nevertheless, we found sufficiently broad support for this proposition among small manufacturers to justify the conclusion that in marginal cases the law might well make a difference in the instrumentation industry.

4. The Smog Case

The industrial climate of the Automobile Manufacturers Association case is at the opposite pole from that of the pathologists case. The latter is characterized by small, aggressive companies with a high degree of innovation, which actively pursue patents for offensive as well as defensive purposes. The

former is characterized by several industrial giants with an astonishingly low level of innovation, to whom patents are largely trading material within the industry and in antitrust cases.

In the principal case involving the Automobile Manufacturers Association, the Department of Justice brought an action against the Association and its principal members and joined the entire industry as co-conspirators. The four major U.S. automobile manufacturers were named as defendants. The object of the lawsuit was to eliminate the industrial custom of pooling research, at least so far as it pertained to innovations in automotive emissions. The essence of the government's argument was that the major manufacturers had conspired to prevent or retard pollution control through a pooling technique that guaranteed that no manufacturer would proceed more rapidly than the slowest member of the inside group.[1] The defendants answered that they sought to improve the technology by opening the fruits of their research to the industry. The consent judgment filed in this case required each of the defendants to withdraw from the industry cross-licensing pool. At the same time the defendants were ordered to grant nonexclusive royalty-free licenses to any of the patents in the pool and to open to the public over 100 specified technical reports on automotive pollution control.

For a variety of reasons peculiar to its history, capital structure, and manufacturing and marketing methods, the utilization rate of innovation in the automobile industry is extremely low. (The same was found to be true of the steel industry during the course of the trade secret studies, discussed in Part G.) From interviews with industry leaders, it was concluded that patents are integrated into overall market strategies and are not seriously considered either as a source of new technology or as a significant factor in commercialization. Furthermore, it became evident during patent interviews--and was subsequently confirmed in trade secret interviews--that neither patent nor trade secret is a particularly important repository of intellectual property in the automotive industry. Characteristically, for large companies in established industries with a low level of innovation, the principal capital in the technical data bank, so to speak, is neither patent nor trade secret but industrial know-how. We were advised on several occasions that there are no real technical breakthroughs in the automobile industry--only lead time differentials. It appeared to

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[1] A note, Patent Pooling and the Sherman Act, 50 Colum. L. Rev. 1113 (1950), holds that the criteria used by the courts to determine the legality of patent pools are the dominant position of the parties and their intent.

be accepted by the major companies that market position is maintained by making as few significant changes as possible, as inexpensively as possible.

Underlying the action of the Department of Justice was the belief that the key issue was simply the speed of utilization of existing technology rather than further innovation. The industry, however, argued that in 1970, when the Congress set the automotive emission standards for 1975 to 1976, there was no known technology to eliminate 97 percent of the hydrocarbons, 96 percent of carbon monoxide, and 93 percent of nitrogen oxide. If the technology did exist for mass production--and most authorities believe that it did[1]--the industry certainly worked at least as hard for a relaxation of the standards as it did to effect compliance.[2] It is probable that the industry has dragged its heels. However, the key question concerns the effectiveness of the Justice antidote; how accurate is the implicit assumption that an antitrust action against technology pools is to utilization as an antitrust action against monopolistic market practices is to competition?

The game was not played out before the rules were changed. But as far as it went, a definite pattern was becoming evident. Even though the opening of technical data in some portions of the smog case decision and the prohibition of sharing in other portions of the decision had little effect on technology utilization, the antitrust action appears to have substantially affected the lead-time factor. All of the automotive companies were working against the 1975 emission standards of the Clean Air Act. Two of the major companies elected to meet the standards through the catalytic converter, a solution which all agree is technically inelegant and increases operating costs. The third decided to meet the standards through an engine redesign which would result in more efficient combustion. For a time it appeared likely that the first two companies would be able to meet the 1975 standards and the third would not. This created a dilemma of monumental proportions: if the requirements were not relaxed, then one of the big three could be forced out of business for failure to comply with regulatory standards. If the requirements were relaxed for the one company

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[1] In one interview a high company official conceded that emission control is not a matter of technology but rather of what the market is willing to pay.

[2] The public position of the industry is to the contrary. For example, Ford reported to its stockholders that from 1967 to 1972 it spent $360 million on research to reduce emissions and to that end, almost exclusively, employed 3,000 scientists, engineers, technicians, and support personnel. It had also filed 122 patent applications in the field, of which 57 had been allowed at the time of the interview (November 1973).

which was unable to meet the standards in time, then the other two companies would have been at a competitive disadvantage because of the higher costs they had incurred in complying with the law.

Thanks to the current "energy crisis" the 1975-1976 standards of the Clean Air Act have been relaxed by Congress because the catalytic converter increases gasoline consumption. Thus one can only speculate about what might have been. The dilemma has been avoided. The air will become increasingly polluted. And it does not appear that in a regulated environment antitrust actions which are intended to promote competition in research by prohibiting pooling are comparable to similar actions which prevent collusion in the marketing of developed products. Nor do they promote utilization in an oligopolistic market.

5. Government Policy and Patent Licensing

Five and a half years ago, in the Government Patent Policy Study, Harbridge House reported that the commercial utilization of government-sponsored inventions is very low. Of 2,100 inventions examined in that study, only 55 (2.7 percent) played a critical role in the commercial products in which they were used, as compared to estimated utilization rates of 50 percent or more for inventions developed under private research. The federal government addressed this discovery in the President's Memorandum and Statement of Government Patent Policy of August 23, 1971.[1] The principal difference between the 1971 policy and the 1963 policy it succeeded lies in the government's effort to increase the rate of utilization by offering greater license incentives to industry to utilize government-sponsored research. Since the proclamation of the 1971 policy, the government agencies sponsoring research have begun to publish implementing regulations in the Federal Register and elsewhere.[2] For the most part, these regulations are restatements or paraphrases of the President's policy statement. Some executive agencies, notably the General Services Administration, the National Aeronautics and Space Administration, and the National Technical Information Service of the Department of Commerce have instituted active programs. (The programs of the latter two are described in Part H below.)

The policy of waiving government rights to title in patents or granting exclusive licenses to a government contractor has been challenged by critics who contend that such policies are merely a giveaway of government

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[1] See Appendix B.

[2] See Appendix C.

property. The position of the critics was recently sustained in Public Citizen, Inc., v. Sampson.[1] In this case the U.S. District Court for the District of Columbia voided the patent licensing regulations issued by GSA on the grounds that they were an unconstitutional disposition of federal property without congressional authorization and failed to comply with the public notice requirement of the Administrative Procedure Act.

Since the plaintiff in Public Citizen was joined by 11 congressmen, it is evident that the title-versus-license dispute in government contracting, which had been smoldering since the 1968 Government Patent Policy Study, will be rekindled.[2] This is bad news for two segments of the economy which, in the present study, expressed a high sensitivity to patent protection and government policy: (1) the scientific instrumentation industry and (2) the colleges and universities.

During the course of the patent/antitrust phase above, and again below in the trade secret phase, the study singles out "medical instrumentation" as a representative public health technology. Actually, medical instrumentation is a market rather than an industry. Strictly speaking, the industry, which sells its measuring and testing devices to hospitals, industrial and government laboratories, and institutions of higher education, is the scientific instrumentation industry. It includes several large electronic and optical firms and scores of small research-based companies in Massachusetts, California, and elsewhere.

Unlike the larger firms, which currently appear to be concerned with alleged Antitrust Division hostility to field-of-use licensing,[3] the smaller

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[1] ___ F(2) ___ (U. S. D. C., Dist. of Columbia, Jan. 19, 1974).

[2] The principal fear of the title proponents is that discretionary government licensing practices may strengthen monopoly and reduce competition. The principal fear of the license proponents is that government-sponsored research might not be utilized because of inadequate investment incentive in the absence of exclusive rights. The 1968 study was able to uncover only a single instance (in the small synthetic quartz industry) in which government patent policy created a monopoly. It uncovered many more instances in which companies such as oil and pharmaceutical firms (which did not need government rights to strengthen their market positions) simply refused to engage in government contracting.

[3] A patent license may be exclusive as to (1) use, (2) manufacture, and (3) sale. The patent owner may grant a license that is exclusively territorial or exclusive as to certain types of articles manufactured under the license. Licensing contracts, which traditionally include royalty inspection and litigation provisions,

companies are anxious about the high cost of protection under patents of increasingly doubtful validity and also about the failure of the government to either adequately fund research or grant sufficient rights to industry under government contracts to attract risk capital. The observations of the half dozen or so firms interviewed may be critically regarded as anecdotal rather than statistically significant. However, their views are consistent and their concern is sincere, as exemplified by an exchange of correspondence between the American Association of Small Research Companies and the National Science Foundation, in which the former urged the latter to change its patent policy so that profit-making concerns as well as universities might retain title to inventions arising out of government research.[1] Referring to the impossibility of anticipating all possible circumstances, the NSF pleaded for flexibility in dealing with particular cases and reminded the Association that under the Presidential policy--in cases where a principal purpose of the research is to affect public health--the government will normally take title to incident inventions. In the light of the conclusion reached in the pathologists case (Section 3, above), Public Citizen is probably a step backward for utilization in medical instrumentation.

Inventions arising out of university and nonprofit research do not travel the same route to commercial utilization as inventions arising out of industrial research.[2] While there is a great deal of variation in the policies

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may be used to unreasonably restrain trade in violation of antitrust laws. In an address to the American Patent Law Association on October 11, 1973, Karl E. Bakke, General Counsel of the U. S. Department of Commerce, said that ". . . the Department of Commerce will continue to monitor developments concerning the relationship between patent licensing and the antitrust laws. If specific supporting data becomes available establishing that the value of the patent grant is being diminished through court decisions applying general antitrust principles to the specialized area of licensing practices, we most certainly will support corrective legislation."

[1] Copies of correspondence from May 22 to July 9, 1973, are in project files.

[2] "Nonprofit" is a broad classification. The reference here is to institutions like the Woods Hole Oceanographic Institute, which is an East Coast counterpart to the Scripps Institute of Oceanography in La Jolla, California. The only principal structural difference between the two is that Scripps is part of the University of California and Woods Hole is an independent "nonprofit" institution. The term "nonprofit" would not include firms such as Mitre Corporation and Aerospace Corporation, which are also nonprofit but whose operations are closer to industrial application than to academic theory. These two companies are also government laboratory surrogates to specific federal agencies. See Miller, Legal Organization of Research-Based Industry, 41 B. U. Law Rev. 69 (1961).

and practices of educational and nonprofit research institutions, we found more similarities than differences among them when contrasted with industrial commercialization practices. The nonprofit institutions do not make or sell the products and processes embodying their inventions but must license these inventions in order to have them used. Therefore, these institutions have evolved a variety of licensing techniques to transfer technology from nonprofit research programs to the marketplace.

Some colleges and universities have their own licensing programs. These programs call for processing patents through special administrative units that are responsible directly to the administration of the senior policy-making group in the institution. Other colleges and universities administer patents as a part of the routine duties of established offices and faculty committees. An office of research services, which is responsible for administration of sponsored research, provides the necessary administrative support. Here, as in other institutions which lack formal licensing programs, the administrative arm of the school ensures that pertinent institutional regulations are observed, that there is compliance with invention-reporting requirements of government contracts, and that the rights of the parties involved are guarded in the rare case of a decision to patent an invention.

