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ABSTRACT

A study on information technology and public policy examined relationships among information providers and their clients in order to determine the economic, institutional, and technological factors that are key in deciding how people get the information they need. The research project was conducted to help the National Commission on Libraries and Information Science in three ways: to highlight costs and benefits of various allocations of information functions, to indicate the size and direction of forces, and to help libraries and information technicians evaluate their roles so that practical public policy alternatives and their consequences for the public can be better understood. Researchers found that the public reach of information services varies widely even within types of services. The scope of information resources is wide and well-supported by various governments. In the past 20 years, the size, activity, and cost of library and other information services have grown above the growth rates of basic indexes. Information services and libraries suffer from poor accounting practices, confused policies, rivalries, and limited scope of research and development. (CH)

ELEMENTS OF INFORMATION RESOURCES POLICY: Library and Other Information Services

Revised Edition

Anthony G. Oettinger

12 January 1976

Report to the NATIONAL COMMISSION ON LIBRARIES AND INFORMATION SCIENCE

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HARVARD UNIVERSITY

Program on Information Technologies and Public Policy

although a society is a cooperative venture for mutual advantage, it is typically marked by a conflict as well as by an identity of interests. There is an identity of interests since social cooperation makes possible a better life for all than any would have if each were to live solely by his own efforts. There is a conflict of interests since persons are not indifferent as to how the greater benefits produced by their collaboration are distributed, for in order to pursue their ends they each prefer a larger to a lesser share.

J. Rawls in A Theory of Justice, p. 4.

Act as men of thought
Think as men of action.
- Henri Bergson

Harvard University

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I. INTRODUCTION

When setting up the National Commission on Libraries and Information Science in 1970, Congress said that "library and information services adequate to meet the needs of the people of the United States are essential to achieve national goals and to utilize most effectively the Nation's educational resources"; it told the Commission to make plans for implementing that policy.

Few would disagree with the policy since it can be read so many ways. The battles over information services are about just who is to be served, by whom and for how much.

This study looked at relationships among information providers and their clients in order to mark the economic, institutional and technological factors that are key in deciding how people get the information they need. Besides the public, in whose name the issues are joined, the study focused on two of the many protagonists:

1. An increasingly self-conscious private-sector information industry that includes the heterogeneous members of the 6-year old Information Industry Association (Figure 1), members of the Association of American Publishers, and others.

2. The library world sketched in Figure 2.

These two groups are among those who had given the most intensive inputs to the Commission as of early 1975.

ABC/CLIO, Inc.
Richard Abel and Co.
Academic Press, Inc.
American Can Co.
Aspen Systems Corp.
Auerbach Publications, Inc.
Bell & Howell Microphoto Div.
R. R. Bowker Co.
BRICS
Business International
Chase Manhattan Bank
Congressional Information Services
Cordura
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The Williams & Wilkins Co.
Thomson Data Ltd.
Time, Inc.
Unipub, Inc.
University Microfilm
U. S. Asiatic Co., Ltd.
U. S. Historical Documents Inst., Inc.
Warner-Eddison Associates
John Wiley & Sons, Inc.
Westat, Inc.
World Meeting Information Center, Inc.
Xerox Corp.

Figure 1: Information Industry Association

(a) Membership - November 1974

No. of Members	Dues $	Gross Annual Revenue Estimate ($ million) Low	High
6	150	-	1.5
25	300	-	25
2	450	2	5
7	600	1.8	7
6	900	6	15
15	1,200	37.5	75
6	1,800	30	90
4	5,000	400	400+
71		477.3	618.5+

Estimated Range: $500 - 750 million

Figure 1(continued): Information Industry Association

(b) Estimated Gross Revenues 1973-74

TYPE	NUMBER*	VOLS.(& OTHER ITEMS)**	TOTAL ANNUAL OPERATING EXPENDITURES ($) MILLION	DATE OF DATA
1. All College and University Libraries	2,650	538,200,000	850	1972-73
2. Major Academic Libraries	81	217,000,000	291	1972-73
3. Library of Congress	1	85,100,000	74	1972
4. National Agricultural Library	1	1,500,000	4	1972
5. National Library of Medicine	1	1,400,000	17	1972
6. All Federal Libraries	2,313	N. A.	191	1972
7. Public Libraries	1,000-12,000	157,000,000 (1968)	1,024	1972-73
8. Elementary and Secondary School Libraries	18,985-59,064	N. A.	N. A.	1968
9. Special Libraries (Industry)	14,000	N. A.	N. A.	1973
10. Government Scientific and Technical Information (STINFO)	--	--	950	1971
11. USIA, Foreign Dissemination	--	--	206	1973 (FY)

Figure 2: BUDGETS OF SOME LIBRARY AND INFORMATION ACTIVITIES IN THE U.S.

(some Double Counting in all Categories)

* See Appendix, Figure 1 for details of ranges and estimates.

** Counting bases vary, so figures are not directly comparable.

What do these contenders see as issues? Private-sector spokesmen, for example, say that they have been denied equal competitive access to this or that part of the information market through the unfair or inept use of public funds. Librarians see a threat of an anti-democratic killing of tax-supported libraries.

Our purposes, in helping the National Commission on Libraries and Information Science with its mandate, are:

-- to highlight for the Commission and the public factors likely to affect the costs and the benefits of various allocations of information functions;

-- to tell the size and direction of forces in play; and

-- to evaluate their roles so that practical public policy alternatives and their consequences for the public can be better understood.

We worked in the context of national information resources as defined by the "information industries" listed in Figure 3. These organizations mainly create, store, process, distribute or use information. This distinguishes them from airlines or supermarkets and all the industries that use information to support other main roles. The information industries are distinguished one from another in ways that are sketched in Figure 4.

The Appendix presents the evidence we gathered and gives details of interpretation. *All data used were already on hand somewhere or readily derived; making fresh measurements or surveys was beyond the scope of our work.*

Here, we present our findings and the underlying issues they reveal for the public and the Commission.

Estimates gathered from U.S. government, trade associations and other sources; all figures in current dollars; double counting not eliminated.

