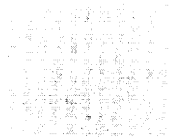

Chapter 5

Public and Private Information Sectors: Elements of Current Domestic Policy Issues



Public and Private Information Sectors: Elements of Current Domestic Policy Issues

INTRODUCTION

The Federal Government has had a longstanding role in the creation and distribution of information goods and services. At the same time, the private sector has participated extensively in Government information matters. For example, all through American history, the Government has had a significant role in publishing, yet the main publishing activities in this country have been private. The role of the Government has been neither to overwhelm or to restrict, but rather to encourage private information activities. Interactions between the private and public sectors are and have been dynamic but often discordant, requiring continuous renegotiation. In recent years, the growing reliance of society on information and the increase in the number and type of information products, services, and resources have heightened the tension between the two sectors.

There are fundamental philosophical differences underlying the discord. One philosophy is that the Government's role should be restricted in information activities and that information is best managed and distributed in the marketplace by having many non-Government information sources. The other philosophy recognizes the economic value of information, but in addition is concerned with its social value and impact (125). As a result of the philosophical differences, agreement as to the proper role of Government has proven elusive.

After 2 years of deliberations, a task force of the National Commission on Libraries and Infor-

mation Sciences (NCLIS) completed a thoughtful study setting forth *general* principles concerning the role of the public and private sectors in Government information activities. The NCLIS task force is "in favor of open access to information generated by the Federal Government; in favor of reliance on the libraries and private sector organizations (both for-profit and not-for-profit) to make readily available information that can be distributed by the Federal Government; in favor of a leadership role for Government rather than a management role; and in favor of limiting direct Government intervention in the marketplace" (96). (See app. F for a complete listing of principles and recommendations of the NCLIS Public Sector/Private Sector Task Force.)

This chapter presents primary considerations for examining future as well as present national information issues and the specific issues concerning the National Library of *Medicine's* (NLM or the Library) creation and provision of computerized bibliographic information. The considerations are the Government's role in the allocation of resources to information development and distribution, and the effect on the private information sector of the Government's involvement in allocative activities. The influence of the Government's pricing policies is of particular importance. Because a historical perspective is needed to understand Government information activities, the chapter includes a brief section on the history of public and private sector involvement in health information policy.

DEFINITIONS

Except where explicitly stated otherwise, OTA uses the definitions of the NCLIS Public Sector/Private Sector Task Force (96):

Public Sector—This term . . . includes Government and, more specifically, Federal Government. Agencies, like public libraries or public universities that are entirely tax-supported, even though non-Governmental in character, are included.

Private Sector—This term . . . includes private enterprises, for-profit and not-for-profit, as well as organizations such as professional societies and trade associations, hybrids that are joint Government/private enterprises, and organizations such as privately supported libraries and universities (even though they may be subsidized by public funds).

HISTORICAL PERSPECTIVE

Health information has a somewhat different policy history than that of other science and technology information. Studies and activities in the late 1950's and early 1960's that dealt with improving scientific and technical information either implicitly or explicitly treated health information in a different manner from other information both in their general considerations and when addressing public/private sector issues. After the mid-1960's, most information policy studies and activities, including those dealing with public/private sector issues, were not discipline oriented, and, thus, did not consider science information by itself.

In addition to being allied to information policy, health information policy has been and is now strongly tied to health policy, particularly that of biomedical research and medical education. In the past decade, health information policy has come to be increasingly associated with policy toward health services delivery, behavioral research, and Federal payment for biomedical, behavioral, and health services research.

Many Federal actions and publicly sponsored studies of health information communication or health issues testify to the perception that health information is singular, and requires public support to assure its production and dissemination in the interest of the Nation's health. A comprehensive review of the roles of the public and private sectors in health information policy is beyond the scope of this report: the following selected studies and legislative and executive actions exemplify the public position.

Perhaps the strongest indications of the attitude of both the executive and congressional branches of the Government toward health information are the passage of the National Library of Medicine Act in 1956 (Public Law 84-941), which established NLM, and the continued appropriation of funds for the Library's operations. (See app. A for a discussion of the legislation.) The National Library of Medicine Act was passed without opposition. Witnesses from the Government and the medical profession unanimously supported it as a most important contribution to biomedical research and the national welfare. The White House was convinced that the Library would serve as the best resource for the production and dissemination of biomedical information (13). NLM was placed under the auspices of the Public Health Service both to foster contact with programs in biomedical research and to assist the Library with providing access to information about scientific advances to the health community.

NLM began to assume its official role as a national resource at the start of a period of governmental examination of the importance of research and development (R&D) in the sciences. The 1958 Baker report (122) was the first of a series of studies of information handling that arose from concern with American science and technology after the launching of the Soviet satellite Sputnik I in 1957. It implicitly separated health from other scientific information in its recommendations. One result of the report was the establishment of the Office of Science Information Service in the National Science Foundation. The office was

given congressional and Presidential authority to assume leadership in coordinating scientific (excluding medical) information activities within the Government and between the public and private sectors. For the most part, private information services at the time of the report were in the not-for-profit sector of the industry.

During this period, the Subcommittee on Reorganization and International Organization of the Senate Committee on Government Operations was deeply involved in studying the management of scientific and technical information, and from 1960 to 1962, the subcommittee released a number of documents on various aspects of the issue. As the major supporter of scientific and technical R&D, the Government was perceived as having the major responsibility for information. The little attention the subcommittee paid to the private sector consisted of urging scientific and technical professional and trade societies to "meet their own challenges head-on and not wait upon Government to do so" (147).