Many educational institutions administer patent programs through independent foundations for various legal, financial, and policy reasons that are only occasionally related to invention utilization. In these instances, the invention is assigned to the foundation either by the institution or by the inventor himself. The reasons for working through such foundations include:

- Insulating patent funds from use by the state government, or even by the university itself, for purposes other than financing scientific research.
- Creating a buffer between the nonprofit institution and industrial licensees in the event of litigation.
- Limiting contractual and tax liabilities.
- Providing a degree of flexibility in relationships between the nonprofits and industry, which is not possible if the nonprofit institution works alone.
- Facilitating a continuing relationship between the inventor and the licensee in order to develop the invention.

In many instances, a patent administration foundation is created to relieve the institutional administrative staff of the complicated and time-consuming technical and commerical problems of patent management.

The principal agent for the transfer of the patentable products of nonprofit research industry, however, is the patent development firm. Two out of every three academic institutions have contracts with patent development firms. Our investigation was therefore confined to these firms (and one large university which prosecutes its own patents) rather than to the colleges themselves.[1] Some patent development firms serve a restricted clientele or a limited technological market. Only three firms offer their services in invention marketing to all educational institutions, foundations, and nonprofit research corporations. The services of patent development firms include:

- Evaluation of disclosures.
- Assistance in preparation of patent applications.
- Promotion of inventions.
- Negotiation of licenses.
- Distribution of royalties.
- Policing the patent.

The patent development firms act both as a clearinghouse for the nonprofits and as a marketplace for industry. Patents are typically assigned to the firms on a royalty-sharing basis. Patent applications are filed on approximately 10 to 15 percent of the disclosures submitted, and, if present circumstances continue, only one quarter of these patents will ever be licensed.

Inventions arising out of nonprofit research have a distinctly different character than the patentable ideas arising from R&D contracts with industry. In nonprofit research, the end product is normally "software," or scientific findings, and patentable ideas take the form of concepts rather than hardware. In industry R&D, on the other hand, the result is usually "hardware"; a product, process, or component--and a working model, at least--will have been developed.

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[1] In the 1968 Government Patent Policy Study, Harbridge House examined the practices of 67 representative institutions.

The task of a nonprofit organization is over and its contract has been fulfilled when the organization submits a research report. Funds are rarely available to reduce the discovery to any practical application, and interest and motivation to seek utilization are often absent. The idea of following an invention through development and production to a marketable product is alien to the academic and nonprofit environment. For this reason, the patent licensing profession refers to academic invention as a "bare-bones patent." Industry must take it from there.

In contrast, under comparable government research contracts, the industry contractor normally seeks to promote follow-on work that will ultimately develop his findings into a product. Should contract research result in an invention with commercial possibilities, in-house funds may be assigned to develop and exploit it.

Nonprofit research inventions usually require a larger investment for commercialization than industry discoveries because nonprofit inventions are frequently at an earlier stage of development. In our investigation, the nonprofit institutions repeatedly emphasized the additional investment industry has made to develop products based on nonprofit discoveries.

Another characteristic of nonprofit inventions is that they stand alone. Their isolation is a major obstacle to utilization, since most inventions are not marketable products in themselves. The industrial product is often protected by a cordon of patents, as illustrated by the list of patents on a packet of Polaroid film. A university invention, on the other hand, is a one-shot patent. Even if the patent specification discloses an ingenious invention, the patent claims which define the scope of the monopoly are likely to be narrowly drawn. Whereas industry will add to its patent arsenal as a product is improved, a university patent, if it is to be licensed at all, must be licensed on the initial effort.

Industry can profitably keep an innovation "on the shelf" until the time is right to market it. Furthermore, cross-licensing agreements between firms extend the economic utility of the industrial patent. Nonprofit inventions, on the other hand, remote from the market to begin with, are perishable if unlicensed, since the nonprofit organizations do not have manufacturing operations. All the above characteristics of inventions developed by nonprofit institutions make them high-risk commercialization ventures.

Another major factor which affects invention utilization by academic institutions is the drive to publish research results. This drive produces a dilemma where utilization of inventions is concerned, since patents are the only protection for the inventions of nonprofit institutions. In the nonprofit environment

there is no economically useful equivalent of "proprietary data" or industrial trade secrets. While industry may benefit from these alternatives to patenting, the secrecy involved is counter to the tradition in university and nonprofit research.

This tradition reflects the relative values which academic institutions place on publishing and patenting the results of their work. Publications are central to scholarly pursuit. Invariably, the results of research, except those limited by the terms of a grant or contract, are fully disclosed through articles in scientific and technical journals. Patents, on the other hand, have traditionally been regarded as irrelevant at best and, at worst, as an indication of unworthy commercial motives. Thus, we found that perhaps the single most difficult task of a university patent administrator was the solicitation of invention disclosures. Even if the inventor was willing to cooperate in the utilization process, it was a familiar story that the university patent office only learned of the invention eight months after publication in a scientific or technical journal.

Under the present law, patent applications must be filed within one year of public disclosure of the invention or the patent will be banned. Thus patentable ideas are frequently lost to an institution's portfolio. The universities, however, have never considered the industrial alternative of delaying publication until a patent is filed, resting on the comfort of one year within which to file an application.[1] On the other hand, if government regulations required disclosure to the government prior to the publication of findings, a serious question of academic freedom might arise.

While nonprofit institutions actively disseminate technology through publication, promoting utilization of a specific invention is another matter. Given the academic preference for publishing of research results rather than patenting them, a major problem exists in mounting an effective patent promotion program. Except for a few universities and technical schools, there is currently little active promotion of patents by academic institutions.

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[1] The one-year grace period of the Patent Code of 1952 would be preserved by the Administration's Patent Modernization and Reform Act of 1973 as well as by S. 1321 and S. 1975, the opposition patent reform bills introduced in 1973. From time to time patent reform bills have proposed bringing the U.S. patent system in line with those of other countries which have eliminated patent interferences by adopting a first-to-file policy. If the grace period were ever eliminated, the universities would then have to choose between publishing or patenting, a choice in which utilization would be the loser.

Notwithstanding the low-key promotion of inventions by academic institutions, the critical question concerning utilization is whether patents, given their speculative utility, would be promoted more effectively through government ownership. Research indicates that the DOD, which is a license agency, leaves commercial utilization to the private sector. On the other hand, NASA, which is a title agency, has adopted an active utilization policy (described in Part H, below). In most cases, a substantial private development is required to commercialize patents, and the nonexclusive licenses offered by such agencies as NASA may not compensate for the development risks involved.

Inventions of public service agencies--such as TVA, HEW, and the Departments of Agriculture and the Interior--may differ from the inventions discussed above in two important respects: (1) their close alignment with commercial needs and (2) their greater development and promotion by the agency for public use. Appraisal of public service agencies and their promotional programs suggests that TVA and Department of Agriculture inventions have a good chance of utilization if these agencies retain title and invest in invention development and promotion. HEW and Department of the Interior inventions, on the other hand, require strong patent incentives for industry because of high product development costs and minimum development and promotion on the part of the agencies.

Allowing academic and nonprofit institutions to keep title, under these circumstances, offers greater flexibility in providing patent protection to interested developers, when protection is necessary to achieve utilization. Title also motivates the inventor to assist in developing the invention for commercial use, because of its potential rewards to him.

PART G
TRADE SECRET AND INDUSTRIAL KNOW-HOW

1. Current Legal Issues

The Restatement of Torts defines a trade secret as "any information of peculiar value to its owner, not protected by patent and not generally known or accessible to everyone."[1] Trade secrets last only as long as substantial secrecy is preserved. Ideas in general circulation are obviously in the public domain. By the same token, any person who independently learns a secret may lawfully use it or disclose it to another. The same is true of "know-how," a concept related to the application of technology in an industrial situation rather than to creativity. Know-how is a body of knowledge which often includes bits and pieces of information known in the public domain, records of other industrial application, cost data, and so forth. The main elements of a plaintiff's action in a trade secret or know-how case are (1) proof of discovery of a specific trade secret by unfair means; (2) a disclosure of the trade secret to the defendant in trust or confidence; and (3) the violation of the confidence to others to the injury of the plaintiff. Figure G-1 compares the scope of protection and legal characteristics of patent and trade secret.

Although a cause of action for the wrongful disclosure of trade secrets has existed since the earliest times,[2] it has only become significant in the United States since the beginning of the twentieth century.[3] But since then, hundreds of cases in the state and federal courts have resulted in entire textbooks on the subject.[4]

The classic trade secret case can be illustrated by presenting the trade secret aspects of the recent celebrated antitrust case of Telex Corporation v. IBM.[5] The key issues were raised by IBM as part of its counterclaim

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[1] ALI Restatement of the Law of Torts, § 757.

[2] See Trade Secrets and the Roman Law, 30 Colum. L. Rev. 837 (1930).

[3] See Tom Arnold and Jack C. Goldstein, "Painton v. Bourns, The Progeny of Lear v. Adkins: A Commentary on Know-How Law and Practice," Trade Secrets Today (Practising Law Institute, 1971).

[4] See Roger M. Milgrim, Trade Secrets (New York, Matthew Bender & Company, Incorporated, 1973).

[5] Telex Corp. v. IBM, No. 72-C-18, No. 72-C-89 (D. N. Ore., filed Sept. 17, 1973).

FIGURE G-1
COMPARISON OF THE SALIENT CHARACTERISTICS AND PROTECTION AFFORDED BY LETTERS PATENT AND TRADE SECRET PRINCIPLES*

	Full Disclosure Required	*Disclosure of Discoverer*	*Level of Invention*	*Cost to Obtain*	*Date Protection Commences*
PATENTS	Yes	Yes	Relatively high	Relatively expensive	Upon grant of letters patent
TRADE SECRETS	No; unprotected disclosure risks loss	No	Indeterminate, but considerably less than for patents	Indeterminate; cost of maintenance of secrecy must be considered	From research and development stage

	Date Protection Ceases	*Duration*	*Loss by Independent Discovery*	*Rights Against Independent Discoverers*
PATENTS	Expiration of patent or declaration of invalidity	If valid, 17 years	None, if patent valid[1]	Full rights
TRADE SECRETS	As of unprotected disclosure or matter becoming generally known	Indeterminate; may be perpetual	Loss if such discovery becomes so widespread as to be "generally known"	None

	Availability of Injunctive Relief	*Availability of Damages*	*Recovery of Attorney's Fees*	*Criminal Law Protection*
PATENTS	Yes[2]	Yes[3]	In exceptional case[4]	Not available[5]
TRADE SECRETS	Yes	Yes	Yes[6]	Available at state and federal level

	Protection Outside the United States	*License or Sale Revenues Eligible for Capital Gains*	*Basis for Jurisdiction*
PATENTS	Only by further registration in foreign jurisdictions within prescribed period	Yes	Registration with U.S. Pat. Office[7]
TRADE SECRETS	Probably, and if so, without formalities	Yes	No comparable basis

 Selected footnotes, which appear on the following page, have been renumbered for clarity.