	Approximate Gross Revenues, (in billions of dollars)			
	1970	1971	1972	1973
Broadcast television	2.8	2.8	3.2	3.5
Cable television	0.3	0.3	0.4	0.5
Broadcast radio	1.1	1.3	1.4	1.5
Telephone	18.2	20.0	22.4	25.5
Telegraph	0.4	0.4	0.4	0.5
Specialized common carriers	0.0	0.0	0.0	0.0
Satellite carriers	0.1	0.1	0.1	0.1
Mobile radio systems	2.0	2.2	2.4	2.6
Motion pictures	3.8	3.8	NA	NA
Organized sports, theaters, etc.	4.4	NA	NA	NA
Computer software suppliers > Computer service suppliers	1.9+	2.4+	3.0+	3.7+
U. S. Postal Service	6.3	6.7	7.9	8.3
Private information delivery services	0.7+	0.8+	1.0+	1.2+
Newspapers; wire services	7.0	7.4	7.8	8.3
Periodicals (including newsletters)	3.2	3.4	3.5	3.7
Business consulting services	0.9	1.1	NA	NA
Advertising	7.9	7.6	NA	NA
Marketing	32.4	37.7	41.3	43.4
Brokerage industries	40.6	47.4	54.4	NA
Book publishing and printing	3.4	3.7	3.9	4.1
Libraries	2.1	NA	3.6	NA
Schooling	70.0	76.3	83.2	89.5
Research and development	26.5	27.3	29.2	30.6
Federal information institutions				
Census Bureau	0.1	0.1	0.1	0.1
National intelligence community	4.0+	NA	NA	NA
National Technical Information Service	0.0	0.0	0.0	0.0
Social Security Administration	1.0	1.2	1.3	1.4
County agents	0.3	0.4	0.4	0.5
Banking and credit	61.1	68.9	76.9	NA
Insurance	92.6	103.5	121.4	NA
Legal services	8.5	9.6	NA	NA
U. S. Gross National Product	977.1	1,055.5	1,155.2	1,294.9

Figure 3: The Information Industries

The information industries are those where creating, storing, processing, distributing or using information are primary functions. Elsewhere, these functions are incidental to some other primary role. Even the massive information processing performed by railroads or supermarkets qualifies them as important information users, but not as information industries. Approximate annual gross revenues shown here for 1970-73 provide a rough index of the relative sizes of these industries. Double-counting has not been eliminated.

Costs Borne By:
* users
  personally
  organizational unit
* general public
  direct taxation
  indirect subsidy
  passed-through costs (e.g. of advertising)

Type (and Span) of Information Sources:
* direct gathering (as by observation, experiment, poll, survey, etc.)
* primary documents (newspapers, books, official records, accounting or operating records, professional journals, etc.
* secondary documents (indexes, directories, etc.)

Timeliness of Information:
* immediate
* periodical
* occasional

Storage Medium:
* hard-copy media (paper, microform, etc.); digital or analog
* electronic media (computer memories, magnetic tapes, etc.); digital or analog

Distribution Medium:
* physical transportation
* electronic telecommunications

Clientele:
* general public
* limited constituencies (by subject matter interest, by organization, or other affinities)
* scope of geographic coverage

Mix of Basic Functions:
* creating/processing
* storage
  selection
  access
* distribution
* control
* using

Types of Use:
* educational, cultural
* entertainment
* decision-making
  etc.

Institutional Type:
* private (profit or non-profit) or governmental
* primary unit or subunit

Quality

Responsiveness and Marketing:
* producer-initiated
* user-initiated

Extent of Assistance to User Search or Analysis:
* none
* clerical or routine
* consulting
* turnkey service

Figure 4: Factors Differentiating Information Industries

II. SUMMARY

The public benefits unevenly from both private and public information services: does this mean that there are wrongs to be righted or just fair differences in purpose or needs?

The nation has many information resources. The challenge to the Commission is how best to marshal all of these to meet the needs of the people. The choice between private and public instruments is not crucial. What matters is how funds flow and who benefits from them, how unique information resources are best exploited and how the conflicting ideals of equal opportunity and of local or private decision-making are accommodated.

Costs in this field have risen more rapidly than elsewhere. At issue is whether growth in services should and can be sustained and how costs might be controlled. However, accounting practices are poor and better support for management and policy decisions is essential.

Present policies are fragmented, confused and often contradictory. Effective Commission plans must take into account policies in many closely related areas.

Our findings point to issues that are complex and persistent, although their manifestations often change rapidly. This suggests that the Commission, in its plans, address continuing processes for identifying and accommodating specific problems as much as it addresses desirable outcomes. The findings that follow describe areas in which such problems will continue to well up.

III. FINDINGS

1. WHO IS SERVED (4,11,13,14)*

The public reach of the services we have looked at varies widely as to the proportions, absolute numbers and types of actual users. High variation occurs as much within types of service as across types.

The main issue is whether this variation means there are wrongs to be righted or just fair differences in purposes or needs. Where inequities do exist, the question is choosing the means of redress.

30% of the adult public is the highest estimate we found for sometime users of "free" libraries; only 10% are characterized as "heavy" users. Geographic variations of resources and usage are high. Overall, programs to bring libraries to the poor have not worked out. Reach through compulsory (and tax-supported) elementary and high school education is limited: statistics on use are not available and a majority of the public schools do not meet American Library Association standards or even (giving slightly less cause for concern about self-serving professionalism) the less stringent standards that states set for school libraries and other information services. Library use is generally weighted toward the upper socio-economic levels of the public plus those youths who make it to colleges and universities.

Statistics about users of direct-fee services are not publicly available, but the traffic bears fees from tens of dollars to thousands of dollars a shot, hence also favors those better off economically.

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* Numbers in parentheses designate the sections of the full report giving supporting evidence and interpretation.

In contrast, 73 percent of adults in a 1973 survey of newspaper readership had "read any daily yesterday" and 92% had "read any daily in the past 5 week days." Basic telephone service, reaching 93% of the U.S. households in 1973, is priced at $5-20 per month. 99.8% of households have television, without direct usage fees but with a cost of $100-500 to buy the set itself. Mean watching time per household is over 6 hours a day, within a seasonal range of 5-7 hours. For monthly fees of $5-10, cable television reached less than 11% of households in 1973.

Whether variations in the reach of library and other information services are equitable or not depends on how well the substance and the reach of the full range of rapidly changing alternative media match the needs of the people. It cannot be taken for granted that 19th-century means and institutions are the only equitable or economic ways to build and share the information resources of a democracy.

Where inequities do exist, the options available for the Commission to consider in its plans include the mass media, educational or public television, and numerous other actual or potential information resources, public and private.

2. WHO SERVES (2,6,15)

   The world of information resources is wider than that of the protagonists most vocal in the Commission's arena. The linkages among the elements of that world are manifold and strong.

By focusing too narrowly (Figures 1 and 2), the Commission risks addressing only parochial interests, not its national mandate. The risks of dissipation through too broad a sweep (Figure 3) are equally obvious. Findings (1) and (7) suggest linkages to media and constituencies most deserving of attention.

3. WHO PAYS HOW MUCH

a. COMMONALITY OF PUBLIC SUPPORT (6,10,12,14,15)

Whether operated for profit or not-for-profit, whether in the public sector or the private sector, all information services are supported in significant amounts -- although to varying extents and degrees of directness -- by governments at all levels.

Mechanisms include: direct tax support or concessions; subsidies to providers, through both categorical support and revenue-sharing; publicly or privately set cross-subsidies among services; tax support or subsidies of direct payments by consumers.