Although the subcommittee was very concerned with the transmission of all categories of scientific and technical information, it had a stronger interest in biomedical information. The stimulation of the not-for-profit organizations in the private sector was a small part of the subcommittee's interest, but interaction between the public and private sector was looked on favorably. Although the greatest emphasis was put on the Government's responsibility for biomedical communications, Senator Humphrey was interested in public/private cooperation and pointed to the publication of the annual *Cumulative Index* (which at that time was published by the American Medical Association based on NLM's monthly *Index Medicus*) as a fine example of collaboration between the two sectors (147).

In 1962, the Surgeon General's Conference on Health Communications emphasized the Public Health Service's responsibility in improving the communication of biomedical research (138). A major recommendation was that the Public Health Service should "give technical libraries support for their present activities and make funds available so they can use, experiment, and broaden their role in meeting the needs of users, including

scientists, health practitioners, health educators, and science writers."

In 1962-63, at the request of the National Institutes of Health, the National Academy of Sciences/National Research Council conducted a study of biomedical research communications problems (111). The report recommended that the biomedical community continue managing its own communications. Although it conjectured that the growth in biomedical research would require public funding of some information modalities, it stressed the need for scientific control of the communications process. The report differentiated the conduct and location of biomedical research from other scientific and technical research, and suggested that the type of communication used for other types of scientific research might not be appropriate for biomedical research. It singled out NLM as "the central resource for the network of biomedical libraries and information services and as the major indexing service in the biomedical field . . . and the hub of the entire document retrieval component of the biomedical communication complex" and urged its continued support by the biomedical community in its future development. It also urged support in the form of direct grants in aid in the short term to upgrade local biomedical academic libraries.

A similar and even stronger position was taken by the President's Commission on Heart Disease, Cancer, and Stroke in its report of 1964 and its source papers of 1965 (121). The report dealt at length on the needs for improved health communications, and advised that this should be accomplished through existing libraries throughout the country. The report noted that as a result of the explosion in biomedical research "the continued and accelerated generation of scientific knowledge will become increasingly an exercise in futility" without an improvement in the library school base, as medical libraries were essential for advancing health knowledge, health education, and health practice. It emphasized the vital need for Government leadership in providing assistance to medical libraries to assist researchers and practitioners in fulfilling their information needs, and recommended strengthening NLM and bolstering the Nation's medical school libraries. It suggested

establishing a library network based on existing libraries with centralized responsibility in the NLM, building on its acknowledged capabilities, including that of MEDLARS. This report provided a primary impetus for the passage of the Medical Library Assistance Act of 1965 (Public Law 89-241), which incorporated many of its recommendations. (See app. A for a discussion of the legislation.)

Further expressions of congressional and executive interest in public support of health information and NLM are found in the transfer of the Public Health Audiovisual Facility to NLM in 1967. The same year, the Toxicology Information program was assigned to NLM, and the next year, the Lister Hill National Center for Biomedical Communications was set up as part of NLM.

The uniqueness of the Government's involvement in health information was later underscored in a report on scientific and technical communication sponsored by the National Academy of Sciences and the National Academy of Engineering (95). One of the 1969 report's recommendations was that steps should be taken to upgrade and stimulate the initiation of privately operated information services, which would then serve as component elements in information programs with Government services. The report explicitly excluded NLM from this recommendation, thereby acknowledging the need for Government-funded health information services.

More recent studies of information policy deal with broad issues that overlap disciplines, such as privacy, Government management of data processing, and the need for a national informa-

tion policy (see app. B). Thus, few studies base their considerations on health as distinct from other disciplines. Health policy studies that consider information issues and health information studies focus on such issues as quality filters for biomedical information, means of informing the public of biomedical advances, and means of increasing the efficiency of the Government's management of health information; they do not consider the Government's role in providing health information to any degree.

Government activities in health information have been concentrated mainly in the areas of establishing health-related clearinghouses and other types of information organizations, attempting to establish a coordinated Health Information System based on primary data, appropriating funds under the National Library of Medicine Act, and reauthorizing and appropriating funds for the Medical Library Assistance Act. At many of the hearings regarding these two acts, there was considerable questioning with respect to the Library's cost recovery practices for its information goods and services, but little attention was paid to the appropriate role of the Library in providing information goods and services.

Thus, public policy regarding the degree of Government involvement in health information activities in general, and in NLM in particular, has persisted essentially as enunciated 25 years ago. In the past few years, however, there have been definite indications that this policy is being reconsidered. The section of this chapter entitled "NLM's Pricing Policies" addresses the proposed policy changes.

THE APPROPRIATE ROLE OF GOVERNMENT IN INFORMATION ACTIVITIES: MAJOR UNDERLYING CONSIDERATIONS

Introduction

In this Nation, there is a clear preference that the private sector produce and offer goods and provide services. This is underscored in OMB Circular A-76 (1979) (49), which sets policies for the acquisition of industrial products and services needed by the Government. The circular states

that the "Government should not compete with its citizens" and that it is "the *general* policy of the Government to rely on competitive private enterprise to supply the products and services it needs" (emphasis added).

The complexity of the issue is illustrated by the policy precepts which form the foundation of the

general policy. As stated in OMB Circular A-76, the three “equally valid policy precepts” are: 1) to rely on the private sector, because “the Government’s business is not to be in business;” 2) to retain certain Government functions in-house, because certain functions are “so intimately related to the public interest as to mandate performance by Federal employees;” and 3) to aim for economy and employ rigorous cost comparisons when deciding how work should be done.

Thus, drawing the line between those Government activities which supplement or promote private efforts and those which abridge private enterprise is difficult. Economic considerations are of some help in identifying appropriate Government activities. This section discusses the Government’s role in the allocation of resources to information development and distribution, and the attendant consideration of the effects of the Government’s involvement in information activities on the private information sector, particularly the effects of the pricing of Government products and services.