FIGURE G-1 (Cont'd)

[1]Approximately 80 percent of all patent actions reaching the appellate court level have been held invalid. Moreover, even if a patent is valid, competitors may successfully design around it or employ it secretly, as in the case of process patents.

[2]35 U.S.C. § 283.

[3]35 U.S.C. § 284.

[4]35 U.S.C. § 285.

[5]35 U.S.C. § 281 (civil action is patentee's remedy for infringement).

[6]Where defendant is a flagrant wrongdoer, attorney's fees are in order.

[7]See United States v. Farbenfabriken Bayer, A.G., ____F. Supp. ____ (D.D.C. 1968), Antitrust & Trade Reg. Rep. No. 358, A-9 (question certified to D.C. Cir. whether nonresident patent registrant subject to service of United States antitrust process); United States v. Glaxo Group, Ltd., ____F. Supp. ____ (D.D.C. 1968), Antitrust & Trade Reg. Rep. No. 356, A-8.

to the antitrust action brought by Telex. Telex had a policy of generally following IBM's product leadership and subordinating its own efforts in technological innovation. Telex products were designed as the functional equivalent of previously announced IBM products. A typical finding of fact (F153) was " . . . Telex was not primarily interested in new product design or in an advance of the state of the art through technology developed independently, but rather in a . . . device copied from IBM's design through utilization of IBM information."

What was IBM's posture with regard to technological development and protection of its position? The U.S. district court judge found little or no evidence that IBM adopted specific programs to throttle or impede general systems competition (as distinguished from "plug-compatible-products" competition). IBM's growth and success, the court found (F112), was due in substantial measure to its skill, industry, and foresight. "In the approximately 20 years that the EDP industry has been in existence IBM has introduced more than 600 products. Some of these products include major technological innovations. By virtue of its own research and development, IBM has obtained more than 10,000 patents which are freely licensed." The court also found that it would be competitively unreasonable and inhibiting to technological development to require IBM to describe all product enhancements that are planned or anticipated to be made to a product during its product life.

Telex strategy in availing itself of IBM confidential data appeared to have two phases: first, to hire people who could provide proprietary business or marketing data on IBM--marketing analyses, financial forecasts, product costs, plans for new products, and so forth; and second, to hire engineers from IBM who could provide technical details of proposed IBM products so that they could be copied and marketed in much less time than if Telex waited for public introduction of the new product. Nearly all the people who left IBM to go to Telex had exit interviews during which the proprietary aspects of IBM data were emphasized. Statements were signed acknowledging this fact, and in many cases the IBM employees had also signed a similar agreement when coming to work for IBM.

The court recognized that the line of demarcation between use of trade secret information and legitimate use of skills acquired on the job was often difficult to draw. Nevertheless, it was clear, in the court's view, that Telex intended to benefit not only from skills legitimately acquired, but also from knowledge it knew existed as trade secret.

IBM was awarded damages for loss of rentals and for unjust enrichment caused by misappropriation of trade secrets and for increased security costs occasioned by Telex's activities. Both sides have appealed to the U.S.

Court of Appeals. In addition to determining the complex antitrust elements, which are being appealed by the defendant, IBM, the court will have to rule on the validity of the trade secrets, which is being appealed by the plaintiff, Telex.

Another current classic involving trade secret is the case of Kewanee Oil v. Bicron. To understand the issue and the significance of the data in this intellectual property case, we must go back to the decision of the U.S. Supreme Court in Lear, Inc., v. Adkins.[1] This was a patent case which held that the licensee of a patent may avoid further royalty payments, regardless of the provisions of any contract, once a third party proves that the patent is invalid. Regarding a pending patent, however, the court reserved decision on whether the states have the power to enforce contracts under which someone claiming to have a new discovery can obtain payment for disclosing it during the pendency of a patent application, even if the application is subsequently abandoned or the innovation held to be unpatentable. More often than not, an invention is licensed during the pendency of the patent application. But because patent applications are not published by the Patent Office, the distinction between licensing an invention for which a patent has been applied and licensing a trade secret is difficult for a businessman to perceive.

Subsequent to Lear, a legal crackdown on trade secrets and know-how followed immediately: a New York federal district court simply denied the licensability of any unpatented know-how. However, this decision was reversed by the U.S. Court of Appeals for the Second Circuit in Painton & Co., Ltd., v. Bourns, Inc.[2] But again, on May 10, 1973, the U.S. Court of Appeals for the Sixth Circuit, taking its cue from the concurring opinion of Justice Black in Lear, went the other way in Kewanee Oil v. Bicron, and the trade secret was once again placed in jeopardy. The facts of the case are as follows:

Kewanee, through one of its divisions, manufactured synthetic crystals which have the property of generating a minute particle of light when struck by ionizing radiation. It had taken Kewanee 16 years to perfect its processes, and the company regarded several of the processes--the purification of raw material, the growth of the crystals, and the preparation and encapsulation of the crystals--as trade secrets which gave it a competitive advantage over its competitors. It is customary in the synthetic crystal industry to use both patents and trade secrets. (It has been noted in Part C, above, that certain industries

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[1] 395 U.S. 653, 89 S. Ct. 1902 (1969).

[2] 309 F. Supp. 271 (S.D.N.Y.), rev'd, 442 F(2) 216 (2d in 1971).

normally employ trade secrets when they suspect that patent infringement will be difficult to prove.) All of Kewanee's employees were required to sign employment agreements promising not to disclose confidential information or trade secrets. Subsequently, four of the company's employees resigned and formed the defendant Bicron Corporation, which within nine months was marketing a competing product.

In the trial court the plaintiff claimed that all of its processes were secret. The defendants not only argued that the plaintiff had failed to maintain the proper security required to protect a trade secret, but also that each of the claimed secrets was not, in fact, a trade secret but rather industrial know-how. The District Court came out squarely in the middle: it decided what was secret and what was not and then issued an injunction against the disclosure of the trade secrets but refused to enjoin the defendants from the use of the industrial know-how. In the best of worlds, the distinction between secrets which are confidential and know-how which is presumed to be public is rarely clear-cut. So both sides appealed.

A brief of amicus curiae, filed by the Association for the Advancement of Invention and Innovation, argued on behalf of the plaintiff, Kewanee, that no company embarking on an R&D program can ever be certain whether an invention will ultimately be held patentable or unpatentable. If both trade secrets and know-how are not rigorously protected, the results are likely to be the encouragement of industrial espionage, the reduction of research budgets, and the loss of a billion dollars of royalties per year under know-how license agreements. The Court of Appeals, however, determined that the principal issue was whether the federal patent laws preempt the field for patentable subject matter, thus invalidating state trade secret laws. Acknowledging that other courts had decided to the contrary, [1] it reviewed the history of patent and trade secret laws and decided that state trade secret laws, which, in effect, grant an unlimited monopoly, are in direct conflict with patent laws, which have as their purpose the objective of obtaining public disclosure after a limited period of time. The significance of the case to industry, in jurisdictions in which it is controlling, is that the option to protect patentable subject matter as a trade secret is destroyed. New

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[1] In addition to Painton, which was the most recent case on the subject, other courts which refused to declare a conflict between federal patent law and state trade secret law include the Fourth Circuit in Servo Corporation of America v. General Electric Co., 337 F. 2d 716, the Ninth Circuit in Dekar Industries, Inc., v. Bissett-Berman Corp., 434 F. 2d 1304, and the Fifth Circuit in Water Services, Inc., v. Tesco Chemicals, Inc., 410 F. 2d 163.

products and processes which are capable of being patented must be patented; otherwise, they are denied any protection under the law.

These recent cases reflect the state of turmoil in the law regarding which forms of protection may properly be used to safeguard intellectual property without discouraging competition or unreasonably extending monopoly. What has been the reaction of industry toward patent and trade secret in an atmosphere of legal uncertainty? In the next section industrial attitudes and behavior are examined by the project staff.

2. The Intellectual Property Survey

Through a combination of written questionnaires and personal interviews,[1] the project team surveyed the opinions of 552 companies about a variety of issues involving the protection of innovation through trade secrets. The survey was directed to companies in six industrial states in each of three major technical fields:

- Energy Conservation
- Public Health
- Environmental Protection

The energy field was further subdivided into three major industrial classifications: coal, electricity, and petroleum. Each of the five industrial areas was keyed to an SIC group code, and respondents were selected from Standard & Poor's 1973 Index, Dun & Bradstreet Middle Market Index for 1973, Funk & Scott 1973 Index, the 1973 Thomas Register Directory, and 1973 state manufacturing directories for all states. Sample analysis was based upon an average 10 percent reply. Figure G-2 indicates the distribution of inquiries. The number of responses varied according to the questions posed. (For present purposes, the written and oral responses are combined.)

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[1] The written questionnaires were circulated with the support of the PTC Research Foundation (Franklin Pierce Law Center), formerly the Patent, Trademark & Copyright Institute of George Washington University.

FIGURE G-2
INTELLECTUAL PROPERTY SURVEY
DISTRIBUTION OF INQUIRIES

Technical Field / State	Energy Conservation			Public Health	Environmental Protection	Total
	Coal	Electricity	Petroleum			
California	7	11	34	35	14	101
Illinois	13	27	9	17	13	79
Massachusetts				19	2	21
New York	15	13	40	36	21	125
Pennsylvania	70	27	15	11	18	141
Texas	3	58	15		9	85
Total	108	136	113	118	77	552

The survey was designed to elicit answers to the following questions:

- Has there been any marked change in the number of disclosures of patentable or nonpatentable technology in the last three years?
- If a company has a trade secret policy for its employees, does it maintain an inventory of trade secrets?
- Do trade secrets describe inventions which would otherwise be patentable?
- Do companies employ any mode of protection other than patent or trade secret?
- In the context of a company's business, is one legal form of protecting intellectual property regarded as superior to another?
- Has the company ever been involved in litigation over proprietary rights?
- If other economic and technical factors are equal, does the availability of protection for intellectual property affect the utilization of innovations?
- Is the development of any products or processes believed to have been frustrated by deficiencies in the law of intellectual property?

- Is the development of any products or processes believed to have been frustrated by legal deficiencies other than in the laws of intellectual property?

Figures G-3 and G-4 indicate the size of the companies participating in the survey. As measured by either sales volume or number of employees, it is apparent that most of the survey respondents were large corporations. The respondents in the energy conservation category were principally the energy producers and distributors themselves. Understandably, virtually all of the companies regarded their sales as related to energy "conservation." The 14-company petroleum group included the country's eight largest producers and only one refinery with sales of under half a million dollars. The 14-company electrical energy group included nine producer-distributors and five manufacturers. The 10-company coal group included one subsidiary of an oil company, four steel companies, a copper company, and a chemical company. All in the 12-company environmental protection group were manufacturers. Their products ranged from chemicals to mine safety appliances. The 10-company medical instrumentation (public health) group was the only one that included several smaller companies. The conclusions relating to this group, but not the statistical analyses in this section, were modified by information obtained from interviews with three small instrumentation companies conducted for the patent part of the study.