Rhetoric about private vs. public enterprise therefore means less than do

-- the shares of money flowing through either sector both as to amount and as to patterns of flow and incentive;

-- the relationships between costs and prices; the magnitude of both; where they fall; how accounted for;

-- the nature and incidence of resulting benefits or burdens for the public; and

-- the tensions between the ideals of equal opportunity and of local or private decision-making.

b. OVERALL EXPENDITURES (2)

Annual library expenditures in the United States amount to roughly $2-3 billion or about 0.2 percent of the Gross National Product in 1972. A lower limit on the size of other information services, primarily in the private sector, is somewhat less than $1 billion a year in gross revenues. A $300 billion level corresponds to one economist's definition of "knowledge

industries". Groupings selected from Figure 3 according to taste yield both higher and lower estimates.

More precise or timely estimates are difficult to come by, since the sketchy available information is for professional consumption at best, not for either management or the public.

At issue is how much of the claims to public funds for information services is justifiable without adequate baselines of accountability at least for costs, if not for benefits.

The status quo is clearly unsatisfactory. In view of Finding 3a, it seems warranted for the Commission strongly to encourage, as a price for its attention, efforts to develop at least elementary statistical series for the most significant elements (in size or growth-rate) of both public and private sector information services.

4. UNIQUE COLLECTIONS (4,7,8,9)

Some information resources are unique. This stems in part from institutional arrangements, as for U.S. Census data or for various proprietary data bases; or in part from historical development, as for various book or periodical collections. Uniqueness is often related to economies of scale that make fragmentation or duplication cost more than single systems.

At issue is the identification of any natural monopolies in either the public or the private sector, and their treatment on matters that include the size and the allocation of profits, incentives for innovation, etc.

The available options include most that have been experienced, for example, in transportation or telecommunication services and in the history of copyright. Why and when should duplication of facilities be encouraged? Nationally? Regionally? How much vertical integration is desirable in the services based on a natural monopoly? How much competition in these derived services? How much to pay a public or private monopoly for the use of a unique resource? How much should be publicly and how much privately operated? How much should be regulated and, if so, how? What and how much should be subsidized or cross-subsidized for whose benefit and at whose expense?

These questions are as relevant to traditional information services as to newer developments. Their importance is proportional to the stakes in benefits or burdens.

5. GROWTH RATES AND PRIORITIES (2,8,9,10,11)

   In the last two decades, the size, activity and cost of library and other information services have grown at rates above the growth rates of basic indexes such as population size, wholesale and consumer prices and, in some cases, of the Gross National Product.

At issue, in the first instance, is whether growth in size or activity is -- or, in any case, can continue to be:

-- a concomitant of growing complexity of social mechanisms and of a resulting increased need for information;

-- a high priority among educational or other information needs;

-- a high priority relative to all other national needs;

-- equally desirable for services of different size or clientele.

If necessity or priority is granted, attention to cost of both labor and capital is needed all the more.

6. POOR ACCOUNTING PRACTICES (5,7,15)

Functional accounting is a rarity. Even where aggregate figures are kept, there are only minimal data on the costs of various services, the cross-subsidies among them and the clienteles actually served. The "inputs" to specific services are generally not measured, hence barely identifiable even in gross terms. The value of "outputs" is, as in many service activities, hard to assess even in principle, and reliable marketplace indices are few in practice.

At issue is creating a basis for management and policy judgments about what mix of services is to be offered by whom to what clienteles.

Even crude functional accounting and explicit allocations of shared costs augment the basis for management decisions or for expressions of public will in matching up costs with benefits.

That "problems" can be created for managers when their clienteles become aware of the costs of services from which they or others benefit must be weighed in considering this option; so must the hard problems of sharing joint or common capital and operating costs among several services.

7. CONFUSED POLICIES

a. INCONSISTENCY OF GOVERNMENT POLICIES (12,13,14,15)

Many apparently unrelated policy decisions of governments at all levels directly impact library and other information services. These decisions are often at cross-purposes.

At issue is whether or not plans proposed by the Commission, including those for the forthcoming White House Conference on Library and Information Services can be significant if they do not take into account the rapidly evolving context of policies in closely related areas.

Certain areas are especially important for the Commission to take into account. Among them: policies affecting vital support systems like physical transport, copying technologies, telecommunications and computers, themselves currently undergoing major changes; the laws, traditions and practices surrounding copyright, and thus affecting all information industries; the laws and regulations governing access to, and publication of, government documents; diverse organizations and associations within the information industries of Figure 3.

Specific links to watch include: policies that might emerge from the 1973-74 hearings on the telecommunications and computer industries by the Subcommittee on Antitrust and Monopoly of the Senate Judiciary Committee; the work of the National Commission on New Technological Uses of Copyrighted Works that Congress created in December 1974; legislation affecting postal rates; federal and state court decisions on school and library tax equalization; etc.

b. INTERDEPENDENCE OF SECTORS (6,7)

Libraries and other information services are highly interdependent. As a consequence protagonists are found on the same side of some issues as commonly as on opposing sides in others.

At issue is how well adversary processes can serve the public interest in a situation where coalitions are so fluid.

The Commission and the public risk being misled when apparent adversaries are in fact pressing their common interests on the public purse. Calling on a broader range of parties-at-interest or increasing capabilities for objective judgments through market or other mechanisms are therefore options to be considered.

c. RIVALRIES WITHIN AND AMONG SECTORS (5,6,7,10)

Rivalries among "free" libraries or among "for-profit" firms are as evident as cross-sectoral rivalries. Some movements toward cooperative efforts or "networks" of various kinds are evident, but progress is slow and painful.

At issue is whether or not to foster alliances and, if so, how.

Since effective collaboration involves sharing costs, revenues, operating responsibilities, etc. across jurisdictional or institutional borders, failure to account for underlying rivalries can lead to a lip-service to ideals that covers up inaction or guerilla warfare.

Assessments of shifting burdens, and mechanisms for their equitable sharing therefore deserve explicit Commission attention.

d. WIDE TECHNOLOGICAL CHOICES (4,5,14,15)

Present and prospective means for communication and resource-sharing among collaborating institutions include the whole gamut of ancient and modern technologies.

At issue is the role of new technologies as agents of change and as effective operating tools.

Zealots overestimate the value of new technologies in overcoming institutional entrenchments or in delivering cost effectiveness as readily as neanderthals cling to comfortable but ineffective ways.

A wide range of technological options are available for the Commission to consider in whatever plans it proposes. The merits of specific mixes depend on outcomes in the many linked areas described in 7(a).

e. LIMITED SCOPE OF RESEARCH AND DEVELOPMENT (9)

Government-supported research and development on information science and technology deals almost exclusively with information that itself is scientific or technical. Such information is but a fraction, albeit a significant one, of the much wider substantive scope of library and other information services.

At issue is the balance of government-sponsored R&D in the information field and the range of activities to which the results are applied.

Since the only visible sponsor is the National Science Foundation, and since the law constrains it to considering only scientific and technical information, the questions are: What are the results of focusing on only scientific and technical information; and are these results transferable (or have they been transferred) to other information fields?

If present know-how in the public or private sector is an adequate base for any Commission plan, the matter is evidently less consequential than if it is not.