Allocation of Resources

Economic Theory

In general, the market mechanism for the allocation of resources has proven to be effective, and in the United States, most goods are produced and bought and sold in the marketplace. There are several reasons why Government itself assumes the functions of allocating resources and distributing certain goods and services. One reason lies in the nature of the goods and services: some goods and services are available to everyone if they are available at all. No one can be excluded from the service. Services such as national defense have the property of nonexclusivity. Such services can be provided more efficiently by nonmarketing techniques. Other examples are public health measures to reduce contagious diseases, such as eradication of the anopheles mosquito that carries malaria. Goods and services with this property of nonexclusivity are termed “pure public goods” by economists.

Another possible justification for governmental allocation is the presence of positive externalities—i. e., the total social benefit from a good or

service may be greater than the sum of the benefits to separate individuals. For example, the social benefit from the research that resulted in the development of the polio vaccine was far greater than the sum of the benefits to the individual researchers and firms that participated in the experimentation or to the people who received the vaccine. The research yielded benefits external to those separate individuals. The society as a whole gained added benefit from the reduction of a major health problem. In such cases, Government funding of the research may be considered appropriate in order that society reap more of the potential benefits.

Although there are other economic reasons that justify the Government’s provision and distribution of goods and services, the two just discussed are the most pertinent to the issues of this OTA study. The allocation of resources by the Government is based on both social and economic values. Regardless of the justification for its involvement, the Government “may provide a good or service directly or it may purchase the good or service from the private or public sector.

Allocation of Resources to Information Development and Distribution

One reason it has been difficult to clearly define the role of the Government in information activities is that economic theory concerning the allocation of resources has significant limitations, although it provides many useful explanations. Economic theory does not always conform nicely with reality. Another reason is the lack of general agreement as to the nature of information. Information can be conceived of in two ways: some understand it to mean the content of communication, while others equate it with the medium of communication. This difference is seen in the characteristics that are attributed to information (96,12,29,21):

- Information is an intangible.
- Information can benefit an individual recipient and/or society as a whole; it is not exclusive.
- Information is not depleted by use; if one person uses it, this does not mean that another person will not be able to use it. The value

of the information may decline, however, even if the information itself does not change.

- Information can be possessed by more than one person at the same time.
- Information cannot be easily packaged in well-defined units.
- Information can be made available in many media, such as books, documents, journal articles, bibliographic references, videotapes. These forms have many of the same characteristics as other goods and services.
- Information is marketable and maybe profitable. It has value as a capital resource, as an essential tool for decisionmaking, and as a means for the better management of tangible resources (118).
- The price of information bears little relationship to the costs of making copies available. The cost of the first copy is likely to be a very large part of the total cost of production and the reproduction costs are relatively minor (96).
- The value of information increases as the amount of data involved and as the degree of organization of those data increases (96).

When information is viewed as a medium or conduit, it does not possess the characteristic of nonexclusivity, the common characteristic of a pure public good. One reason for the Government to create or distribute information is that it is a public good. However, most Government information activities are conducted because of the presence of externalities. For example, when the Government provides information about impending typhoons or hurricanes, not only do the people in the path of the storm benefit from the information, but society as a whole benefits from the reduction or prevention of a disaster.

Externalities from a particular good or service are not always similarly perceived by all members of society. In the United States, the Government provides an extensive crop-reporting service that is invaluable for agricultural markets. The Government also gathers statistics forecasting total production (gross national product) which, in turn, are used by private firms and trade associations to forecast their sales in order to plan production schedules and major long-term investments. Some would contend that the Government

is not justified in providing access to such information in either case because the benefits of the service to society at large are not greater than that of the sum of the benefits to separate individuals. Others would argue that such benefits, in the long run, are greater to the society as a whole than to the individuals.

The problem is complicated by the extreme variety in the content and medium of information. The responsibility for creating and disseminating information may rest with the Government or the private sector depending on its content and/or media. Because of considerations of public good or externalities, which are influenced by societal values, the Government maybe justified in certain information activities.

On the other hand, the long history of the private sector in publishing activities and the growth and development of the commercial information field in the last two decades give evidence that much information can be successfully provided and allocated by the market. But private enterprise is, and of necessity must be, selective in the information it provides, in order to stay in business. The market may not operate successfully for all types of information, particularly highly technical and esoteric materials. Such materials may not have a large enough audience to be profitable for a commercial firm to market, although the information is or may be essential for the common good. They may or may not be of sufficient interest to nonprofit professional associations.

Effects of Government Involvement in Information Activities on the Private Information Sector

Introduction

Where one draws the line separating competitive from complementary activities of the public and private sectors depends on one's philosophical orientation. Some believe that certain Government activities amount to unfair competition with the private sector, while others do not. There are areas where the private and public sectors are in competition (e.g., both are involved in providing postal services, education, and weather information). In most cases, prices that the Government

charges for these services are zero or very low. Some have interpreted this as unfair competition.

In the current dialog among the sectors involved in information activities, the term “unfair competition” is not used in the legal sense. The laws that govern competitive activities apply only to private actions, and the Federal and State Governments are deemed to be immune from their prohibitions. The term “unfair competition” is used in the sense that prices for Government-sponsored information products are often subsidized, resulting in unfair price competition.

Regardless of definitional distinctions, the presence of the Government in the information market does influence the private information sector. Because the two sectors are not subject to the same laws, conflicts between Government and private activities are accentuated.

Market Segmentation

In evaluating whether or not the Government is competing unfairly with the private sector, the boundaries of the market for the information good or service under consideration need to be defined. In general, products and services that differ compete in discrete markets. For the most part, the Government does not offer the same product or service as private industry. A Government-provided information product, for instance, may contain data that is not of interest to a limited market or may not be of immediate interest. In addition, the Government may make information goods or services available to populations or areas that private firms would not find profitable to serve. In some cases, however, Government information goods and services are similar to ones produced by the private sector.