FIGURE G-3
SIZE OF RESPONDENT MEASURED BY TOTAL ANNUAL SALES VOLUME AND VOLUME OF SALES IN GOODS OR SERVICES INVOLVED IN SURVEY
(Figures represent percentage of respondents within each sales category)

Technical Field / Sales	Energy Conservation						Public Health		Environmental Protection	
	Coal		Electricity		Petroleum					
	T*	S**	T	S	T	S	T	S	T	S
Over $50 million	.67	.67	.71	.64	.71	.79	.50	.40	.67	.33
$5 - $50 million	.11	.11	0	.07	.21	.14	.10	.20	0	.25
$1 - $5 million	.22	.11	.14	.14	0	0	.30	.30	.17	.25
$500,000 - $1 million	0	0	.14	.14	0	0	.10	0	.17	.17
$100,000 - $500,000	0	.11	0	0	.07	.07	0	.10	0	0

*Total annual sales volume.

**Volume of sales in goods or services involved in survey.

FIGURE G-4
SIZE OF RESPONDENT MEASURED BY NUMBER OF EMPLOYEES
(Figures represent percentage of respondents within each employment category)

Technical Field / Employees	Energy Conservation			Public Health	Environmental Protection
	Coal	Electricity	Petroleum		
Over 1,000	.89	.71	.71	.50	.67
500 - 1,000	0	0	.07	0	0
100 - 500	0	0	.14	.20	0
25 - 100	.11	.14	.07	.20	.33
Less than 25	0	.14	0	.10	0

With reference to the total survey, 63 percent of the respondents were in the various energy categories, 20 percent in the environmental protection category, and 17 percent in public health. The participation of the energy group and of seven large companies in the environmental protection group biased the survey heavily in the direction of expressing the attitudes of big business. (Fifty-seven percent of the respondents had annual sales of over $50 million, and 68 percent of them had over 1,000 employees. They are broken down by respondent categories in Figures G-3 and G-4.)

In few periods of recent industrial history has the degree of uncertainty about the various laws of intellectual property been so high. There is a general feeling among the survey respondents that legal uncertainty is a negative influence on innovation. However, in spite of this quandary, as will be seen below, the number of disclosures of innovations in recent years has remained relatively constant. Even so, a majority, albeit not a substantial majority (53 percent to 45 percent), of the sample felt that if other economic and technical factors are equal, the availability of protection for intellectual property affects the utilization of innovations developed by the company. This answer was undoubtedly influenced by the fact that many of the respondents were the patent attorneys for their companies. No professional person wants to feel that his profession has little to do with the outcome of events.[1] Nevertheless, assuming

[1] An extensive study of patent licensing practices in the United States, sponsored by the French government, has recently been concluded by M. Alain Anizon of the Centre d'Etudes Economiques d'Entreprises. After 10 months of interviewing government and private licensing executives in this country, M. Anizon mentioned to the Harbridge House project staff, one of his most surprising findings was the total lack of communication among resident or retired patent attorneys, licensing executives, and marketing personnel in American industry.

the accuracy of the insights, it is evident that either all factors are never equal, or that utilization considerations do not affect the level of innovation. Measuring innovation over the past three years by the number of disclosures of patentable and nonpatentable technology, 64 percent of the total sample felt that there had been no observable trend toward increase or diminution. Of those who felt that there had been change, only 13 percent thought that the number of disclosures had decreased and 18 percent felt that there had been a relative increase.

The replies to the question regarding number of disclosures are broken down by participant categories in Figure G-5:

FIGURE G-5
PERCEPTION OF CHANGE IN DISCLOSURE RATE
(Figures represent percentage of respondents answering under each category)

Industry	More	Same	Less
Coal	.11	.67	.22
Electricity	.21	.64	0
Petroleum	.21	.57	.21
Public Health	.20	.60	.20
Environmental Protection	.08	.67	.16

A large majority of the participants--71 percent--have active patent policies. Of those who do not have such programs, the electrical distributing companies composed more than half of the respondents. On the other hand, 36 percent of the petroleum companies had well over 1,000 active patents. Among the companies with active patent programs, there was general consistency in the replies pertaining to the number of technical disclosures of all kinds and the number of patent applications filed in recent years. Fifty-five percent of the companies with active programs indicated no change in the number of patent applications filed, 25 percent reported an increase, and 20 percent reported a decrease. However, the spread by participant categories, shown in Figure G-6, reveals a significant finding. Although no group has had a positive decline in patent applications, among the petroleum and coal companies that replied to this question the percentage of companies that reported a decrease in patent applications outnumbered those who reported an increase, and the percentage

of companies reporting no change was the same as that reporting a decrease. Only in public health and environmental protection was there substantial stability in patent filings.

FIGURE G-6
CHANGE IN RATE OF FILING PATENT APPLICATIONS
OVER PAST THREE YEARS
(Figures represent percentage of respondents answering under each category)

Industry	No Change	Increased	Decreased
Coal	.33	.22	.33
Electricity	.29	.29	0
Petroleum	.29	.21	.29
Public Health	.60	.20	.20
Environmental Protection	.75	0	.16

It would appear that in some industries the number of disclosures has been increasing at a greater rate than the number of patent applications. Several possible reasons include (1) a change in the quality or type of disclosures; (2) a lack of faith in the patent system, which reduces the rate of filing; (3) a switch from patents to trade secrets if the technology so allows; (4) a decision to suppress new technology, or at least to postpone its development.

Since 78 percent of the entire sample had trade secret policies for their employees, and not a single company reported a decrease in the rate of trade secret accumulation in the past three years, the project staff attempted to put some dimensions on the second of the possible reasons. The evidence suggests that most companies have adopted employee trade secret policies to ensure the loyalty of their employees rather than to encourage trade secrets disclosures. Only 31 percent of the sample bothers to keep an inventory of secrets at all. Of those that do, the only group with a significant showing was the public health category: 50 percent of those respondents not only keep an inventory of trade secrets, but all of them reported that their trade secrets might otherwise be patentable.

Among the other groups responding to this line of questioning, roughly two thirds claimed that the subject matter of their trade secrets might be patentable. Virtually all participants who keep an inventory of trade secrets regard

them to be an effective means of protecting intellectual property. Although only a 42 percent minority reported that they protect intellectual property in any manner other than patent or trade secret--the references were principally to copyright and trademark--most companies were unable to generalize about the superiority of one mode of protection over another. One large electrical engineering company reported a deliberate policy of coordinating patent and trade secret protection. Another said that before Kewanee, it regarded the two modes as overlapping, but now it is uncertain. On the other hand, a large company in the environmental protection category, with an unusually sophisticated patent department, reported that they do not regard patents and trade secrets as overlapping forms of protection.

Forty-nine percent of the sample had been involved in proprietary rights litigation at one time or another. One large oil company, with a portfolio of over 2,000 patents, noted that in the past decade the number of suits involving theft of trade secrets and breach of confidence has been rising relative to classical infringement actions. Another oil company, which depends heavily on trade secrets to protect its blending formulations, has simply become diligent in protecting them from many of its own employees.

It has been observed above that 53 percent of the respondents felt that the availability of protection affects the utilization of innovations, while 45 percent felt it does not make any difference. The distribution of responses was approximately the same in all five participating industrial categories. Although most of the large oil companies related their affinitive response to the importance of royalty income, the others who stressed the importance of protection invariably said that their companies would be reluctant to invest in new technologies in its absence. In this regard, several companies in the environmental protection market were especially emphatic: one felt that the "compulsory licensing" features of the 1970 amendment to the Clean Air Act were counterproductive.[1] Another pointed out that the ease of infringement in water treatment plants makes patents essential to justify investment in research.

The 45 percent that were unable to relate legal protection to utilization included several companies that are universally regarded as innovative. Their view was that innovation is an essential part of market strategy. They seek all the protection they can get, but its absence will not affect innovation if

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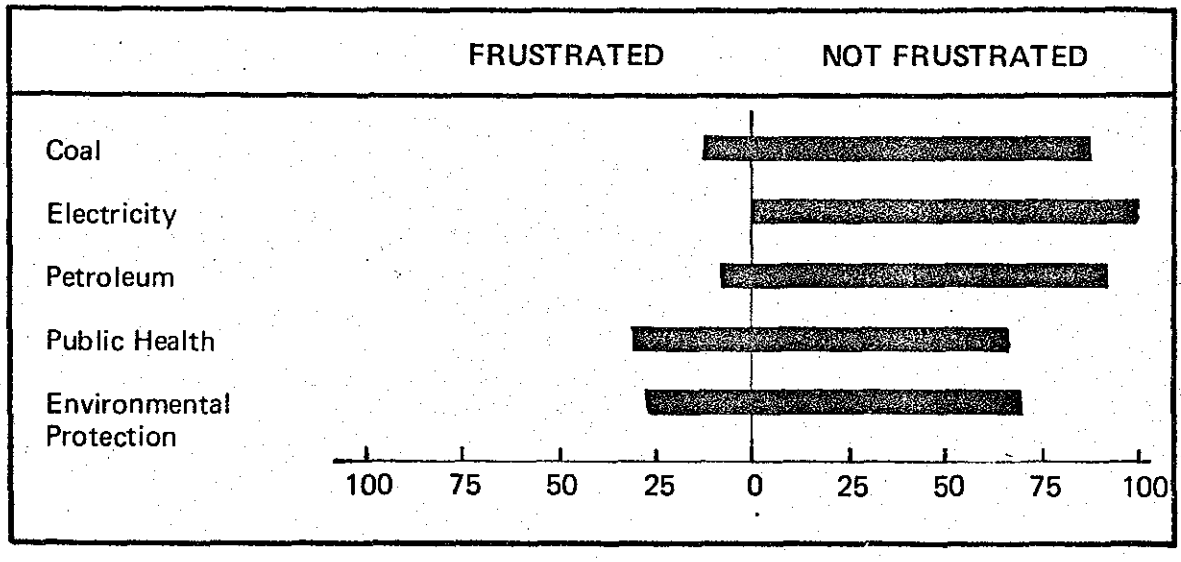
[1] However, it should be noted that Exxon, one of the petroleum group participants in the survey, widely advertises an offer of royalty-free licenses to the "bottom-tension boom" device for containing offshore oil spills.

they can acquire a market lead and if there is a reasonable promise of profits. Many of the companies in both groups expressed concern about the possible effect of Kewanee, if upheld; all of the participants desired patent reform to reduce the proportion of patents invalidated on appeal.

It is not an all-or-nothing proposition with either group. Considering that 85 percent of the total sample could not recall the development of any product or process having been frustrated because of the law of intellectual property, it would seem that on this issue the attitude of the 45 percent minority is more consistent with actual industrial behavior than that of the majority. Figure G-7 is a categorized breakdown of responses on the effect of the law of intellectual property on research and development.

