

Government Patent Policy Study

Final Report Volume I

by
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For the
F C S T Committee on
Government Patent Policy

PREFACE

In October 1963, after 18 months of intensive interagency deliberations, the President issued a Memorandum and Statement of Government Patent Policy. The Policy established, for the first time, basic criteria to guide all executive departments and agencies not otherwise governed by statute in allocating rights to inventions made under government grants and contracts. The Policy was viewed as a first attempt to establish a central rationale for allocating patent rights government-wide in accordance with the public interest.

Because of its newness and the great concern of government and industry over the subject, the President provided for continuing evaluation of the Policy to determine the need for revision. In December 1965, the Federal Council established the Committee on Government Patent Policy, to examine the principles established by the Policy and their effect on the public interest. The Committee, comprised of policy level officials from the R&D sponsoring agencies represented on the Federal Council and representatives of the Departments of State and Justice, first identified the basic policy questions underlying the President's Memorandum. It determined that three questions represented the fundamental policy issues:

- (i) What effect does patent policy have on industry participation in government R&D programs?
- (ii) What effect does patent policy have on the commercial utilization of government-sponsored inventions?
- (iii) And what effect does patent policy have on business competition in commercial markets?

In considering a way to examine the questions, it concluded that a study contract would best collect and analyze the necessary data. In September 1966, the Committee commissioned Harbridge House to study the policy questions and to prepare reports which would: (i) help test the effects of alternative patent policies; (ii) lead to affirmation or revision of the President's Policy or assist in formulating useful legislation; and (iii) be useful to executive departments and agencies in administering government-wide policy, whether established by Congress or the Executive Branch.

The accompanying final report and three research reports describe the study findings. Volume I summarizes findings on the three policy questions. Volume II reports on Question One—the effect of patent policy on industry participation in government research and development programs. Volume III reports on one aspect of Question Two—the efforts of eight federal agencies to promote commercial utilization of government-sponsored inventions. And Volume IV reports on Questions Two and Three—the effect of patent policy on utilization of government-sponsored inventions and business competition.

investigated to determine the effect of agency mission on invention utilization.

- (iii) Sixteen educational and nonprofit institutions representing a cross section of all types and sizes of organization were interviewed to determine what role they play in promoting utilization of government-sponsored inventions.
- (iv) All sample inventions involved in infringement suits were investigated to identify what effect they have on business competition.
- (v) An industry study involving the medicinal chemistry program of NIH was performed to determine the effect of patent policy on voluntary industry participation in, and utilization of the results of the government program.

B. Effect of Government Patent Policy on Commercial Utilization

The study sought answers to several key questions concerning commercial utilization of government-sponsored inventions. Among these were:

- (i) Under what circumstances have government inventions been utilized?
- (ii) How important have exclusive patent rights been in promoting their use compared with other factors such as market potential, prior experience and amount of private investment required?
- (iii) Under what conditions has utilization been optimized by government ownership of patents? By contractor ownership of patents?
- (iv) Has substantial private investment been required to develop government-sponsored inventions for commercial use?
- (v) Has such investment been made when everyone has been free to use the invention?

Several factors were found to have an important bearing on the answers to these questions. The intended uses of the sample inventions were found to have a primary effect on their commercial potential. Their intended uses, in turn, were determined by the R&D missions of the sponsoring government agencies. Once the invention was developed, several factors were found to affect their actual use in commercial markets—the extent of market demand for products employing them, the degree of promotion by government agencies which sponsored them, the size of private investment required to apply them, the prior experience and attitude toward innovation of organizations that developed them, and the type of patent rights available to protect the user's investment in bringing the inventions to market.

These factors have had the following net effect on utilization of sample inventions:

Of 2,024 contractor inventions in the two sample years for which information was available, 251 were used commercially.

- Two hundred were utilized by industrial contractors and all but seven were owned by them. Twenty-six of these were utilized by their licensees.
- An additional 51 inventions not utilized by contractors were utilized by their licensees. Ten of these inventions were owned by educational and nonprofit institutions.
- Fifty-five played a critical role in the commercial products in which they were used.
- All but two resulted from DOD contracts.