APPENDIX

1. Introduction

This report examines likely relationships between traditional library services and other information services in order to identify economic, institutional and technological aspects of these services that are key in determining where and on what terms people get access to information they need.

In creating the National Commission on Libraries and Information Science, the Congress affirmed that "library and information services adequate to meet the needs of the people of the United States are essential to achieve national goals and to utilize most effectively the Nation's educational resources"(2); it charged the Commission with primary responsibility for developing or recommending overall plans for implementing that policy.

To assist the National Commission as it explores the roles of various information services in relation to its own proposed national program, the report stresses the dynamics of actual and potential relationships among these services. The objective is to illuminate for the National Commission and the public operational factors likely to affect benefits and costs of various allocations of service functions, to identify the magnitude and direction of forces in play and to estimate so far as possible their relative weights so that practical public policy alternatives and their consequences for the public can be better understood.

In the process, we treat questions affecting libraries and other information services within the context of the wider legislative, regulatory, economic, technological and other determinants of the structure

and performance of information systems so as to increase the likelihood that significant factors affecting future developments will not be overlooked.

2. Library and other Information Services - An Overview

Few would disagree with the Congressional affirmation of the importance of providing "library and information services adequate to meet the needs of the people of the United States"(3), especially given the wide range of possible interpretations of that statement. The on-going battles over information resources swirl around the crucial and more specific questions of precisely who is to be served, by whom, with what and on what terms.

Besides the public in whose name the issues are joined, the protagonists include:

1. The library world characterized in Figure 1. The most numerous members of this world are public libraries, largely tax supported, and open in principle to all citizens in the communities they serve, and the libraries in elementary and high schools in the 3 thousand school districts of the United States, again tax supported and open in principle to all pupils attending school. The libraries of private, elementary and high schools and of the various institutions of higher education serve a clientele composed principally of the members of those institutions and are supported in varying degrees by taxation and private funds. Finally, the various special and professional libraries serve principally the private corporations or professional groups in which they are imbedded and are principally supported by private funds, but with benefits from postal and other subsidies.

2. An increasingly self-conscious for-profit private-sector information industry that includes, but is scarcely limited to, the heterogeneous members of the 6 year old Information Industry Association whose members are listed in Figure 2.

TYPE	1972-73
Total	29,819
United States	24,069
Public	7,109
Public, branch	4,881
Public, military installations	446
College and university	1,667
Junior college	1,056
Special (industry or specialized schools)	4,200
Special (college or university)	1,238
Special (part of public systems or military installations)	500
Law	482
Law (part of college and university)	131
Medical	1,406
Medical (part of college and university)	156
Religious	773
Religious (part of college and university)	24
Outlying areas	65

(a) Libraries -- Number by Type, 1972-73 (As of September. Covers listings in American Library Directory.)

U.S. Bureau of the Census, Statistical Abstract, 1973, Table 219, p. 137.

FIGURE 1. U.S. LIBRARIES

TYPE	NUMBER	VOLS.(& OTHER ITEMS)	TOTAL ANNUAL OPERATING EXPENDITURES ($)	DATE OF DATA
1. All College and University Libraries [a]	2,650	538,200,000	850,000,000	1972-73
2. Major Academic Libraries[b]	81	217,000,000	291,000,000	1972-73
3. Library of Congress[c]	1	85,100,000	74,300,000	1972
4. National Agricultural Library[c]	1	1,500,000[d]	4,300,000	1972
5. National Library of Medicine[c]	1	1,400,000	17,000,000	1972
6. All Federal Libraries[c]	2,313	--	191,800,000	1972
7. Public Libraries[e]	1,000-12,000[g]	157,000,000[f] (1968)	1,024,000,000	1972-73
8. Elementary and Secondary School Libraries[h]	18,985-59,064	--	--	1968
9. Special Libraries (Industry)[i]	14,000	--	--	1973
10. Government Scientific and Technical Information (STINFO)[j]	--	--	950,000,000	1971
11. USIA, foreign dissemination[k]	--	--	206,100,000	1973 (FY)

(b) BUDGETS OF SOME LIBRARY AND INFORMATION ACTIVITIES IN THE U.S.

(some Double Counting in All Categories)

Figure 1 (Continued). U.S. LIBRARIES

a. R.R. Bowker Co., The Bowker Annual of Library and Book Trade Information, 1974, p. 258-259. (Estimated)

b. Association of Research Libraries, Academic Library Statistics, 1972-1973, p.7.

c. Olson, Edwin E. et al., Survey of Federal Libraries, 1972, Table 6, p. 14, Table 13, p. 21.

d. Volumes only. Number of other items not available.

e. R.R. Bowker Co., op cit., p. 251.

f. U.S. Bureau of the Census, Statistical Abstract of the U.S., 1973, Table 220, p. 137. For volumes only.

g. Variation in numbers cited depend on whether only libraries in large population centers or a wider range of libraries is included.

h. Adapted from U.S. Bureau of the Census, Statistical Abstract, 1972, Table 152, p. 102 and from U.S. Dept. of Health, Education and Welfare, Office of Education, An Evaluative Survey Report on ESEA Title II: Fiscal Years 1966-1968, p. 76-77. The latter had figures for the fiscal year 1968.

i. Young, Margaret Labash et al., Directory of Special Libraries and Information Centers, p. ix. See Introduction p. vii-viii for caveats on accuracy: includes U.S. and Canada, and definition of scope of inclusion and exclusion of institutions is complex.

j. Personal Communication, Office of Science Information Service, National Science Foundation -- based on unpublished study by P. Vlannes, NASA, completed in 1973 for COSATI (Committee on Scientific and Technical Information of the Federal Council on Science and Technology). The figure covers only federal agency expenses.

k. Personal Communication, Budget Office, U.S. Information Agency. Figure is direct outlays for the fiscal year.