Assessing whether or not information products and services are competing in different markets depends not only on the specific characteristics of the product or service, but also on the substitutability of one product or service for another in the market. For example, the mail, the telephone, and the telegram can be considered as substitutes for one another and as such are competing in the same market. In reality, the substitution may be imprecise, and these three communication modalities can be considered as operating

in three distinct markets. Geographic distribution may be another factor in considering substitutability and market segmentation. The services provided by one telephone company may be similar to those provided by another. But if one telephone company is serving a more circumscribed area than another, the two companies can be considered as operating in discrete markets.

Segmentation may also occur when there are different types of buyers for the product or service. For example, the users of health-related information can be conveniently divided into students, teachers, investigators, practitioners of various categories, managers, administrators, planners and policy analysts, the Government, health-related industries, publishing and communications industries, recipients of health-related services, and the general public. The markets are quite discrete, and the buyers in different markets may be willing to pay different prices (65).

The Information Market

Information transfer is in an area where market and institutional imperfections exist (125). Factors leading to market inefficiencies include economies of scale, economies of scope, and structural and price barriers that prevent entry into a market (21). Information goods and services are often produced with significant economies of scale due either to extremely high startup costs or fixed costs or to the existence of decreasing unit costs—or both.

The situation is even more complex because information production and distribution also leads to economies of scope. Since doing so is often less expensive, most information organizations usually produce more than one product or offer more than one service: e.g., a telephone company usually offers long distance as well as local call service, or the publisher of a printed abstract journal may offer the same information in a computerized data base (21).

Structural and pricing barriers that may impede the entry of new firms into the field include the “lack of availability of major resources because of uniqueness, geography, and so forth; lack of competition because of low pricing and Government regulatory restrictions that exclude addi-

tional firms from certain markets; and market restrictions caused by the advantages of scale economies" (21). Other factors, including the difficulty of determining market demand and uncertainties about the value of information, may also bring about imperfections in information markets. Lave believes that as a result of the above factors, the private sector may tend to undersupply information, particularly information that is needed by and valuable to a small number of users (80).

Government and the Information Market

The Government both corrects and causes imperfections in the information market. The inefficiencies in the market provide a rationale for a Government role in information activities (80). Some of the inefficiencies in the market, however, are the result of Government participation.

The Government enters the market when the externalities are important enough that the market cannot provide an efficient outcome and the economies of scale required to produce or distribute a product or service are such that the Government is about the only organization that has sufficient resources to do so. The Government can also correct market imperfections by subsidizing the private sector to provide the information (80).

When the Government undertakes the production and distribution of information, it may have the power to affect the market price. Most Government organizations price their goods and services at zero or a low price. In addition, the Government often has the advantage in the marketplace of prestige. There is a perception on the part of some users that Government-sponsored information goods and services are reliable (168). Thus, because of the low price and/or perceived quality of Government-sponsored information goods and services, some buyers will favor these goods and services over those that are produced or disseminated by commercial firms. Hence, new entrants may be dissuaded from entering the information market, and if the Government enters an established market, others may leave.

Pricing of Information Products and Services

Introduction

When the Government participates in the development and provision of certain information products and services, the questions are whether, when, and what to charge users for such products and services. What rates should an agency charge to best serve the public purposes for which the agency was created? What rates should an agency charge that will not stifle the growth and development of the private information sector?

Although the library tradition is that ideally all information should be made freely available to all, some libraries have always charged for some services. Many first introduced fees with the advent of computer-based reference services (49). Most services allocated by the public sector are mixed with private benefits. It has been suggested that user fees be instituted when the following conditions obtain (92):

- Units of service can be defined and measured, and the fees related to benefits received in an equitable fashion.
- Individual users can be identified, and ownership rights defined: that is, at least some of the benefits are private.
- Fees can be enforced and nonpayers excluded at a reasonable cost.
- Charging users is not contrary to other, overriding social objectives: in particular, the distributional consequences of fees must be acceptable.

Practically, user reactions to fees must also be considered, and the following ideas for setting fees have been put forth (90):

- New fees should be for new services, not those which have previously been free.
- The fee should be closely associated with the service for which it is paid, and should be a simple function of the quantity of use, so that the consumer can make a rational decision about how much to spend.

- The highest amount consistent with the purpose of the public activity should be charged. As long as the institution is going to incur the political and economic costs of introducing fees, it is better to get full payment, not just the illusion of it.

Computer-based services fit most of the principles noted above. They differ from services traditionally offered in libraries, are relatively expensive, are tailored to individual needs, are obtained from an outside source (a vendor) who charges the library, and are easily identifiable and provided at the user's request.

Methods of Pricing Information Goods and Services

When the true costs of a good or service are known, average cost pricing or marginal cost pricing can be used as the pricing method. The costs of an information good or service are the generation of the information or the collection and organization of information; the design and development of the product or the service; the maintenance of the operation, including the equipment, rent, utilities and space (fixed costs); the handling of requests; the reproduction of materials; and the distribution of the good or service.

In the information field, average cost pricing is used to recover fixed costs and those associated with the handling of requests, the reproduction of materials and the distribution of the product and the service (72). Creation costs have not been included in calculating average costs for most information products and services. The creation costs of Government-sponsored computerized bibliographic data bases have been subsidized by the taxpayer. The creation costs of privately produced computerized bibliographic data bases have been in almost all cases subsidized by a companion print product. But because of usage and technological changes in the information market, some adjustment in cost calculations may have to be made for the increasing use of data bases and the decreasing use of print products.

When the true cost of a good or product is not available, formula pricing or target pricing is used. In formula pricing the manufacturing cost is multiplied by a predetermined factor. For example,

books are often priced at five or six times the cost of printing. Target pricing is based on estimating the volume of demand and determining in advance a price that will yield a desired rate of return on the total cost (12).