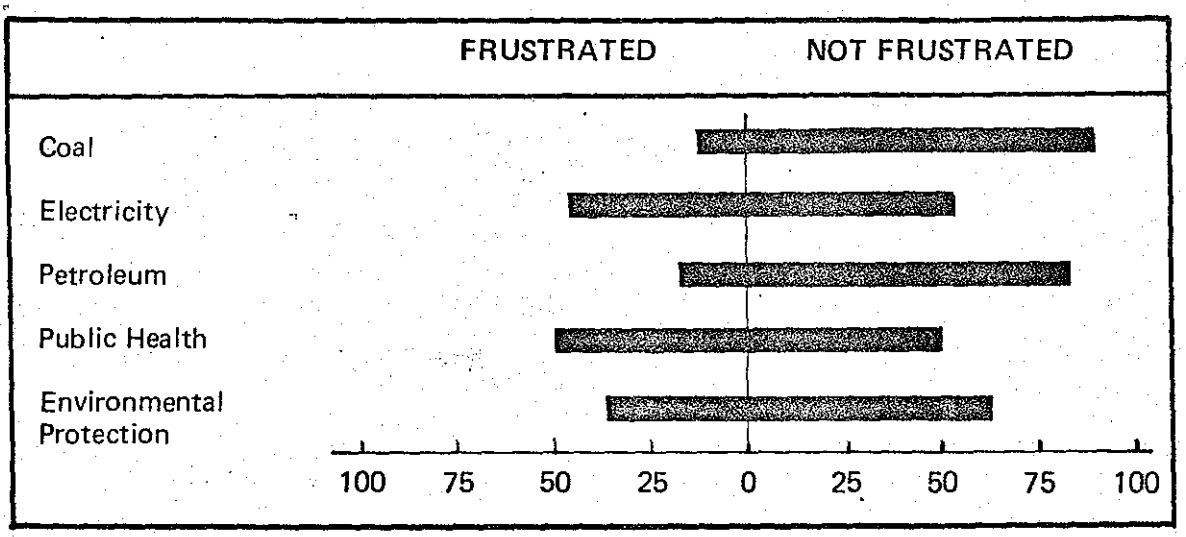
FIGURE G-7
AMOUNT OF R&D BELIEVED TO HAVE BEEN FRUSTRATED BY INTELLECTUAL PROPERTY LAWS



One could conclude from the variance between expressed dissatisfaction with the law of intellectual property and the fact that industrial development proceeds apace, either that the dissatisfaction is overstated, or that this body of law is simply not influential. Evidence that the latter conjecture is closer to the truth arises out of industrial response when the scope of the inquiry is expanded from the law of intellectual property to all law. When asked whether industrial development has, in fact, been frustrated by other laws, the affirmative responses were more than doubled (from 15 percent to 35 percent). Although

67 percent of the sample still felt that legal deficiencies did not frustrate industrial development, one out of every three companies felt otherwise. Moreover, this time the categorical spread was sensitive to industry size. The petroleum group, which contains the largest companies, is less sensitive to the influence of the law on development than the medical instrumentation group, which includes a few smaller concerns. The categorical breakdown is set forth in Figure G-8:

FIGURE G-8
AMOUNT OF R&D BELIEVED TO HAVE BEEN FRUSTRATED BY OTHER LAWS



The other laws most often mentioned by the medical instrumentation companies involved FDA approvals and the title policy of the government in federally sponsored research.

In general, the project staff found a high correlation between the responses of the companies surveyed for this study (both the responses of the 60 companies in the intellectual property survey and the more detailed interview results of the patent section) and the industrial attitudes toward patents published in the earlier Government Patent Policy Study.

3. Government Solicitation of Trade Secrets: The Federal Trade Commission

The trade secret is under attack from all sides: the courts have attacked the validity of the concept in both Lear and Kewanee. Executive agencies which sponsor research and development retain title to data (including trade secrets) unless it is developed entirely at private expense, properly marked, and brought to the attention of the contracting officer.[1] One major regulatory agency, the Federal Trade Commission, even has the statutory authority to subpoena commercial and industrial trade secrets in order to enforce unfair competition laws.[2] Although the statute itself forbids the publication of confidential information subpoenaed by the agency, the courts have ruled that there is no absolute protection for trade secrets; their disclosure may be properly required if the information is relevant to the issues in an adjudicative proceeding.[3] In the absence of a court order, however, FTC employees, as well as other federal employees, are prohibited from revealing confidential proprietary information under the threat of a criminal sanction in the general criminal statutes.[4]

The Commission has a substantial interest in soliciting secrets which have been developed at private expense, and the project staff investigated whether its policies and practices tend to create any blocks to the utilization of technology. The FTC, it was learned, has somewhat of a dilemma. It is legally obliged to create a public record; at the same time, it must preserve the confidentiality of respondents' data. Accordingly, it has felt obligated to formalize its criteria with respect to the disclosure of subpoenaed information. The criteria are:

- To how many people is the putative secret information known? Would disclosure in an FTC proceeding increase that number significantly?
- Does the information have value to its possessor who is requested to disclose it? Would it have value to a competitor? Is the value in either case substantial?

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[1] See Armed Services Procurement Regulation 9-202.

[2] 15 U.S.C. §46(d).

[3] Covey Oil Co. v. Continental Oil Co., 340F.2d 933, 999 (10th Cir. 1965).

[4] 18 U.S.C. § 1905.

- Has the possessor of the information incurred development expenses? Has he realized a return on them?

- What damage, if any, would the possessor suffer from the disclosure sought? What advantages might his competitors derive from such disclosure?

- Would any benefits be derived from disclosure? And if so, to whom? Specifically, is there a public "need" justifying disclosure? Is the need significant? Could it be satisfied without disclosure?

The balancing of equities, implicit in the FTC criteria, is substantially at variance with the trade secret concept accepted by industry and by research-sponsoring federal agencies. This arises partly because the so-called "trade secrets" with which the FTC normally deals are more in the nature of confidential commercial data, with a smattering of industrial know-how, than technological innovations. For example, in the Chock Full o' Nuts Corp., Inc., case,[1] the respondent argued that recipes for coffee, baked goods, and so forth, were trade secrets.[2] In addition to the culinary specifications, the data which the respondent requested the Commission to hold confidential included a substantial amount of franchising information relating to alleged tie-in sales. The issue in the case was whether Chock could compel its licensees to purchase its foodstuffs prepared according to "secret" processes as well as particular branded goods. The Commission ordered the respondent to desist from forcing its franchisees to purchase food products from suppliers other than Chock. It could continue to compel them to purchase coffee and baked goods that it manufactured itself according to its secret recipes. The FTC did not reveal the recipes--this time. One as yet unresolved issue is whether or not a formula replicable by reverse engineering (even at great expense) should be granted trade secret status. The FTC is inclined toward a negative answer because of its obligation to create a public record.

A review of many of the pending cases and discussion with FTC counsel convinced the project staff that the Commission is sensitive to the possibility that its trade secret policies could act as a barrier to innovation

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[1] No. 8884 FTC (October 2, 1973).

[2] It must be conceded that an original recipe bears a marked similarity to a secret chemical process.

regarding commercially profitable consumer products. It should be noted, however, that the Commission has yet to face a difficult decision in an area of high technology. Its current litigation is principally involved with cornflakes, coffee, hamburgers, and the like. However, it is highly probable that in the near future the FTC will wish to investigate practices in a high technology field where the forefront of science may be involved. The Commission's evolving philosophy of the protection of trade secrets does not support the hope that the FTC will then be as concerned with the utilization of technology as it is with insuring competition and preventing monopoly. Even so, there is little in the record of the Antitrust Division cases or the intellectual property survey discussed above to indicate that industrial utilization would be appreciably affected one way or the other. The statement of the FTC's Director of the Bureau of Competition that there is a "complete lack of empirical evidence that antitrust is a bar to technological development"[1] is probably a self-serving prediction.

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[1] Quoted by Hummerstone, "How the Patent System Mousetraps Inventors," Fortune (May 1973), p. 262.

PART H
COPYRIGHT AND DATA

1. Introduction

It is generally assumed that the pace of technological innovation, and hence the utilization of technology, is influenced by the systems, laws, and regulations that govern the accessibility and movement of knowledge from one part of society to another. Copyright law involves a simple system of registration without examination. A singular feature of patent law, on the other hand, is a complex (and expensive) examination system. Accordingly, it is usually supposed that copyright law presents fewer barriers to the utilization of technology--to the extent that it is involved with technology at all. Interestingly, it so happened that for 43 years the patent system was also a registration system.[1] A patent was granted to anyone who applied, submitted the proper drawings, and paid a fee. In 1836, however, examination for novelty, utility, and invention were reinstated, thus sharply delineating patent and copyright.

Our investigation of whether copyright (and data) regulations do, in fact, influence technological utilization was addressed to two questions: Do existing provisions of copyright law or the data and publication regulations of the federal government inhibit technological utilization? Or, conversely, do current practices for making data available from the federal government promote utilization? Our research in this area focused primarily on a survey of the computer software industry and also on the administrative policies of the National Aeronautics and Space Administration and the National Technical Information Service, both of which are actively involved in the dissemination of technical information at the federal level. Section 2 discusses special questions surrounding the status accorded computer programs as a form of intellectual property and current attitudes on modes of protecting software. Section 3 describes the patent and data promotion and licensing policies of NASA and NTIS.

2. Protection of Computer Software

The protection of intellectual property in the computer software industry is a special case. A multimillion-dollar industry, given special impetus, as noted in Part E, by the so-called "unbundling" decision,[2] its technical output is

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[1] From the Patent Act of 1793 to the Patent Act of 1836.

[2] IBM's 1969 announcement that it would price separately from hardware most new computer programs and most systems engineering and educational services.

denied patent protection as a matter of law.[1] Lacking access to patents for all practical purposes (one of the rare patents issued in this field has allegedly been infringed by a government agency), the computer software industry relies on other legal and physical techniques of safeguarding proprietary rights. Yet there has been a question as to the relative effectiveness of the various other techniques. For example, although the U.S. Copyright Office accepts registration for copyright of computer programs,[2] over a period of nine years (through 1972) there have been only 750 such registrations. The current annual rate is 125 to 150 per year (as compared with roughly 168,000 registrations in the entire "books" class, where they are placed).

In its investigation of the protection of computer software, the project staff enlisted the cooperation of the Association of Data Processing Service Organizations (ADAPSO) to poll its membership on the types of legal protection used for software, the relative satisfaction with the available modes of protection, and whether legal barriers are ever instrumental in discouraging or preventing the development or marketing of software. Thirty-one of the 46 companies polled responded to the ADAPSO questionnaire. Members of the project staff attended the annual meeting of the Association and had the opportunity to discuss the subject matter of the questionnaire with individual respondents. Although the legal protection of software is the subject of many articles, treatises, and conferences, to the best of our knowledge this is the first empirical study of the subject.

Like the industry itself, ADAPSO is a relatively young organization. All except one of the 31 firms which responded are under 11 years old. Most of the companies (87 percent) are independently owned. In almost all cases, the president or vice president of the company answered the questionnaire. Figure H-1 presents a profile of respondents by sales volume and number of employees.

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[1] Gottschalk v. Benson, 93 S.Ct. 253 (1972).