FIGURE 1 (Continued). U. S. Libraries

ABC/CLIO, Inc.
Richard Abel and Co.
Academic Press, Inc.
American Can Co.
Aspen Systems Corp.
Auerbach Publications, Inc.
Bell & Howell Microphoto Div.
R.R. Bowker Co.
BRICS
Business International
Chase Manhattan Bank
Congressional Information Services
Cordura
Corpus Publishers Services Ltd.
Data Courier, Inc.
Data Flow Systems, Inc.
Diablo Systems, Inc.
Disclosure, Inc.
Dun & Bradstreet Inc.
Economic Information Systems, Inc.
Editec, Inc.
Electro Optical Systems
Environment Information Center, Inc.
Esselte, Inc.
Frost & Sullivan
Fuji Corp.
Ginn and Co.
Greenwood Press, a Division of Williamhouse-Regency, Inc.
Herner & Co.
Information and Publishing Systems
Information for Business
Information Dynamics Corp.
Information Clearing House
Information Handling Services
Information Retrieval Ltd.
Information Specialists, Inc.
Informatics, Inc.
IBM
Inforonics, Inc.
Institute for Scientific Information
International Development Center
International Data Corp.
Lockheed Missiles & Space Co.
McGraw-Hill, Inc.
Macmillan Information Corp.
Multiprint
National Congressional Analysis Corp.
Jeffrey Norton Publishers, Inc.
New York Clearance Systems
Operations Research, Inc.
Opidan Sciences Inc.
Orba Information, Ltd.
Overseas Data Service
Pharmace-Medical Documentations, Inc.
Plenum Publishing Corp.
Predicasts, Inc.
Readex Microprint Corp.
Real Estate Data, Inc.
Research Publications, Inc.
Rocappi, Inc.
Rockville Consulting Group
Science Associates/ International, Inc.
Sedgwick Printout Systems
Standard & Poor's
System Development Corp.
The New York Times Information Bank
The Williams & Wilkins Co.
Thomson Data Ltd.
Time, Inc.
Unipub, Inc.
University Microfilms
U.S. Asiatic Co., Ltd.
U.S. Historical Documents Inst., Inc.
Warner-Eddison Associates
John Wiley & Sons, Inc.
Westat, Inc.
World Meeting Information Center, Inc.
Xerox Corp.

(a) Membership

FIGURE 2. MEMBERSHIP AND ESTIMATED GROSS ANNUAL REVENUES OF THE INFORMATION INDUSTRY ASSOCIATION (AS OF LATE 1974)

No. of Members	Dues ($)	Gross Annual Revenue Estimate ($ Million)	
		Low	High
6	150	-	1.5
25	300	-	25
2	450	2	5
7	600	1.8	7
6	900	6	15
15	1,200	37.5	75
6	1,800	30	90
4	5,000	400	400+
71 (Total)		477.3	618.5+

Estimated Range: $500 - 750 million

(b) Estimated Gross Annual Revenues

FIGURE 2 (Continued). MEMBERSHIP AND ESTIMATED GROSS ANNUAL REVENUES OF THE INFORMATION INDUSTRY ASSOCIATION (AS OF LATE 1974)

Symptomatic of the antagonisms expressed by each of these worlds for the other, are such statements from the library world as: "Several recent developments in the world of American libraries seem to foreshadow an ominous trend toward a new concept of library service. The concept is translated into a variety of proposals - the 'information supermarket,' 'libraries for profit,' 'user fees,' 'user-based charges' - but what's really being proposed is an elimination of tax-supported library service."(4)

Private sector spokesmen, on the other hand, argue forcefully that they have been denied equally competitive access to various portions of the information market by virtue of unfair and inefficient use of public funds to provide services at an overall cost to the public greater than if the same services were supplied by the private sector.

These arguments illustrate an important facet of the policy issues inherent in the questions of who is to be served by whom with what and on what terms. At stake are not only overall costs and their concomitant benefits but also the crucial details as to how these costs and benefits are distributed as, for example, through tax payments by persons who may or may not also directly enjoy the benefits or, at another extreme, exclusively by direct fees for services received.

An understanding of these issues from a national perspective is unlikely to be reached by focusing solely on a slice of information resources that encompasses only libraries and the self-styled Information Industry. These are, indeed, only two elements of a much broader range of information industries on which they depend for key resources and with which they compete.

That larger context could become unwieldingly grandiose were one to adopt as its definition Fritz Machlup's definition of a knowledge industry that, by his estimate in 1958, accounted for almost 29% of the Gross National Product.(5) If the proportion held, $332 billion would have been devoted to the production of knowledge in 1972! But even that might be an understatement. Some of the elements -- public and private -- of the present constellation of information industries are illustrated in Figure 3. In the aggregate, these accounted for over 40% of the 1970 GNP.

Whatever practical grouping one might select, any realistic perspective on library and other information services must take into account the presence of many kindred activities that support or compete with any focal subgroup.

A common trait of the activities listed in Figure 3 is that, in each case, information is the primary or sole output. Excluded from the table, but important as information users, are all the industries where information processing, however important, is incidental to producing such primary outputs as cars of haircuts.

The Social Security Administration, the county agent system and the banking, insurance, securities and legal service industries are listed to mark the borderline suggested by such a "primary business test". Whether the output of these industries is information or something else is arguable. However, each industry's "production line" is essentially nothing other than an information processing line. These industries occupy an unusual public-private milieu with regulation on varying scales and of varying intensities, with competitive stances ranging from monopoly to fear of no-man's-land and with institutional energies ranging from torpid contemplation of the past to enthusiastic ambition for the future.

Estimates gathered from U.S. government, trade associations and other sources, all figures in current dollars; double counting not eliminated.

	Approximate Gross Revenues. (in billions of dollars)			
	1970	1971	1972	1973
Broadcast television	2.8	2.8	3.2	3.5
Cable television	0.3	0.3	0.4	0.5
Broadcast radio	1.1	1.3	1.4	1.5
Telephone	18.2	20.0	22.4	25.5
Telegraph	0.4	0.4	0.4	0.5
Specialized common carriers	0.0	0.0	0.0	0.0
Satellite carriers	0.1	0.1	0.1	0.1
Mobile radio systems	2.0	2.2	2.4	2.6
Motion pictures	3.8	3.8	NA	NA
Organized sports, theaters, etc.	4.4	NA	NA	NA
Computer software suppliers > Computer service suppliers	1.9+	2.4+	3.0+	3.7+
U. S. Postal Service	6.3	6.7	7.9	8.3
Private information delivery services	0.7+	0.8+	1.0+	1.2+
Newspapers; wire services	7.0	7.4	7.8	8.3
Periodicals (including newsletters)	3.2	3.4	3.5	3.7
Business consulting services	0.9	1.1	NA	NA
Advertising	7.9	7.6	NA	NA
Marketing	32.4	37.7	41.3	43.4
Brokerage industries	40.6	47.4	54.4	NA
Book publishing and printing	3.4	3.7	3.9	4.1
Libraries	2.1	NA	3.6	NA
Schooling	70.0	76.3	83.2	89.5
Research and development	26.5	27.3	29.2	30.6
Federal information institutions				
Census Bureau	0.1	0.1	0.1	0.1
National intelligence community	4.0+	NA	NA	NA
National Technical Information Service	0.0	0.0	0.0	0.0
Social Security Administration	1.0	1.2	1.3	1.4
County agents	0.3	0.4	0.4	0.5
Banking and credit	61.1	68.9	76.9	NA
Insurance	92.6	103.5	121.4	NA
Legal services	8.5	9.6	NA	NA
U. S. Gross National Product	977.1	1,055.5	1,155.2	1,294.9

Figure 3: The Information Industries

The information industries are those where creating, storing, processing, distributing or using information are primary functions. Elsewhere, these functions are incidental to some other primary role. Even the massive information processing performed by railroads or supermarkets qualifies them as important information users, but not as information industries. Approximate annual gross revenues shown here for 1970-73 provide a rough index of the relative sizes of these industries. Double-counting has not been eliminated.