Some information services charge different prices to different buyers for the same product or service for reasons not associated with costs. A problem with this pricing strategy—price discrimination—is the possibility that a buyer who bought the product at a lower price might resell it to others at a price lower than that charged by the first seller. Another pricing strategy not based solely on costs is pricing to achieve an objective and not necessarily to recover the costs of a particular product.

Pricing Practices of the Private Sector

Generally, the for-profit sector of the information industry depends on venture capital or profits from other products or services to initiate a new service or product (12). The price to the user of the product or service is not solely based on costs, but is usually established according to the perceived value of the product or the service to the user (66).

The information industry views itself as a "niche" industry in which each firm operates in a particular segment of the market. A firm carves out a portion of the market where it sees a need for its product or service and then develops the market for its specialized service or product (66).

The two current commercial vendors of NLM's data bases—DIALOG Information Services, Inc. (DIALOG) and Bibliographic Retrieval Services (BRS)—view themselves in this light. When BRS was established as a for-profit venture in 1976, it targeted the academic and medical library communities, high-volume users of biomedical data bases, as its market segment. The two principal organizers of BRS, Janet Egeland and Ron Quake, came from the (former) State University of New York (SUNY) Albany Biomedical Communications Network (BCN), a nonprofit agency. Using SUNY Albany computers, BCN served large universities and medical schools from the East Coast to Chicago during the late 1960's until 1975, when State funding for the project was withdrawn. At

that time, BCN made available MEDLARS and eight other data bases: BIOSIS PREVIEWS, CHEMICAL ABSTRACTS, CAIN (now known as AGRICOLA from the National Agricultural Library), ERIC, INSPEC, NTIS, PSYCHOLOGICAL ABSTRACTS, and INFORM.

When first formed, BRS contacted members of its delineated market to determine the services they wanted and the price they would be willing to pay. The company then and now establishes prices on the market demand for the service and adjusts the service to the established price. Since its founding, BRS has added other types of data bases and expanded its market interests, particularly in the area of the corporate community (46).

DIALOG terms itself a service bureau industry specializing in bibliographic retrieval service for institutions. The company, which started as an internally funded R&D project of Lockheed Missiles Space Co. in 1961, made on-line services commercially available to the general public in 1972. It initially sold access to data bases in education and science, but now it includes data bases in many fields including health. DIALOG's pricing includes both cost and market value elements. Calculations of average cost are based on the following cost categories: royalties, telecommunication, equipment leasing, storage, loading and updating of data bases, documentation, facilities, personnel, and various overhead figures. DIALOG does not do rigorous market surveys before marketing a new data base, but has experience in estimating the market demand at various price levels for a new product.

In determining market value, the nature of the data base and its general potential of appeal to a mass market are taken into consideration. The segment of the market the data base will appeal to is also influential in establishing a price—e.g., financial market is more likely to accept a higher price than an academic community. DIALOG also examines what competitors are charging for a similar service. The value of the data bases to the mass market and/or market segment is balanced against the calculated cost, and a price determination is made after a profit is also factored in. However, if the market value appears to be lower

than anticipated costs, the decision is made not to provide the service.

Government Pricing of Information Goods and Services: Federal Policy and Practices Currently in Force

The Federal Government has no set policy for pricing the information goods and services it provides. Authority for pricing stems from enabling legislation and the Office of Management and Budget's (OMB) directives, with departmental policies serving as a secondary source. Enabling legislation is the principal authority governing charges. Such authority is possessed by only a few agencies, such as NLM and the National Aeronautics and Space Administration. Other authorities governing charges are title V of the 1952 Independent Offices Appropriations Act (31 U.S.C. 483a) and OMB Circular A-25 (1959) (48).

Title V of the Independent Offices Appropriations Act requires that the Government set prices to recover as fully as possible the entire costs of providing a service, taking into account the public good and the benefit to the user. Indirect costs that benefit the public at large, rather than the purchase of specific services provided, cannot be included in the authorized fee.

OMB Circular A-25 requires that a reasonable charge should be made to each identifiable recipient of a Government service from which the recipient derives a special benefit. The identifiable recipient of a Government service who derives a special benefit above and beyond what the public at large received from the service should be charged, so that the Government recovers the full cost of rendering the service. Exceptions are allowed when the recipient is engaging in a non-profit activity designed for the public safety, health, or welfare and when payment of full costs would not be in the best interest of the program. The circular prohibits Government agencies from charging more than the cost recovery level, since it limits the charge to the services' total cost and not the "value" of the services to the recipient.

Although both title V of the Independent Offices Appropriations Act and OMB Circular A-25 are concerned with setting prices for Government

services in general—and not specifically information services—more and more, the policies are being applied to information products and services. Owing to their lack of specificity, interpretation of these two authorities is very difficult, and despite two Supreme Court cases, the questions of who and how much should be charged remain unclear. Indeed, in 1979 the General Accounting Office (GAO) recommended “that OMB should work with the executive departments to clarify the circular to state clearly when charges should be made and the manner in which full costs should be recovered” (55).

Operational considerations are also involved in setting Government prices. In general, an agency operating under a fixed budget will not attempt to recover costs in excess of its budget regardless of demand. A disincentive to increased productivity occurs because production costs and billing and accounting costs come from appropriated funds, but in most cases any funds collected by an agency are returned to the U.S. Treasury. The type of information good and service also influences the pricing practices of a federally funded information organization, and the organization usually has different criteria in establishing a price for a primary (e.g., a technical report), a secondary (e.g., a computer search of bibliographic information), or a tertiary information product or service (71).