The study also reviewed 126 government-owned inventions from all sources, in-house and contractor, patented in 1957 and 1962 for which a license was issued to firms other than the inventing contractor. Ten of 126 inventions were reported used by some 50 licensees. Utilization is concentrated in TVA and Agriculture inventions which account for 60 percent of the utilized patents and 90 percent of the commercial users.

Measured in sales, commercial utilization of the inventions studied amounted to \$616 million through calendar year 1966:

- \$406 million were sales by contractors who owned the inventions.
- \$210 million were sales by nonexclusive government licensees.
- All but \$271,000 of contractor sales were from DOD inventions.

Sales of inventions, both with and without exclusive rights, were heavily concentrated in a few patents:

- 88 percent of contractor sales where the invention played a critical role are attributable to five patents in the fields of transistors, vacuum tubes, numerical control devices, computers, and gas turbine engines.
- About half the sales of licensees are attributable to three patents on the manufacture of potato flakes.

Study inventions that were used commercially found quick application in their commercial use. About one-third were applied by the time a patent application was filed, and almost two-thirds were in use when a patent issued.

A factor instrumental in the speed of utilization is prior experience. If rapid utilization is defined as occurring within three years of application for a patent, then firms with experience achieved rapid utilization over 80 percent of the time compared with half that for firms without.

The mix of government and commercial work within a firm also has an important effect. Firms in the middle range of government activity (20 to 80 percent government business) use inventions much more quickly than

Thus, users of civilian agency inventions assume less financial risks in applying them than users of DOD inventions. This has a bearing on the degree of patent protection that may be needed as an incentive to utilization. All other factors being equal, more protection is required where the technical costs and financial risks are greater than where they are not.

3. Patent Rights as Incentives to Commercial Utilization

The study data show that patent rights play widely different roles in the business affairs of organizations in the sample. The sharpest distinction occurs between educational and nonprofit institutions, on the one hand, who can only achieve utilization of their inventions by licensing others, and industrial firms, on the other, who can promote utilization through direct use and licensing.

Educational institutions in the past have been much more concerned with publishing the results of their research than with promoting patents that may arise from it. Today, however, schools with large government research programs are taking greater interest in their patent portfolios and are seeking through a variety of means to promote them through licenses with industry. Nonprofit research firms also view their patents as a potentially useful source of income and actively seek to license others. In both cases, the inventions must frequently arise from basic research and require substantial private development before reaching the stage where they are commercially useful. Some measure of exclusive rights appears necessary to motivate licensees to invest in the work necessary to commercialize these inventions. Where the institution has an active promotional program and the government has none, commercial utilization would appear to be promoted more effectively by permitting the institution to retain exclusive rights. Where this is not so, more individual analysis is needed to determine what allocation of rights would best foster utilization.

Industrial firms in the sample place differing weights on the need for exclusive rights in using government inventions. At one extreme were firms who rely heavily on patent rights to establish their proprietary position in commercial markets and would hesitate to invest in an invention in which they could not obtain exclusive rights. At the other, were firms so completely in the government market that they attach little or no importance to patent rights for commercial purposes. In between were firms for whom patents provide a variety of incentives. The nature and importance of these incentives to firms in the sample are outlined below.

A lack of interest in patents was characteristic of some research-oriented and manufacturing firms that do

a preponderance of their business in the government aerospace and defense markets. No desire to expand into commercial markets and no mechanism for the commercialization of inventions were noted. When these firms obtain patents, their sole purpose is recognition within the company of technical competence.

In a second group of firms patents were secondary to broad technical and management competence in maintaining their position in commercial markets. Firms expressing this attitude toward patents were generally manufacturers of complex systems and technical products, such as aircrafts, jet engines, computers, or communications equipment. Although as much as 75 percent of their sales may be direct to the government, these firms frequently sell similar products to commercial markets. Inventions developed during the course of R&D activities tend to be auxiliary components and subsystems or incremental improvements to the basic product. These inventions are not as important to these companies in sustaining sales or selling new products as is the basic engineering management and production capability of the firm. New ideas and inventions are incorporated in product modifications or in new models with little consideration given to the protection offered by patent rights. Using a new idea to enhance product performance is regarded as more important than assuring that the company owns the exclusive right to use it.