Historically, patterns of information use, of market structure, of public intervention, of analysis and of evaluation have developed independently in the information industries. Presumably, these patterns were adapted to the particular users, markets and technologies of each.

However, the record of the past decade suggests that the information industries are becoming increasingly intertwined. The technologies of computer systems and telephone systems for example, appear to be merging to the point that each may be soon considered as a branch of an over-arching digital technology for information processing. This technology is used, for example, by organizations providing terminals for on-line access to varied information files or "data bases".

This growing interchangeability and indistinguishability is a natural development because all information systems perform one or more of the following basic functions:

- creating information
- storing information
- processing information
- distributing information
- using information.

These information functions, of course, pervade all organized activity. In the information industries, however, they are primary functions. Elsewhere, they are incidental to some other primary role. Even the massive information processing performed by airlines, railroads or supermarkets qualifies them as important information users, but not as information industries.

Present differences in structure, in payment mechanisms, in jurisdiction, in legal and other traditions among the information industries are as important to understanding how their interacting affects the public as are the growing similarities of basic functions.

Some of the information industries, for example newspapers and the telephone companies, are primarily in the private sector. Others are essentially in the public sector, like the Postal Service and the Federal information institutions. Still others are mixed, like libraries and schooling. Some, including the telephone and telegraph companies and the Postal Service, transfer information without exercising substantial control over what content flows among users. Others, including television, newspapers, book publishers and schools create, process and disseminate information content.

Different traditions of government and other public interventions apply. The competitive book publishing and newspaper industries have been affected indirectly through devices such as taxation or postal rates (which side-step judgments as between "worthy" and "unworthy" publications that might interfere with the protection extended to content by the First Amendment) and directly as through censorship or copyright. The telephone and telegraph companies are monopolies subjected to economic regulation, but essentially free from intervention as to content, over which, in any case, they have little control. Intervention in television content is manifest through such devices as the Fairness Doctrine, through governmental pressure, and through the actions of consumer groups before regulatory agencies or the courts. The public schools and most public libraries are instruments of state and municipal governments.

In analyzing who is to be served, by whom, with what and on what terms, it seems important to underscore once again that in addressing the equity of the distribution of costs and benefits of information it is important to look beyond the appearance of overabundance suggested by the fashionable notion of "information explosion" in order to discern scarcities, bottlenecks or inequities that make "library and information services adequate to meet the needs of the people of the United States", a goal to strive toward, not a current reality.

The emphasis on information explosions is understandable in the context of statistics like those shown in Figure 4 that reflect substantial rates of increase in various indices of the activity of libraries and the book trade. Figure 5 shows that these rates are comparable with the growth rates of many varied types of transactions that far outstrip the growth rate of the population either in the United States or in the world and that in some cases outstrip the growth rate of the U.S. Gross National Product.

The reality of a concern for scarcities in the face of such apparent abundance stems from many factors.

A factor of considerable importance but of sufficient imponderability to be banned from further consideration in this paper, arises from the distinction between information and knowledge. Knowledge is in the mind of the beholder; data or information are the raw materials from which he fashions his knowledge of the world with the theory at his disposal. Since either pure raw information or theories without factual foundations can give the appearance of knowledge, both are all too often confused with knowledge. The point to be made here is simply that one can have vast amounts of information and still know nothing. The implications of this for

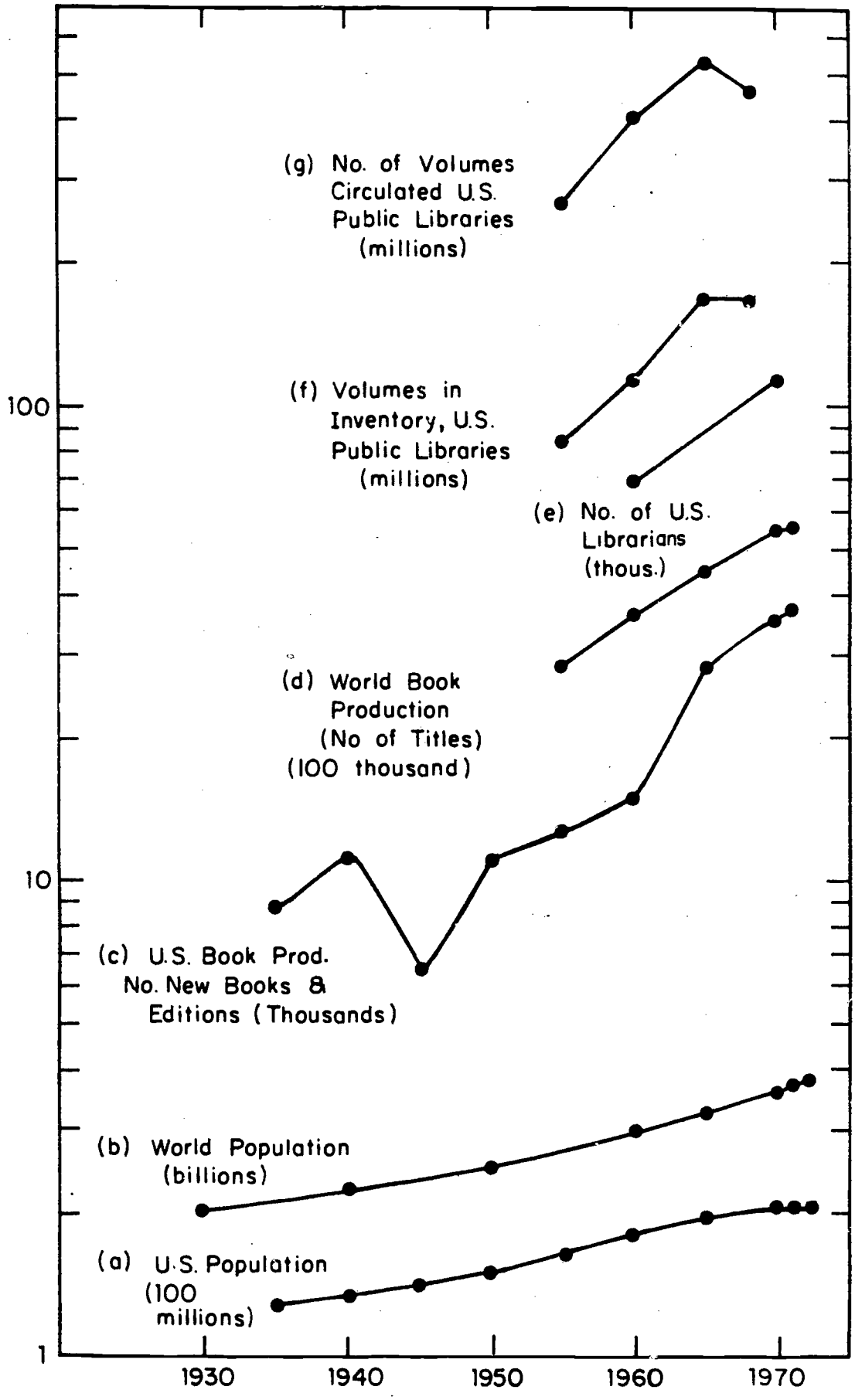


FIGURE 4. COMPARATIVE GROWTH DATA

a. U.S. Population: U.S. Bureau of the Census, Statistical Abstract, 1973, Table 2, p.5.