As a result of the vagueness and variety of the laws and regulations governing pricing, a Federal information organization has many pricing options available. Government organizations are not established to raise revenues and therefore choose their pricing strategy on bases other than economic considerations.

The mission of the organization is a major factor in a Federal information organization’s determination of the amount of costs and the categories of costs they want to recover. King (71) concludes that the Government has three goals in providing scientific and technical information: 1) assuring the distribution of the results of federally funded research or federally collected information; 2) supplying an agency and its grantees and contractors with the information they require for their mission; and 3) providing a particular community

(i.e., health or education) with information, regardless of the origin of the information or the recipient’s funding source.

Social utility of the information provided is another major factor in pricing. When the Government assumes the responsibility of allocating resources for the development and distribution of information, its pricing philosophy is premised on the societal benefit that information development and distribution bestows. Distributing information free would at first glance appear to realize the greatest social benefit, but there are costs to the Government associated with the development and distribution of information which reduce the net value to society. Thus, calculating a price which stimulates the greatest use of an information good or service, but discourages frivolous use, is another purpose of pricing (71).

The cost categories and methods used to calculate costs vary widely among federally funded information organizations, but in no case is there an attempt to recover the costs of creating information. The most frequent method of costing bibliographic computer searches, computer data searches, bibliographic data bases, and bibliographies is using fixed costs and costs associated with reproduction and distribution (71).

Considering the variety of methods used and the different aims of pricing, it is not surprising to find inconsistent pricing practices among Government information organizations. In 1979, GAO found that information organizations that provided scientific and technical information in five Government agencies in general were not functioning in accord with title V of the Independent Offices Appropriations Act and OMB Circular A-25 in their pricing practices.

In its analysis, GAO did not distinguish between those programs that have enabling legislation regarding pricing and those that do not, nor between data bases and on-line service. It reported that, for the most part, the agencies providing scientific and technical bibliographic *services* did not charge for providing such services, were inconsistent in applying cost recovery policies when charges were made, recovered less than 15 percent of the costs associated with user services, and

did not equitably recover the costs of bibliographic data services supplied to private organizations for commercial purposes. GAO attributes the inconsistent practices partly to the ambiguity of OMB Circular A-25.

Many of GAO's findings have been confirmed in other studies. A survey, released in 1981, of 24 human services clearinghouses that are partially or totally supported by Government funds found that 9 recovered no costs through user fees, and 14 recovered some (12). An exception was the National Technical Information Service (NTIS), which is required by law to be self-sustaining.

A 1980 analysis of 111 federally funded information organizations found that 43 percent did not charge their users for information services and products (71). Further, charging practices varied with the agency, the size of the organization's budget, the type of operating organization, and the type of service or product. The product and service most often charged for are books (42 percent), nonprint media (44 percent), computer bibliographic searches (39 percent), and computer data searches (41 percent). Thirty percent of the information agencies funded by the Federal Government charged user fees for their bibliographic data bases.

A Changing Emphasis in Federal Pricing Policy for Information Goods and Services: "Full Cost Recovery"

At this time, the pricing of data base tapes and bibliographic computer searches by a Federal information organization falls under the authority of the organization's enabling legislation, title V of the Independent Offices Appropriations Act and OMB Circular A-25. As just noted, the OMB Circular A-25 calls for instituting charges that should recover the "full costs" of rendering a service, but the vagueness of the language has left it open to considerable interpretation. In the past 2 years, OMB has emphasized full cost recovery in further directives, again without defining the term.

In June 1980, an OMB draft circular, "Improved Management and Dissemination of Federal Information," was issued for comment. One of its requirements was that information made available

through other than the depository library information system be provided at a price that would recover all costs to the Government associated with disseminating that information—including printing, processing, and retention—but excluding the costs associated with the production or creation of the information. The circular was not issued in final form, because OMB felt that the new administration coming into office in January 1981 should set policy, and because some of its requirements are incorporated in the Paperwork Reduction Act (Public Law 96-511) of December 1980.

In the Reagan administration, the issue of recovering costs of information products and services has become an increasingly important one (7). In April 1981, OMB Bulletin 81-16 imposed a moratorium on the production and dissemination of certain audiovisuals and publications and called for recovering the costs of production through use fees. In fall 1980, the Government halted the production of many agency publications.

Of more direct interest is OMB Memorandum 81-14 released in September 1981. In implementing the 1980 Paperwork Reduction Act, OMB has requested that all Federal information centers be evaluated. Memorandum 81-14 sets forth criteria to be used in the evaluation by departments and agencies. One criterion is whether or not the information organization prices its products and services in order to recover their full cost. Officials at OMB recognize that "full costs" are not defined in the memorandum, but suggest that if full cost recovery for information goods and services were required, the definition would be flexible and would vary according to the specific case (7).

Also of interest is an unsuccessfully offered amendment to the 1981 Senate bill, S. 800, which reauthorized the Medical Library Assistance Act. The amendment would have required NLM to recover the full costs of products and services sold to domestic profitmaking institutions and foreign private users. NLM products and services sold to a nonprofit institution were exempt from full cost recovery only as long as the institution did not provide information services to profitmaking institutions. Full costs were defined as "the direct

and indirect costs (including overhead) applying cost accounting principles associated with: (i) the administrative and intellectual preparation of information products; (ii) the creation and maintenance of systems for the storage, retrieval, and dissemination of these products; (iii) the storage and retrieval of these products; and (iv) the dissemination of these products in whatever form. " Neither the 1982 Senate bill (S. 2311) nor the 1982 House bill (H. R. 6247) which propose reauthorization of the Medical Library Assistance Act consider full cost recovery.