A third group of firms believe that corporate ownership of patents offers flexibility in design, both in the United States and abroad (through ownership of corresponding foreign patent rights), and provides trading material for cross-licenses with competitive firms. Ownership of a patent, however, as a prerequisite for new product development is a relatively minor factor compared with market considerations and investment requirements associated with commercialization of the invention. A change in government patent policy may affect firms in this category by causing them to choose more carefully the areas in which they are willing to undertake government research. Faced with the possibility of being unable to obtain title to patents they develop, these firms may refuse to contract in research areas that would impair their operational flexibility.

A fourth group of firms actively seek ownership of patents, to establish and maintain proprietary positions in new technologies, as well as in established product areas. Invariably, however, estimates of market potential and corporate investment requirements determine which product areas are developed. The makeup of the patent portfolio may indicate the direction for product development in order to strengthen proprietary positions, but development is rarely, if ever, undertaken solely because patent protection is available. A change in government

C. Effect of Government Patent Policy on Business Competition

To evaluate the effects of government patent policy on business competition, the study tried to answer three questions:

- (i) What are the effects on competition of the acquisition of exclusive commercial rights to government-sponsored inventions?
- (ii) Do they increase or decrease concentration in commercial industries?
- (iii) Do they create or eliminate significant areas of market power?

In evaluating the impact of government patent policy on competition, it is important to distinguish the effects of patent policy from other effects which may result from industry participation in government programs. Competitive advantages in commercial markets may well accrue to government contractors through knowledge gained in new technologies, through sharpening of technical skills, and through government funding of R&D work, which has parallel commercial areas of interest. But these are quite separate from the advantages of owning patents to specific inventions. This study has tried to measure only the latter. And, it has tried to measure it in terms of the inventions included in the survey sample. While a broader study of the cumulative effect of government-sponsored inventions patented over several years might have provided more definitive data, we believe that the study data provides a representative and useful picture of the effects of patent policy on competition.

The study indicates that both in number of inventions utilized and in sales volume, the patents sampled appear to have had small impact on commercial markets. Although over 80 percent of both sample inventions and utilization were concentrated in 50 firms, only 55 inventions owned by contractors—2.7 percent of the sample—played a critical role in their commercial use, and five were responsible for \$201 million out of the \$406 million in cumulative sales attributable to contractor inventions. This utilization of critical-role contractor-owned inventions is low compared with the total sales of these firms and the industries in which they participate. Of equal importance is the fact that very few instances were reported where owners of government-sponsored inventions refused to license their patents. Only 15 inventions—less than 1 percent of the sample—involved such refusals, and these 15 refusals involved just five companies.

The study did show that government retention of title, when coupled with full development and active government promotion of inventions having high com-

mercial potential, has promoted competition. A striking example of this is the fertilizer industry where TVA developed high-concentrate fertilizers, patented them, proved their effectiveness on pilot farms and their commercial feasibility in pilot production, and aggressively promoted their use among farmers and fertilizer manufacturers. Industry sales have increased greatly through the manufacture of these fertilizers by many small regional producers. In circumstances like these, government retention of title can be an effective spur to competition because licenses are available to all comers. But several additional factors must be present for patent policy to have this effect. It must be evident to licensees that the invention has good commercial potential. The invention must be producible in commercial quantities and marketable at a cost that is competitive with alternative product. And the risks of recouping development costs must be no greater than similar investment opportunities available to the licensee.

In most cases, government agencies have to go far beyond discovery of an invention to create these conditions. Some agencies do—as described in the Volume III report on government efforts to promote utilization of government-sponsored inventions. The Department of Agriculture, for example, has an active program of developing inventions to the point of commercial feasibility. Potato flakes and frozen orange juice are two of its well-known successes. That agency, in promoting potato flakes, sponsored pilot production of the product and performed a market study in supermarkets in a major city to determine the product's consumer appeal. The study was then made available to the food industry to stimulate interest in the product.

In other cases, allowing industry to retain title to inventions has promoted competition. The clearest example of this is the small firm which penetrates a market of large competitors on the strength of a patent on a government sponsored invention. Just such a case is described in Volume IV, Part V, Section C.