b. World Population: United Nations. Dept. of Economic Affairs, Statistical Office, Statistical Yearbook, 1974, p. 8, 1970, p. 16, 1965, p. 24.

c. U.S. Book Production: U.S. Bureau of the Census, Statistical Abstract, 1972, Table 816, p. 503. and U.S. Bureau of the Census, Historical Statistics of the United States, Colonial Times to 1957, Table R 165, p. 499.

d. World Book Production: United Nations, UNESCO, Statistical Yearbook, 1972, p. 714, 1970, p. 631.

e. Number of U.S. Librarians: R.R. Bowker Co., Bowker Annual, 1974, p. 323.

f. Volumes in Inventory, U.S. Public Libraries: U.S. Bureau of the Census, Statistical Abstract, 1973, Table 220, p. 137.

g. Number of Volumes Circulated, U.S. Public Libraries: Ibid.

Figure 4 (Continued): COMPARATIVE GROWTH DATA

Type of Transaction	Average Annual Growth 1940-1970
Checks written	6.7%
Telephones in use	6.2
Individual Social Security payments	17.1
Individual federal tax returns	5.8
Public welfare recipients	3.5
Airline passengers	14.3
Persons entering hospitals for treatment	3.8
Persons covered by private hospitalization insurance	9.5
Motor vehicle registrations	4.0
Passports issued	16.0
Students enrolled in colleges and universities	5.2
Applications received for federal employment	3.7
New York Stock Exchange transactions	8.3
Pieces of mail handled, U.S. Postal Service	3.6
Academic libraries:[(a)]	
volumes held	4.2
volumes added	6.6
Abstracts Produced by Chemical Abstracts Service	6.5
U.S. population	1.5
U.S. gross national product	3.9

FIGURE 5. Average annual growth of various transactions.

Increases in the volume of annual transactions. Adapted from Alan F. Westin and Michael A. Baker, *Databanks in a Free Society* (a report of the Computer Science and Engineering Board, National Academy of Sciences), Quadrangle Books, New York, 1972, pp. 224-227. The GNP growth rate is based on GNP expressed in sonstant dollars.

(a) 1951-1967

managerial decision making, scientific or scholarly research, and for education or learning in general are profound, but outside the s ope of this inquiry. It is sufficient for our purposes to limit analysis to the question of how the right information can get to the right people and the right time in the right form to be assimilated -- or not -- into useable knowledge. The scarcities of real concern are implicit in the evasive term "right".

As Herbert Simon has noted, the time and attention of information recipients is the scarce commodity in most practical situations, of which managerial decision-making is typical.(6) The bottlenecks in that situation are the processes for selecting a manageable volume of relevant information out of the abundant wealth of raw materials, just as for other natural resources that are abundant in principle, the issue is extracting them from the earth, air or water and delivering them in useable form. The means for prospecting and the rights of access to any lodes that are found are, in any case, as we shall see in Section 4, far from uniformly distributed, even assuming that they are adequately developed.

Nor is the capability to prospect for or mine information uniformly distributed in such terms as distance from the source, price of the product or literacy. Finally, in spite of well-intentioned expressions of ideals to the contrary, the desire to prospect or mine, especially for what someone else believes to be valuable, is again far from uniformly distributed, as suggested by some of the data in Figure 26.

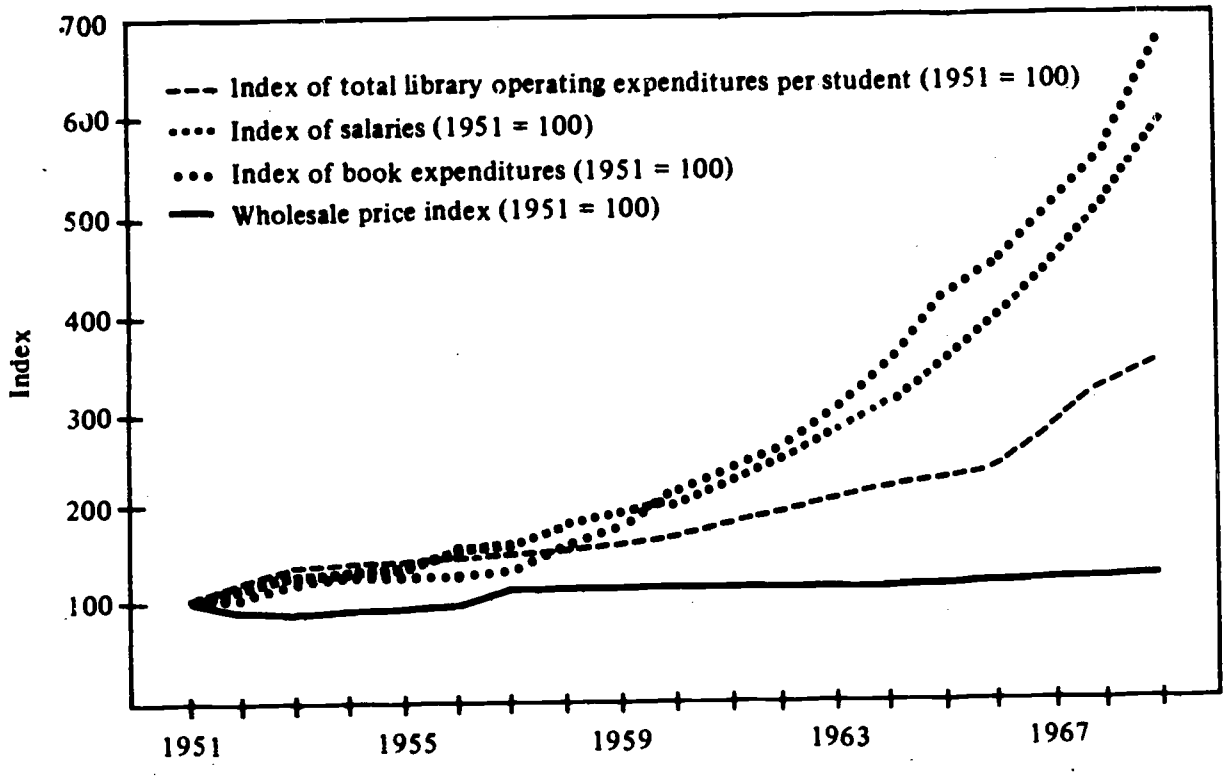
Furthermore, underlying perceived inequities of access to information resources are costs that have risen, even before the current general inflationary trend, at rates significantly above the rates of increase of general price indexes, as reflected in Figure 6.