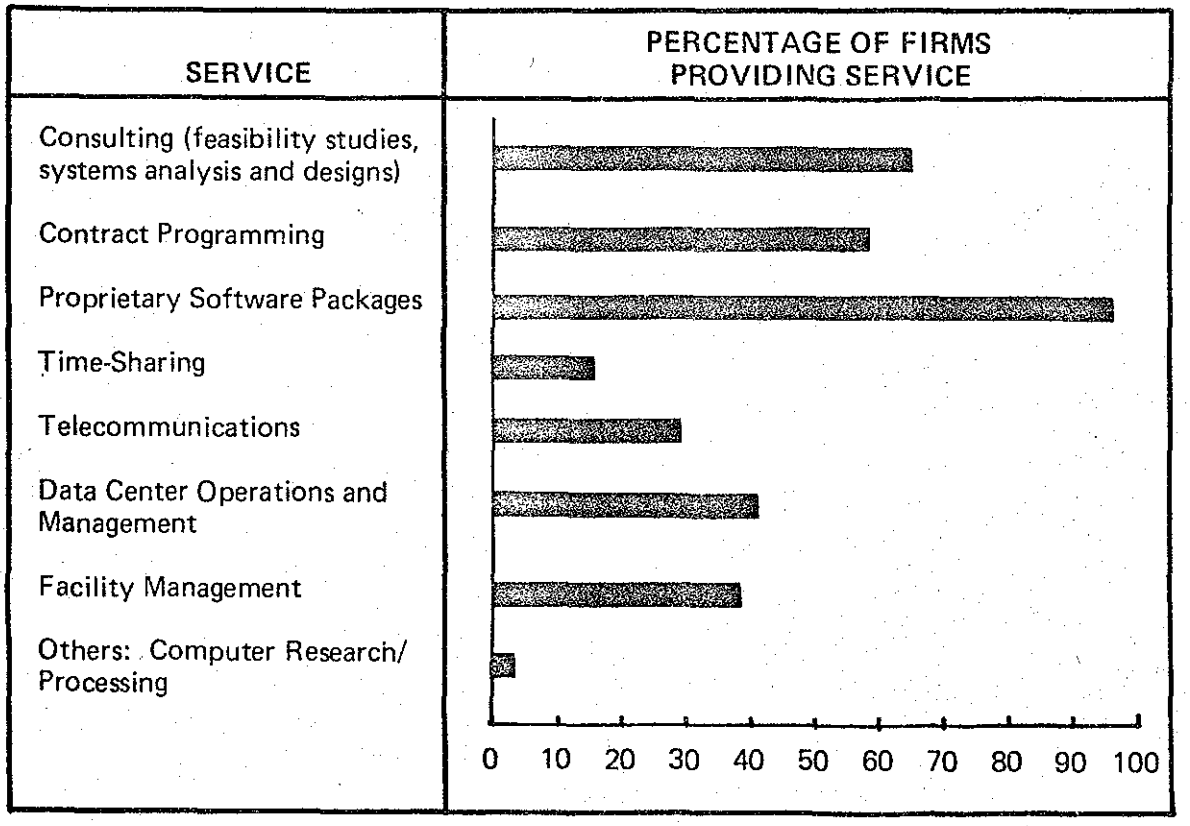
[2] In the opinion of the Copyright Office, there is a question whether a computer program fits the statutory definition for copyrightable material. However, in accordance with its policy of resolving doubtful questions in favor of registration, it accepts computer programs as long as certain formalities are observed.

FIGURE H-1
PROFILE OF ADAPSO RESPONDENTS
(Figures indicate percentage of respondents in each category)

SALES		NUMBER OF EMPLOYEES	
Over $50 million	.03	Above 1,000	.07
$5 to $50 million	.10	500 to 1,000	0
$1 to $ 5 million	.42	100 to 500	.13
$500,000 to $1 million	.16	25 to 100	.45
$100,000 to $500,000	.29	Under 25	.35

The respondents provide a variety of services in the software field, as shown in Figure H-2, with nearly all firms offering proprietary software packages. None of the firms surveyed manufacture hardware or peripheral equipment. More than half of the respondents (58 percent) stated that over 50 percent of their sales volume is related to the development and sale of computer software as an end product, and most of this sales volume is in proprietary software. (Fifty-two percent of the firms attributed more than half their sales volume to proprietary software, while the same percentage stated that less than 10 percent of total volume comes from programs developed at the customer's expense.)

FIGURE H-2
TYPES OF SERVICES PROVIDED



The preferred modes of legal protection for proprietary software are shown in Figure H-3. No method of safeguarding software is regarded as completely effective by all respondents. Thirty-five percent of the respondents regard the lease as very effective, and 26 percent of those who use copyright find it somewhat effective. In cases where respondents designated a particular protection technique as not at all effective, they were asked to explain their answer in terms of their actual business experience. Of the 10 comments received, two companies stated that the cost of litigation and legal advice makes protection of rights impracticable. (These were infringement situations--one patent and one copyright.) Several qualified their "ineffective" ranking to mean they had made a business decision not to go the "protection" route, or that the techniques seem impracticable (except for confidential disclosure clauses). One company felt it needed more protection, although it had had no specific problems. Other comments were that limiting access is ineffective when trying to sell to outside users, that lack of knowledge of copyright principles inhibits the use of this technique, and that any program may be "dumped" from memory with sufficient decoding of the object program to make the inspection of techniques incorporated relatively simple.

FIGURE H-3
PREFERRED MODES OF LEGAL PROTECTION
(Figures indicate percentage of respondents answering in each category)

Mode of Protection	Degree of Effectiveness				Not Used
	Not At All Effective	Somewhat Effective	Very Effective	Completely Effective	
Lease with a Confidential Disclosure	.03	.23	.35	.16	.23
Trade Secret License	.13	.16	.26	.10	.35
Copyright	.09	.26	.16	.07	.42
Physically Limiting Access to Technology	.07	.16	.20	.13	.44
Cryptographic Coding	.13	.10	.07	0	.70
Other: Software Lock	0	0	.03	0	.97
Controlled Support	0	0	.03	0	.97
Patent	.03	0	0	0	.97

The companies' use and perception of the effectiveness of protection techniques appear to be moderately correlatable to several outside variables.[1] Of those tested (annual sales, number of employees, derivation of sales from proprietary or contract software), no single variable has a very marked relationship with the survey responses. However, taken together, the outside variables tested showed a correlation index between .30 and .60. Thus, although the correlations are not that significant individually, they do indicate as a group that the responses to questions about use and perceived effectiveness of techniques are tied in to certain company characteristics: as sales, number of employees, or percentage of sales attributable to programming increases, the use and perceived effectiveness of various protection techniques also increases.

[1] Correlations were made using the "rank-difference" technique.

As shown in Figure H-4, protection is regarded as most significant for general business and financial operations, and for systems software (for example, new techniques for more efficient processing or machine utilization).

FIGURE H-4
SIGNIFICANCE OF SOFTWARE PROTECTION BY FUNCTION
(Figures indicate percentage of respondents answering in each category)

Function	No Significance	Some Significance	Great Significance	NA
General Business and Financial Applications (accounting, inventory control, payroll)	.19	.26	.42	.13
Business Planning Operations (planning models, simulations, operations research)	.29	.13	.29	.29
Complex Production/Distribution Control Operations (linear programming)	.35	.19	.10	.35
Engineering and Scientific Applications	.32	.16	.13	.39
Data and Statistical Analysis	.26	.29	.13	.31
Project Management and Control	.29	.36	.03	.32
Systems Software (compilers, monitors, new techniques for more efficient machine utilization)	.16	0	.62	.22

Opinions about the significance of software protection in different application areas seem, for the most part, to be held randomly throughout the sample. Specifically, the low correlations found when crossing this question with sales level, number of employees, and types of services provided suggest that opinions regarding software protection are not significantly affected by outside variables. Only one variable seemed to correlate even moderately with opinions on software protection. The figures show a slight positive correlation (.50) between sales derivation and software protection opinions for general business and financial applications. Those companies with a higher percentage of sales from contract software placed greater significance on software protection for general business and financial applications. With respect to systems software applications, however, this relation did not hold. There was only a

negligible correlation (.08) between sales attributable to proprietary software and software protection for general business and financial applications.

Eighty-seven percent of all respondents could not think of a single instance in which computer programs representing a significant level of innovation were not developed or marketed because of inadequate protection.[1] The four companies which thought the law had been a barrier cited examples in which fear of easy plagiarism or unauthorized disclosure might prevent recoupment of development costs. The situations cited involved such techniques as paging programs for virtual memory computers, an innovative approach to developing multiprogramming capability on the IBM 360/20, and systems software for organizing computer program libraries. Most interesting, perhaps, was the disclosure at the ADAPSO meeting that the mode of protecting intellectual property (that is, computer software) is as likely to be governed by a desired characterization for tax purposes as it is for safeguarding or transferring technology. This is because intellectual property protected by patent or copyright may be subject to local property taxes, and can be capitalized for federal income tax purposes, while intellectual property (the existence of which is not a matter of record) is not readily made a subject of taxation.

3. Active Data Utilization Policies

The practices of two government agencies are of particular interest with respect to our discussion of the laws of copyright and data. This section describes the policies of the National Aeronautics and Space Administration (NASA) and the National Technical Information Service (NTIS), their relation to legal modes of protection of intellectual property, and to the utilization of technology.

NASA's technology utilization program, which is as old as the agency itself, has new vigor under the impetus of a challenge to justify its continued existence by proving the earthly benefits of its research. NASA requires a full invention disclosure from its contractors even if the concept has never been reduced to practice. Since 1962 the agency has screened 30,000 disclosures, filed patent applications on 2,475 inventions, and published "tech briefs" on most of the other technologies. Moreover, unlike private industry, NASA publishes its patent applications.[2] Prior to the 1971 Memorandum of Government Patent Policy,

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[1] The attention of the reader is invited to the correlation between this finding and the nearly identical finding in the intellectual property survey in Part G above.

[2] All patent applications would be published for opposition under the 1973 Patent Reform Bill.

NASA applied for a patent only if there was a government use for the invention. Now, however, it will file on any disclosure with a potential commercial application.

The recent policy of the agency has been to grant nonexclusive licenses only to applicants who are likely to utilize the invention. The term of the license may be less than that of the patent. If it is found that the invention is not being worked by a nonexclusive licensee, and if the invention is not in a class in which the government must retain title under the Memorandum, then NASA will grant an exclusive license in order to promote utilization. However, the license is revocable if the patent is not worked. The licensee is entitled to sue to enjoin infringement, and the agency reserves the right to join in the action. The government also reserves the right to impose field-of-use limitations to retain public health and safety features in the public domain. The program is, or was, sufficiently sophisticated with respect to utilization that it often insisted on a minimum investment before granting an exclusive license and also offered exclusive licenses to foreign licensees who would work the patent in the United States. Now, however, it is not at all certain how much of NASA's program will remain intact since Public Citizen v. Sampson.[1]

The conversion from a passive to an active utilization policy required the NASA Technology Utilization Office to create or find new institutions to promote technology.[2] It assisted in the creation of, and generally supports by contract, six regional application centers for technical data and patented technology.[3] Basically, the centers are computer terminals manned by full-time employees (called "interface men") who access government technological data banks for industrial clients.

The information on the computer tapes comes principally from NASA, although it is also supplied by the Department of Defense and other trade and educational resources. A customer pays an annual subscription fee to

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[1] Public Citizen v. Sampson, supra note 1 (p. II-9).

[2] Each of NASA's own field centers has a patent attorney and a technology utilization officer.

[3] The regional application centers are located at the University of Connecticut, Indiana University, University of Pittsburgh, University of Southern California, Research Triangle Park in North Carolina, and the University of New Mexico.

the application center, which entitles him to establish a contact point within his company. There is no limit to the number of probes by the contact point. The interface man analyzes the customer's technical inquiry, translates the inquiry into machine-readable language, and delivers copies of technical documents bearing upon the question posed. The customer can continue to receive update information as long as he wants it and is willing to pay for it. The charge is for the service; there is no charge for the data.