The increased emphasis on full cost recovery results from a number of causes, including reductions in Federal expenditures and expectations that users of all Government products and services pay for the cost of the product or service. At the same time, members of the private information sector have become more insistent that the Government recover the costs of its information goods and services. The Information Industry Association, which speaks for many private sector firms in the field, has said that "provision of subsidized information services by Government at low prices (or no cost at all) is blocking and delaying the ability of the market economy in information to deliver low-priced information to everyone" (66).

On the other hand, some experts contend that the imposition of a full cost recovery policy on information products and services will limit an individual's choice by limiting financial access. Many, particularly the library community, feel that some social benefits of information will be lost under this policy and that full cost recovery would have "long lasting and deleterious effects upon equal access to Federal information for both the private and public sectors" (8).

The implications of instituting a full cost recovery policy for Government goods and services are not fully understood. Although full cost recovery appears to be a simple and straightforward calculation, the principle is nebulous and "must rely ultimately on arbitrary and economically indefensible accounting conventions" (21). The term full costs has not been defined with any degree of precision, and there are various notions of the cost categories to be included in calculating the full costs of information goods and services

and the allocation of such costs (80). The problem is particularly difficult with respect to joint products, i.e., when more than one product is produced with the same resources.

Some observers believe that the expected increased revenues to the Government resulting from a full cost recovery policy might not materialize. The increased price that would be charged under a full cost requirement might result in a fall in quantity of goods and services sold and might lead to a loss of economies of scale, and the "alleged full cost price would fail to produce revenues equal to costs as it is intended to do" (21). A lower price may have benefits to the supplier—the Government—in the form of increased revenues, and benefits to the user in the form of lower prices.

A recent notion of including creation costs (i.e., the costs of creating information products and services) in a full cost recovery calculation may increase the price of Government-sponsored information products and services sharply. Perhaps even more than other cost categories associated with the production and the distribution of information goods, the costs associated with creating information goods are ill-defined. But the issue is acute because of pricing practices in the private information sector. Until now, private firms for the most part have not included creation costs in the leasing fees for their data base tapes but have absorbed the costs by overpricing the print products associated with the data base. It is questionable how long this practice can persist with changes in user patterns from print products to computerized information. If private firms include creation costs in costing their data bases, they may be put at further price disadvantage with respect to Government-sponsored computerized information products and services.

The copyright law also affects the principle of "full cost" recovery, primarily as it applies to the sale of print material and the leasing of tapes of the data bases, but not to the provision of on-line access to data bases.

The 1976 Copyrights Act (Public Law 94-533) provides no protection for any product—be it a report, data base tape, or geologic map—pro-

duced by Government employees on Government time. Such works are considered to be in the public domain; any domestic individual can copy them and sell them to anyone else.

A full cost recovery policy assumes OMB can establish a formula based on accounting principles to determine an appropriate price for Government documents, magnetic tapes, etc. *Simply* stated, such a formula would divide an agency's budget by the number of products sold in the year prior to instituting full cost recovery, yielding a per product price. The price would equal the average cost. The example below is purely hypothetical, because it assumes that the agency is producing only one product and not performing any other functions. It therefore does not account for the problem of allocating costs between products and among products and services.

If an agency's budget is \$22,000 and it produces one report that is sold to 22 customers in year 1, in year 2, following the adoption of a full cost recovery policy, the agency will charge each customer \$1,000 for the report. Because Government products are not protected by copyright laws against domestic copying, a single entrepreneur could buy one copy of the agency's report for \$1,000, duplicate it, and sell it to the other 21 interested customers, or any interested customers, for less than the Government's price. The private entrepreneur's price could be lower because it does not include the high costs of creating and developing the product. As a result of the lower price of the private sector, the agency might lose its market for the product. Thus, in order to ensure full cost recovery, an agency would have to charge its first customer the full cost of production, in this case \$22,000.

Theoretically, such a scenario is possible now, without an established full cost recovery policy. But because of subsidies, the Government price is less than the price a business could charge if it chose to reproduce Government products. Full cost recovery policy may effectively drive the Government out of the distribution business.

The effects of a full cost recovery policy could be mitigated if there were a clause in an agency's licensing or purchase agreement with a private firm that prohibited resale of its print or computer

tapes product. It is not clear, however, whether such a restriction is enforceable. Since there is no copyright on Government products, the Government may not have the power in legal terms to hold buyers of its products to such a contract. Such a clause currently exists in NLM's licensing agreement for MEDLARS data tapes, which are priced much higher than others in the Government. It has not been challenged to date.

Thus, it appears that full cost recovery and other pricing principles for Government information products and services need a fuller and more comprehensive examination if all their ramifications are to be identified. There may be no one pricing formula that represents the correct price for all Government products and services, or for that matter for any one product or service.

NLM's Pricing Policies*

Introduction.—In almost all respects, NLM's pricing of its products and services is consistent with the National Library of Medicine Act, title V of the Independent Offices Appropriations Act, and OMB Circular A-25, congressional opinion, as expressed in hearings and reports, and the opinion of NLM's Board of Regents.

The National Library of Medicine Act authorizes the Secretary of Health and Human Services with the advice of NLM's Board of Regents to make publications, facilities, or services available: 1) without charge as a public service; or 2) on a loan, exchange, or charge basis; or 3) in appropriate circumstances, under contract arrangements made with a public or any nonprofit agency, organization, or institution. The purpose of this authorization is to advance the legislative mandate of the Library of making scientific and other information readily available in order to promote the Nation's health. Because the act offers the Secretary of Health and Human Services alternatives in setting charges, the Library has been able to be responsive to changing needs and has modified its pricing policies and practices from time to time.

*Specific prices for MEDLARS products and services are reported in ch. 2.

OMB Circular A-25 exempts Federal agencies from recovering the full costs of services when the recipient is engaging in a nonprofit activity designed for the public safety, health or welfare, or when payment of the full fee by a State, local, or nonprofit group would not be in the interest of the program. According to NLM officials, only 3 percent of MEDLARS users do not meet one or both of these conditions (56).