Notwithstanding the utilization programs employed by government agencies, none except AEC has an express statutory mission to increase business competition in commercial markets for its own sake. When it does occur, however, it is an indirect result of their efforts to accomplish their basic mission. From our observations of the study inventions and insofar as the effect of patent policy is involved, competition does not appear to have been adversely affected by this lack of direct concern, for three reasons:

- (i) The rate of utilization of government inventions has been low.
- (ii) The agencies—such as TVA and Agriculture, whose inventions are most likely to be

isolate government work from their commercial operations. In the latter case, there is usually little interchange of technical innovations between the government and commercial activities of the firm and there may be some loss of relevant technical experience and applications to the government work.

Lastly, large diversified firms often follow different patent policies in different divisions of the organization. Accordingly, they may be willing to participate in government programs with small concern for patents in some areas but with great concern for patent rights in others. It is difficult to generalize about these firms except to notice that their policies tend to follow the patterns of the industries in which their divisions participate. Their behavior may, therefore, resemble any of the categories of firms described above if their divisions have similar business profiles.

With respect to educational and nonprofit institutions refusal to participate for patent reasons is not normally a problem. However, instances were found in Department of Interior programs where patent problems were encountered because of conflicting institutional obligations arising from joint support of a research program or where rights in background patents were sought as a condition of the project. With the rising interest in nonprofit institutions in patents as a source of revenue, greater concern over patent rights can be expected from institutions with large research programs as financial pressures on these organizations continue to increase.

Viewing the participation problem from the standpoint of individual government agencies, the effect of patent policy varies with the nature of their R&D programs and the contractors that participate in them. Participation problems are not a concern to TVA which performs virtually all its research and development itself and, therefore, has little or no contractual interface with industry. They are also minimal in Agriculture programs since that agency contracts almost all its extramural research and development with educational and nonprofit institutions. In addition, the firms that do participate in its programs do relatively little research and development on their own and tend to be less patent conscious than those participating in defense/aerospace work.

The direct effect of policy on NSF and HEW programs also appears to be small because most of their contract research is either basic in nature, offering limited opportunities to develop patentable inventions, or is performed by nonprofit institutions who, for the most part, are interested in the research for itself. However, some problems may be encountered in instances of joint or overlapping research at nonprofit institutions where the rights of other parties may be

involved. And, a significant indirect effect has been noted in an important HEW health program where voluntary noncontractual participation by a patent sensitive industry was curtailed because of patent considerations.

The Department of Interior, like HEW and NSF, has a number of programs—such as water desalination—which are oriented toward developing basic technologies. The Agency contracts in these areas with research-oriented industrial firms (many of whom are patent conscious), as well as educational and nonprofit institutions, and acquires title to patents arising under its programs. Under some programs, statutes on which they are based have been interpreted to require the agency to acquire rights in existing patents owned by contractors because of their relevance to the contract effort and future utilization of contract results. These factors—patent conscious organizations and acquisition of rights to contract inventions and existing patents—have resulted in several instances of hesitation or refusal to participate in the government program. Insufficient data was available to establish how widespread the reaction was or its overall effect on Interior programs.

The largest number of opportunities for participation problems occur, of course, in DOD, NASA, and AEC programs because of the size and scope of their contract effort. Only a limited amount of data was available on this question for these agencies but a few general observations may be made. At least as to the majority of DOD inventions, to which contractors are normally permitted to retain title, no problem arises. In addition, NASA's policy of waiving title to inventions to promote utilization under appropriate circumstances provides a method for resolving competing government and industry objectives with regard to patents arising under contract. Lastly, interviews with industrial firms in the survey sample indicate that—except where a large investment in private research, know-how, inventions and/or patents considered to be valuable in commercial markets exist—acquisition or improvement of technical skills is sufficiently important to them in most cases to justify participating in government programs in their areas of interest even though patent provisions are not completely suitable to them.

However, this does not mean that either a title or license policy will equally serve the government's interests under all the above circumstances, since the policy selected may also affect industrial decisions to use contract inventions commercially. Here again, a balancing of government objectives appears necessary to ensure that the net effect of the patent policy promotes the government's overall goals.

continue to have responsibility for United States support to the refugees as they return to East Pakistan, will work closely with Mr. Williams' Interdepartmental Working Group.