In addition to the NASA data banks, the Centers have access to, and expect to tie in to, the growing central technology data banks of the Department of Commerce's National Technical Information Service in Springfield, Virginia. Although the patent rather than the data package has traditionally been the linchpin of the NASA utilization program, it is not clear whether the users are interested in the licenses or in the technical information in the patent specifications. In any event, the fact that 200 industrial customers are already paying at least $1,700 each for data accessed by the New England Regional Application Center alone, and the high attendance and level of interest at the NASA regional patent licensing conferences, augur well for its active utilization program.

* * * * *

The National Technical Information Service (NTIS), an agency of the Department of Commerce, was established as a central source for the public sale of government-sponsored research, development, and engineering reports and other analyses prepared by federal agencies, their contractors, or their grantees. Its mission, in effect, is to remove barriers to utilization both by collecting technical information at a central point and by improving access to it. The NTIS collection exceeds 730,000 titles, and more than 100,000 documents are currently in stock.

Two aspects of NTIS operations are particularly worthy of note. First, there is no law or regulation that requires federal agencies to file reports and documents with NTIS (to the presumed end of making their existence known and contents available). The agency, accordingly, works out a modus operandi with each agency. Some have standing orders that all technical reports will be filed at NTIS; others do not. Second, the agency is required by statute to recover its costs, and only a small portion of its total expenditures are covered by congressional appropriation. The Government Printing Office (GPO), on the other hand, is more heavily subsidized by Congress and can thus offer some kinds of documents to the public at a lower price than NTIS.

One question presented to the NTIS staff was whether they were aware of any complaints that the regulations of government agencies served as a barrier

to innovation by inhibiting the flow of information. For example, were they aware of any alleged abuses of discretionary authority under the Freedom of Information Act? We were unable to identify, in these discussions, any current or recent specific situation where such regulations or policies allegedly erect a barrier in a specific area of technology. From the nature of the question posed, of course, it is clear that the result is by no means conclusive; a very effective barrier could result not only in nondissemination, but nonawareness as well.

NTIS did point out one prevalent practice that might diminish the general level of available information, but it is difficult to assess its final impact on innovation. Many federal agencies prefer to publish through the GPO rather than NTIS. This preference is based on the premise that GPO, because of its lower cost structure, will reach a wider audience. (It may be, too, that GPO is regarded as better known than NTIS.) NTIS argues that GPO should not be the sole distribution agency, for two reasons: (1) GPO will often discontinue an item when sales drop off, so that eventually there are no copies available and (2) NTIS has a superior indexing/accessing system. NTIS also points out that many people mistakenly believe that GPO publishes all government documents that are in the public domain.

On the narrower issue of whether copyright restrictions present a barrier to utilization, NTIS does have problems, but not to the extent that any inhibiting effect on utilization can be documented. The agency operates on the general assumption that work performed under government contracts is in the public domain. Accordingly, when a report is received with a contractor copyright claim, NTIS queries the originating agency as to the validity of the claim and, if valid, attempts to obtain from the copyright owner an authorization to reproduce. The end result is some delay, but there is no evidence that the delay significantly inhibits utilization.[1]

According to NTIS, many government agencies keep no systematic inventory of reports or published works that stem from contract or research grants. Again, the prevailing attitude within these agencies, as reported by NTIS, seems to be that if anything worthwhile results from research, it will eventually--say, within 12 to 18 months after completion--find its way into a

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[1] There is often considerable ambiguity regarding copyright ownership. An interesting example is the paperback book Records, Computers, and the Rights of Citizens, which is published by Massachusetts Institute of Technology with a copyright legend and sells for $2.45. The identical book (from the same reproducible master, but lacking a second foreword by Elliot Richardson and with a different cover) is sold by the GPO for $2.

scholarly journal or other publication. The above observations pertain to the present situation, where NTIS is dealing principally with reports that are (or should be) in the public domain, and where reproductions are available, either in microform or hard copy, upon placement of an order. Taking the long-term view, there is a way in which copyright law can erect a very real barrier to technological innovation. Here we are talking about the "information dissemination" industry itself and the shape it is likely to take in the decades ahead.

As noted earlier in this report, technology has outstripped copyright law. In the view of many observers, we may no longer be talking about modifications to eliminate undesirable side effects in an essentially sound system, but about fundamental changes in the system itself. The question has been given thoughtful consideration by the COSATI Panel on Legal Aspects of Information Systems.[1] The Panel acknowledged two fundamental hypotheses that are engrained in our societal values and on which the copyright law has been built:

- The creator should receive compensation for the use by others of his creative product or as a reward for creation.
- Society as a whole should have the maximum possible access to the creative products of its members.

In the view of the Panel, the intrinsic conflict between these hypotheses gives rise to serious issues that are aggravated by the information revolution. Given the present state of technology, we can visualize a nationwide information network that could make available to educational institutions, large libraries, and businesses newly created knowledge as well as past work--for example, the contents of the Library of Congress. Basically, such a system involves the transmission of information by electronic means and with reasonably prompt access at a multitude of remote locations. If such an information network were put into actual practice, we would require drastically new legal approaches to the definition of use and to the development of equitable compensation mechanisms.

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[1] Report to the Committee on Scientific and Technical Information of the Federal Council on Science and Technology from Its Panel on Legal Aspects of Information Systems, The Honeywell Computer Journal, Vol. 7, No. 1 (1973). Also available from NTIS, Springfield, Virginia, as COSATI 73-01.

APPENDIX A

PROPOSED EXPERIMENTS FOR DETERMINING THE RELATIONSHIP BETWEEN FORMS OF LEGAL PROTECTION AND TECHNOLOGY UTILIZATION

I. THE TRADE SECRET EXPERIMENTS

A. Background

The Phase I background study indicated that there was little substantial difference between the utilization rates of those inventions protected by patent and those innovations (whether or not patentable) protected by trade secret. Moreover, a slight majority of the firms surveyed were unable to state, in the context of their own businesses, whether one legal form of protecting intellectual property was superior to another.

This finding has significance for federal procurement policy, for government agencies have traditionally based their patent and data regulations on (1) the mission of the agency and (2) legal distinctions between patent and "data," rather than on potential commercial utilization of government-sponsored research. The finding is also significant to federal agencies involved in resource management, such as the Departments of Agriculture and Interior, whose proprietary policies affect research and development in scarce commodities.

With reference to the legal bases of distinction, an experiment whose results corroborated the preliminary findings of the background study regarding utilization rates would help to establish a theoretical basis for a long-desired uniform government proprietary rights policy. It could also provide data for dealing with specific industries.

B. Subject Cases

1. The Petroleum Processing Case

It is proposed to test the thesis that utilization rates are unrelated to form of legal protection in the following manner. We would carefully trace parallel development of similar technologies within selected industries which are protected by both patent and trade secret. One test industry might be the petroleum industry, which was one of the few industries in the background studies which employed both patent and trade secret interchangeably and in tandem. Some companies had unusually strong feelings about the superiority of one legal form of protection of intellectual property over another. Of the 14 firms contacted by the project staff,[1] 65 percent felt that one method of protecting

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[1] Texaco, Union Oil, Exxon, Gulf, Shell, Sun, Mobil, AMSCO, Smith, Quaker State, Commonwealth Refining, Earth Resources, Sunland Refining, and Standard Oil (Indiana).

intellectual property was intrinsically superior to the other. Of that number, two thirds favored patents and one third favored trade secrets.

It ought to be possible to identify two similar innovative processes or blending formulations which have been protected respectively by patent and trade secret, and to follow each innovation to discover (1) what dictated the choice of its particular mode of protection and (2) the consequences of the choice to utilization rate, capital investment, and marketing operations.

2. The Cheese Case

Another potential experiment involving the same principle as in the petroleum processing case could be conducted within the dairy industry: the background study happened to turn up the interesting fact that the processes of making certain cheeses have been patented while the processes of making other cheeses have been held as trade secrets. We are aware of two cheeses that are sold to the same market by competing companies which use similar promotion and marketing techniques. One is protected by patent, the other by trade secret. The methodology and issues would be the same as described for the petroleum industry.

3. The Data Processing Case

The subtask of the background studies in trade secret dealing with the legal protection of proprietary software concluded that a majority of the firms in the sample rely on some manner of trade secret or confidential relationship to advance product sales. Sooner or later, however, most computer programs, like other trade secrets, are lost to the public domain.[1]

Spared the cost of development, the capital investment required to enter the market is nominal. Subsequent utilization will depend almost entirely upon the market demand. If demand is low, the firm with the market lead is likely to retain the market as long as quality and price are competitive. If demand is high, then any number of competitors can play.

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[1]Outstanding exceptions--such as the manufacture of the famous glass flowers at Harvard's Peabody Museum (whose secret died with its creator) or the well-kept secret of Angostura Bitters, which has been in the same family for generations--are the exceptions which prove the rule.

Because computer programs are not patentable, it will be impossible to follow the methodology of the previous cases, which compares the utilization rates of patents and trade secrets. Thus the difference, if any, that the law makes in the interval from first public use until public dedication would be ascertained by contrasting transfer of a specific computer program from producers to users in a trade secret situation with the transfer of the same or similar technology within a conglomerate or multidivisional company.

In the former case the restrictions on transfer are protected by law. In the latter there are absolutely no legal restrictions on transfer. Rather, given similar potential for utilization, such barriers as exist in the intra-company transfer would be technical and managerial. Ideally, the program to be tracked should be in systems software (such as compilers, monitors, and new techniques for efficient machine utilization) since 62 percent of the respondents in the background study stated that legal protection has its greatest significance for this application.

In the petroleum and cheese cases the operation of trade secret laws would be tracked against the operation of patent laws; in the data processing case, however, the operation of the trade secret laws would be tracked against a "lawless" background. When considering the law, there is always the question of how safe it is to generalize beyond the facts of particular cases. Nevertheless, taken together the trade secret cases should either corroborate or refute the preliminary finding of the background study.

C. Experimental Initiation

1. The Petroleum Processing Case

Although the Harbridge House staff enjoyed fine cooperation from the attorneys and managers in the petroleum industry during the course of the trade secret study, we have not approached them about a possible experiment because of the industry's current sensitivity to government activity during the energy crisis. It is believed that this matter should be considered by appropriate personnel at NSF and, perhaps, the Federal Energy Office before such an experiment is initiated.

2. The Cheese Case

Harbridge House has had a preliminary discussion with the patent licensor of one of the patents involved in the dairy industry, and they would be most pleased to cooperate in any proposed experiment. In addition, from our

previous experience with the dairy industry during the Government Patent Policy Study of 1968, we would expect cooperation.

3. The Data Processing Case

The trade secret case would be tracked through the membership of the Association of Data Processing Service Organizations (ADAPSO), which cooperated with the project staff in the background study. Intracompany transfer would ideally be traced through IBM, whose general counsel assisted the staff with information on the Telex case. Neither the ADAPSO group nor IBM has been contacted by Harbridge House about this proposed experiment.