NLM has modified its pricing policies over the years. The Library's initial free Carnegie library tradition of not charging for any of its products or services was changed with the advent and extraordinary growth of MEDLARS, which created a new and relatively expensive category of library activities. When the Board of Regents decided it was necessary to recover some of the Library's costs, it determined that the taxpayer should be responsible for basic library products and services but that other costs, particularly those associated with the new computerized products and services, should be borne, at least in part, by the user. The Library recognized that its appropriations could not support the entire costs of NLM's planned communications network, and so had its on-line system designed keeping in mind that it would recover a portion of the costs associated with providing its services from the users of the services (33).

The Library's policy in charging users has been relatively consistent. It is based on four assumptions that have varied only slightly from time to time. They are: 1) the biomedical community of users should share the cost of on-line services with NLM; 2) NLM should support the generation costs of building the data base and the users should pay the costs of accessing the system; 3) all users should have equal access to NLM services and all sectors of the user community should be charged the same amount for NLM's products and services; and 4) charges are imposed to provide a degree of management control over the rate of the system's growth and to make the service as independent as possible of NLM's appropriations (101).

Data Bases.—The NLM Board of Regents reversed a 1965 policy decision to withhold the sale of MEDLARS tapes for profitmaking pur-

poses in 1970 on the basis that MEDLARS was no longer experimental and that OMB Circular A-25 required agencies to recover all or part of their costs by sales in developing products of commercial value (45). A fixed fee was established based on the dollar value of services performed by foreign centers in exchange for access to MEDLINE and other considerations.

In January 1982, the pricing structure was changed. The Board of Regents at their October 1981 meeting resolved to "endorse a change from a fixed fee for the MEDLARS tapes to a use fee rate structure" (102). The use fee has the advantage of providing information on data base use as well as serving a revenue purpose. The Board also recommended that it "continue to delegate to the NLM Director authority to adjust price structures in response to changing situations" (102).

Most other Government data base tapes are also leased on a use fee ratio structure. Characteristically, Federal agencies turn their data base tapes over to NTIS without charge. NTIS is then responsible for marketing the data bases, distributing tapes to customers, and establishing a price for their provision. The price of each data base is established by calculating its direct costs to NTIS, including management and marketing, and NTIS' fixed costs. If a new product or service is to be launched, NTIS considers the anticipated market value in its calculations. (See app. G for a discussion of AGRICOLA and ERIC, two data bases distributed by NTIS.)

On-Line Access Charges.—On-line access to MEDLINE was provided without charge from 1971 to 1973. User charges were adopted as a means of "ensuring that available NLM resources could continue to provide equal access to MEDLINE services, enabling the Library to sustain the quality and the performance of the system by an appropriate degree of control of the system and making it possible for the continued increase in numbers of outside users to be largely independent of NLM appropriations" (99).

In 1975, on-line access charges for all MEDLARS data bases, except TOXLINE and CHEMLINE, were raised. Later that year, a dif-

ferential connect hour rate between prime and nonprime hours for all MEDLARS data bases was imposed in order to strengthen management controls over the use of the Library's computer system by more evenly distributing the workload, which was overburdening during peak hours. It was projected that usage would shift from prime time to nonprime time if the rate were lower during that period. The rates were raised as a means of attaining full cost recovery of those costs associated with NLM's provision of on-line services "outside the walls of the Library," such as telecommunications costs and backup computer costs. In 1980, connect hour rates to CHEMLINE, TOXLINE, and TOXBACK were raised to reflect increased royalty charges.

In October 1, 1981, on the advice of the NLM Board of Regents, connect hour rates charges for all domestic users were raised again, and comparable rates for foreign centers were established as of January 1982. The price per page printed is the same as before, because NLM calculated that the Library is recovering all costs for this process at this time (33). But the cost calculations for the new charges are very different from those used before. The Library redefined accessing costs to mean everything associated with on-line access to the data bases. Thus, an additional \$1 million was added to the costs attributed to on-line services by including such items as overhead costs, computer costs related to the service, and the costs of managing the system. These latter costs were not included previously because they are appropriated costs.

Congressional Actions.—The House and Senate Appropriations Committees regularly review NLM's pricing policies and charges before they are formally adopted, and have agreed with them for the most part in the past. In 1974, Representative Flood expressed interest in putting MEDLARS on a more self-sustaining basis. Both

committees have also expressed concern about the effects of cost sharing on the dissemination of health information, particularly to small institutions, and repeatedly have questioned NLM's Director on this issue (150, 151).

Because the enabling legislation for NLM does not need periodic renewal, the responsible authorizing committees have historically not been involved with the Library's pricing practices. As previously noted, however, in 1981 the Senate Committee on Labor and Human Resources considered an amendment to the Medical Library Assistance Act (S. 800) that would have required the Library to recover the full costs of its products and services from profitmaking institutions.

Although the amendment was defeated, NLM is attempting to respond to the requests for full cost recovery expressed in it, by OMB, and by members of the commercial information sector. The Director of NLM established a task force as early as April 1981 to develop a system which would capture and allocate on a regularly prescribed basis all costs associated with NLM information services.

In the fall of 1981, NLM increased charges for on-line access to MEDLARS data bases and designed a new pricing strategy for the MEDLINE data base tapes. The Library maintains that it made both modifications to accommodate the public and private demands for change while maintaining its policy positions. At its October 1981 meeting, the Board of Regents reaffirmed its position against a differential pricing structure and for "equal access and equal charges for all users" (101). (The issue of differential pricing is discussed in ch. 6.) It also said "the cost of building data bases and housing them should be the Governmental responsibility of NLM, but accessing the system should be paid by the users" at full cost (101).