The members of the new Advisory Relief Panel are as follows:

JAMES PERKINS, former president, Cornell University
 GEORGE ELSEY, president, American Red Cross
 JOSEPH E. JOHNSON, former president, Carnegie Endowment for International Peace
 GLENN HAYDON, St. Joseph's Mercy Hospital in Cedar Rapids, Iowa (expert on disaster relief with experience in Nigeria, Peru, and East Pakistan)
 MAXWELL, RABB, attorney, former member, Executive Committee, U.S. Committee for UNESCO, and former president, U.S. Committee for Refugees
 MRS. JEANNE R. FERST, civic leader active in organizations at both local level in Atlanta, Ga., and national level; Public Member of U.S. Delegation to Eighth Governing Council of U.N. Development Program

The members of the Panel will meet with Messrs. Williams and Kellogg after Mr. Williams returns from Pakistan.

NOTE: The announcement was released at San Clemente, Calif.

Government Patent Policy

The President's Memorandum for Heads of Executive Departments and Agencies. August 23, 1971

On October 10, 1963, President Kennedy forwarded to the Heads of Executive Departments and Agencies a Memorandum and Statement of Government Patent Policy for their guidance in determining the disposition of rights to inventions made under Government-sponsored grants and contracts. On the basis of the knowledge and experience then available, this Statement first established Government-wide objectives and criteria, within existing legislative constraints, for the allocation of rights to inventions between the Government and its contractors.

It was recognized that actual experience under the Policy could indicate the need for revision or modification. Accordingly, a Patent Advisory Panel was established under the Federal Council for Science and Technology for the purpose of assisting the agencies in implementing the Policy, acquiring data on the agencies' operations under the Policy, and making recommendations regarding the utilization of Government-owned patents. In December 1965, the Federal Council established the Committee on Government Patent Policy to assess how this Policy was working in practice, and to acquire and analyze additional information that could contribute to the reaffirmation or modification of the Policy.

The efforts of both the Committee and the Panel have provided increased knowledge of the effects of Government patent policy on the public interest. More specifically, the studies and experience over the past seven years have indicated that:

(a) A single presumption of ownership of patent rights to Government-sponsored inventions either in the Government or in its contractors is not a satisfactory basis for Government patent policy, and that a flexible, Government-wide policy best serves the public interest;

(b) The commercial utilization of Government-sponsored inventions, the participation of industry in Government research and development programs, and commercial competition can be influenced by the following factors: the mission of the contracting agency; the purpose and nature of the contract; the commercial applicability and market potential of the invention; the extent to which the invention is developed by the contracting agency; the promotional activities of the contracting agency; the commercial orientation of the contractor and the extent of his privately financed research in the related technology; and the size, nature and research orientation of the pertinent industry;

(c) In general, the above factors are reflected in the basic principles of the 1963 Presidential Policy Statement.

Based on the results of the studies and experience gained under the 1963 Policy Statement certain improvements in the Policy have been recommended which would provide (1) agency heads with additional authority to permit contractors to obtain greater rights to inventions where necessary to achieve utilization or where equitable circumstances would justify such allocation of rights, (2) additional guidance to the agencies in promoting the utilization of Government-sponsored inventions, (3) clarification of the rights of States and municipal governments in inventions in which the Federal Government acquires a license, and (4) a more definitive data base for evaluating the administration and effectiveness of the Policy and the feasibility and desirability of further refinement or modification of the Policy.

I have approved the above recommendations and have attached a revised Statement of Government Patent Policy for your guidance. As with the 1963 Policy Statement, the Federal Council shall make a continuing effort to record, monitor and evaluate the effects of this Policy Statement. A Committee on Government Patent Policy, operating under the aegis of the Federal Council for Science and Technology, shall assist the Federal Council in these matters.

This memorandum and statement of policy shall be published in the Federal Register.

RICHARD NIXON

NOTE: The text of the memorandum was released at San Clemente, Calif. The statement of policy mentioned in the memorandum is printed in the Federal Register of August 26, 1971 (36 F.R. 16389).