II. THE UNIVERSITY PATENT EXPERIMENTS

A. Background

One of the principal tentative findings of the Phase I background study was that in any instance in which there is an effective demand for an innovation, if it is adequately financed and intelligently marketed, its sponsors are invariably able to avoid whatever inconveniences may be created by the law of intellectual property. This observation must, of course, be restricted to instances in which the sponsor is in a position to commercialize the innovation. Clearly, this is not the case with one of the principal sources of technical creativity: institutions such as technical agencies of the government, universities, and certain nonprofit institutions.

Confining this observation to the private sector, it is evident that the exploitation of inventions arising out of university research (94 percent of which is government sponsored) depends solely on patents and publication. As the primary obligations of the academician are teaching and publishing, the use of trade secret as a device to protect intellectual property is obviated. Thus the commercial exploitation of university-sponsored research can take one of two routes:

1. The innovation can be published. Once in the public domain, utilization will depend upon dissemination of professional publications among scientists and engineers employed by commercial firms.

2. If the innovation constitutes a patentable invention, then the university or its assignee may license a commercial firm.

Although the published literature will undoubtedly be copyrighted, it must be remembered that the law of copyright involves reproduction of the publication and not the reduction to practice of its technical content. On the other hand, the patent may well be the only direct conduit to utilization of innovations from the university campus. In that event the critical stages are the patent disclosure, the strength of the patent application itself, the strength of the patent system, and the government patent policy implemented by federal agencies.

Regarding innovations arising out of university research, two experimental cases are proposed: one affecting disclosure, the other affecting government patent policy.

B. Subject Cases

1. The Disclosure Case

The typical research scientist in a university laboratory is not aware of what constitutes a patentable invention. Because his obligation is to increase the general body of knowledge, he is frequently insensitive to the "nonobviousness" of an advance in the state of art. Moreover, even among those academicians who do recognize inventions when they are conceived, there is often a hostility to the patent system springing from a perceived inconsistency between patening and publishing. (Should the Congress ever adopt a "first-to-file" system, however, the academicians' fears would be well founded.)

Harbridge House proposes to prepare and conduct a seminar series for colleges and universities covering (1) the nature of patents, (2) securing and licensing patents, and (3) the ethical relationship between the patent system and academic research on the one hand and taxpayers' return from sponsored research on the other. The objective of the seminars would be to increase the invention disclosure rate at universities with government-sponsored research. The experiment would have to be conducted over a period of several years to gauge its effectiveness. The control for the success of the experiment could consist either of a comparison of the disclosure rate during two periods at the same institution or of the disclosure rates during the same period at a multi-campus institution in which some campuses or departments were exposed to the seminars and some were not. If several institutions were to be involved in the experiment, it could be conducted jointly with the Research Corporation, which manages the patent portfolios of almost 200 colleges and universities.

2. The Patent Policy Case

Several persons interviewed at university laboratories during the course of the background study insisted that the President's Patent Memorandum of August 23, 1971, although a step in the right direction, simply did not go far enough to promote utilization of government-sponsored research in university laboratories. They argued that the continued reservation of title by the government in the field of public health is a drawback to the utilization of innovations in pharmacology and medical instrumentation. They are still unhappy with the implementation of the memorandum by title agencies such as the Atomic Energy Commission (AEC), arguing, for example, that the occasional five-year exclusive license which is now granted by that agency is too infrequently granted and covers too brief a period of time to affect utilization.

We propose an experiment in which two or three cooperating agencies, such as NASA, AEC, and National Institutes of Health (NIH)--all of which sponsor large amounts of university research and are patent conscious--agree on an experimental basis to liberalize their policies within the discretion permitted by the Patent Memorandum of August 23, 1971. The liberalized formulas would be applied to specific inventions at specific institutions over a specified period of time. Selection of the inventions and coordination of policies could be performed by Harbridge House under the supervision of the Patent Subcommittee of the Federal Council for Science and Technology.

The utilization pattern of each invention would be carefully monitored, and the relationship of utilization to the liberalized policy, if any, would be observed by the project staff. This experiment would, in effect, simulate a change in regulations and, in some instances, even a change of statutes under which the exercise of discretion is currently extremely narrow.

C. Experimental Initiation

The disclosure experiment has been discussed with Research Corporation, which, in fact, made a somewhat similar proposal for services to government laboratories some years ago. Research Corporation would be pleased to cooperate with Harbridge House in the design and implementation of such a program at any of the institutions whose portfolios they manage, or at the University of California, which has its own patent management staff. We have also approached the University of California, which is considering the proposition. (They implied that if they were to participate in such an experiment, they might prefer to work with Harbridge House alone; we are familiar with their operations and conducted a patent study for them in 1967.) The University also appeared to be more interested in participation in the patent policy experiment than in the disclosure experiment. The feeling at the University is that increasing the number of disclosures will not be of as much assistance to them as relaxing the policies in the marketing of their present invention inventory.

III. THE GOVERNMENT PATENT POLICY EXPERIMENTS

A. Background

The background study proposal observed that the federal government plays two characteristic roles in the legal dynamics of innovation: (1) the direct role of a participant, purchaser, and supporter of R&D activity in its own laboratories and in university laboratories through grants and contracts and (2) an indirect role through the law, the court system, the executive branch, and independent regulatory agencies. A change of government patent policy most immediately affects innovation where the government is directly involved in the process. Thus the President's Memorandum and Statement of Government Patent Policy of August 23, 1971, breathed new life into the efforts of title and license agencies alike to encourage utilization of government-sponsored research: the AEC, GSA, NASA, and other agencies which hold title to inventions and data arising out of government-sponsored research embarked upon a score of objectives to promote utilization through licensing.

Passive licensing practices, in which an agency merely lists its inventory of potential licenses, are far less productive than active licensing practices, in which the agency vigorously markets an innovation. In the past, active licensing programs, such as NASA's, have in large part been promoted by the government practice of granting exclusive licenses. However, the practice of active licensing has recently been dealt a severe blow by a court holding that exclusive patent licensing by the executive branch is unlawful in the absence of specific statutory authority. Title agencies must either engage in furious marketing activity to promote nonexclusive licenses (for which there is little demand) or give up on utilization of government-sponsored research altogether.

The marketing burden falls principally upon the Department of Commerce's National Technical Information Service (NTIS), which is charged with patent and data promotion for most agencies of the federal government. The major problems of the NTIS are to decide what data and which inventions should be promoted and how to promote them. Given an inventory of almost one thousand patents per year and tens of thousands of items of technical data, the issues

of "what" and "which" are reduced to devising methods for the screening of the inventory to ensure that promotion efforts are applied to innovations which have a high prospect of utilization. The agency's task will be especially difficult in view of the recent "Nader" exclusive licensing decision.

Thus, Harbridge House proposes three experiments whose results could lead to more effective screening methods. The desirability of putting any of the experimental schemes into actual practice would be determined by observing whether they resulted in an increased number of inquiries, or expressions of interest, on the part of potential users.

B. Subject Cases

1. Alternative Selection Experiment

It has been established by Schmookler and others that in the vast majority of cases in which the stimulus to invention has been identified, the stimulus is ". . . a technical problem or opportunity conceived by the inventor largely in economic terms, that is, in terms of costs and revenues."[1] Although this is somewhat reassuring with respect to prospective utilization, the inventor's economic perspective is often called into question by the patent attorney and the patent developer. In the private sector, corporate marketing departments generally determine whether any patented product or improvement of an existing product shall be promoted. As a result, the economic factors have already been assessed. In the public sector, however, the government is usually not in a position to conduct the necessary market studies.[2] Rather, in projecting utilization, it must rely upon preliminary screening by experts who are closer to the invention itself than to the market.

In order to assist government agencies in general (and the NTIS in particular) in screening inventions for promotion, an experiment is proposed in which 500 patented inventions be preselected on a simple patent classification basis by year (that is, patents in electrical, mechanical, and chemical categories filed or issued in a two- to three-year period). These inventions would then be

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[1] Jacob Schmookler, Invention and Economic Growth (Cambridge, Harvard University Press, 1966), p. 66.

[2] The promotional efforts of the Department of Agriculture and, to some extent, the TVA in fertilizer patents, are outstanding exceptions to this observation.

alternately screened by three groups with a presumably broad range of opinion regarding the utilization potential of innovations: (1) a technical group which, hopefully, might even include some of the inventors; (2) members of the patent bar (who could be government patent lawyers); and (3) a patent development firm such as Battelle, University Patents, Inc., or any other suitable firm.

Each group would select the 50 patents it believed had the highest utilization potential. The group would also describe its selection criteria and how it applied these criteria to the patents selected. We would expect members of the three groups to utilize a variety of selection criteria (some of which would undoubtedly overlap) depending on their professional perspective.

Next, the 50 to 150 patents selected by the groups would all be promoted by NTIS in exactly the same way. The utilization potential of each innovation would be gauged according to how many expressions of interest in patent licensing resulted from its promotion. Finally, the level of interest in each innovation would be correlated to its selection criteria. Hopefully, the experiment would indicate what mix of reviewer criteria led to selection of the most marketable innovations.

2. The Licensee Selection Experiment

In this variation on the alternative selection case, the review would actually be performed (on a cost-sharing basis) by potential licensees. The reviewers would be asked to select the patents which they believed had the highest utilization potential in their own industries. The patents would all be promoted in exactly the same manner, as in the first case. Presumably the reviewers themselves would take nonexclusive licenses in those inventions with the highest utilization potential. Again, utilization potential would be correlated not only to the reviewers' selection criteria, but also to the selection process they had followed. Utilization potential would be further assessed through interviews conducted subsequent to patent selection and would be particularly reflective of the influence of the very fact of involvement in the selection process. Indeed, in this experiment, the screening method and the promotional activities are one and the same.

3. The Spurious Data Experiment

The preliminary finding of the background study--that in the absence of exclusivity the industrial world is interested in technological content rather than legal detail--should be tested by the NTIS or some other government agency. In this experiment, we would seek to discover whether the availability of patent licenses is a lure to potential users, or whether the innovation itself attracts

the interest. Thus, we propose that a promotional program be designed (for a 350-patent sample) which stresses the technical specifications of a spurious data package and neglects to mention that nonexclusive royalty-free licenses are available to the public. In other words, the invention would be portrayed as an unlimited-rights data package rather than as a patent. Utilization potential would be measured by expression of interest, as in the experiments above. Sometime subsequent to his expression of interest, a potential user would be informed of the availability of patent licenses, so that no deception to the public is involved.

If the measured utilization potential for the spurious data package is substantially equivalent to the utilization potential for a real data package similarly promoted, a large-scale experiment should follow the pilot experiment. Should the pilot findings be corroborated, the government might wish to examine the cost-benefit relationship of patent licensing versus data publication.

C. Experimental Initiation

The alternative selection case and the licensee selection case have been discussed with the NTIS, which has indicated its enthusiastic support for both experiments. In fact, the NTIS had reached similar conclusions about the desirability of such experiments (plus several others) independent of the Harbridge House study. At the time the Service was approached with a draft proposal, it indicated that it had intended to seek NSF funding and would be willing to collaborate with the Legal Incentives project staff under the ERDIP program.

The spurious data experiment has not been discussed with any government agency. It could be performed in cooperation with NTIS, NASA, or any other title agency with a "tech data" program.