Figure 7 shows that in certain information activities disproportionate rates of increase apply not only to materials but also to staffing costs, and that rises in costs per unit of output are significantly more rapid than the general rate of increase in price level, a difference that stands out in spite of arguments to the effect that units of output are significantly more difficult to define reasonably in service industries than in manufacturing industries.

Figure 8 shows that libraries share with other service industries a proportion of salaries to total operating costs that is high compared to the ratio in manufacturing industries.

Thus it is not surprising that both the private and the public sector of the information industries have given much attention in recent years to applying various information processing technologies, among them computers and telecommunications, to the more efficient exploitation of information resources. The attraction of these technologies is evident from the cost trends displayed in figure 9.

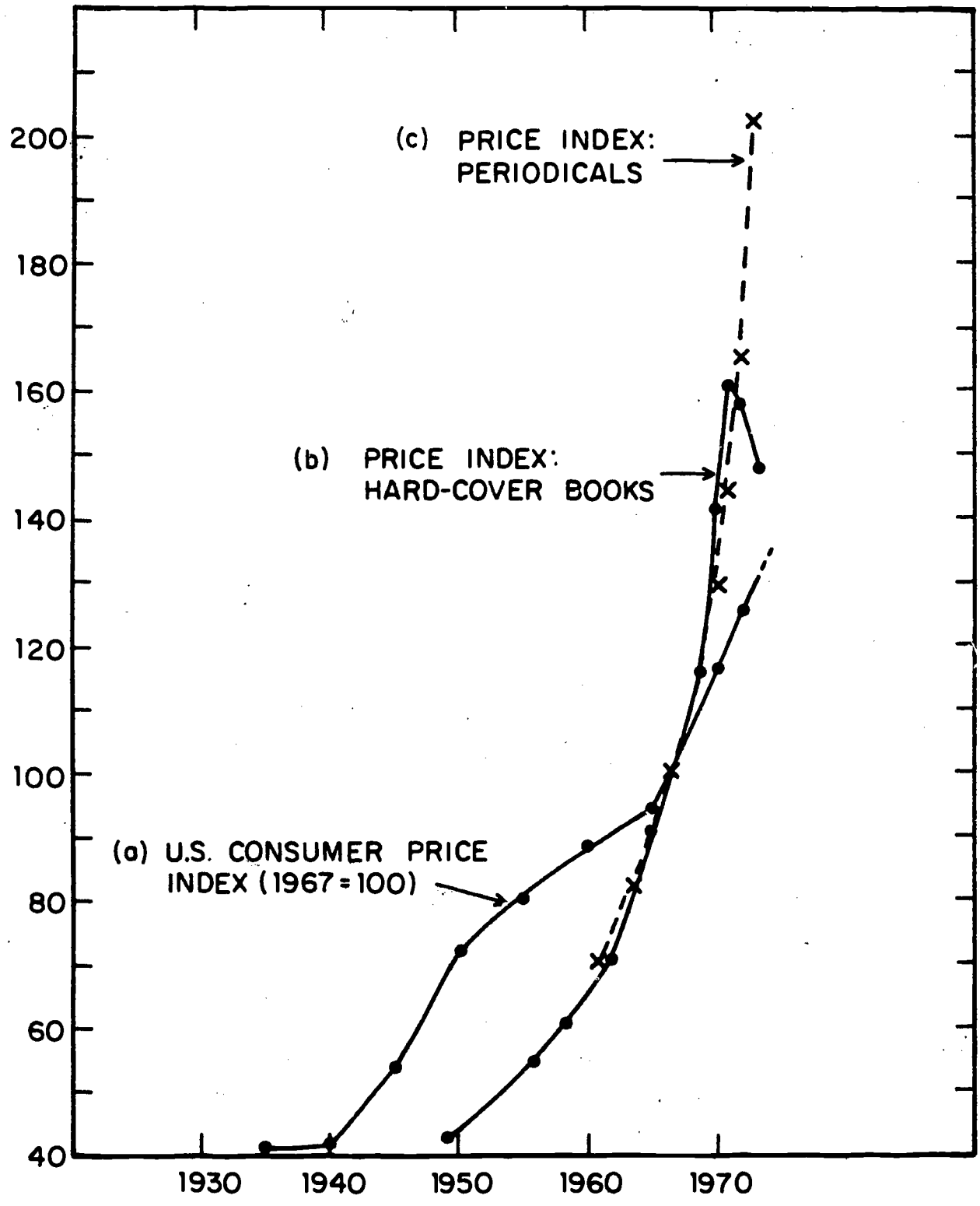
Progress, however, has not been as rapid as advocates of automation and teleprocessing have promised. As Figure 10 suggests, the technological cost decreases displayed in Figure 9 tell an overoptimistic story by neglecting, among others, the costs of software production, a process that is still largely a matter of labor-intensive art and craft.



(a) **Unit Costs in Fifty-eight University Research Libraries in Comparison with Wholesale Price Index, 1951-69**

Baumol, W.J. and Marcus, M., Economics of Academic Libraries, p. 46.

FIGURE 6. COMPARATIVE COST AND PRICE INDEXES



(b) Consumer, Book and Periodical Indexes

FIGURE 6 (Continued): Comparative Cost and Price Indexes

a. U. S. Consumer Price Index: U. S. Bureau of the Census, Statistical Abstract of the U. S., 1973, p. 354.

b. Price Index, Hard-Cover Books: R. R. Bowker Co., The Bowker Annual of Library and Book Trade Information, 1974, p. 210; 1970, p. 39; 1964, p. 82.

Publishers Weekly, p. 60

(Note: In 1971 change from per title to per volume.)

c. Price Index, Periodicals: R. R. Bowker Co., op. cit., 1974, p. 208; 1970, p. 37; 1967, p. 93; 1965, p. 104.

FIGURE 6 (Continued): Comparative Cost and Price Indexes

(a) 1951 - 1969

Wholesale Price Index	0.9%	Academic Libraries
Library Staff Salaries	5.5% (per volume owned)	
	5.3% (per student enrolled)	
Prices of Books & Periodicals	6.5%	
Volumes Held	4.2%	
Volumes Added	6.6%	

(b) 1965 - 1972

	LC	NLM	NAL	
Total Volumes in Collection	2.5%	4%	2.5%	National Libraries
Salaries and Wages	13.8%	23%	10.4%	
Library Materials	20%	33%	26%	

FIGURE 7. SELECTED ANNUAL GROWTH RATES

(a) Baumol, W. J., and Marcus, M., Economics of Academic Libraries, p. 47.

(b) Olson, Edwin E. et. al., Survey of Federal Libraries, 1972, Table 14, p. 22.

CATEGORIES OF LIBRARY OPERATING EXPENDITURES

	Public Libraries[a]	Illinois Library Systems[b]	New York State Library Systems[c]	Three National Libraries[d]	All Federal Libraries[e]	Large Academic Libraries[f]	Small Academic Libraries[f]
Salaries %	64.9	57.7	66.3	63.9	63.6	61.6	52.5
Materials %	16.8	14.6	13.4	11.8	20.2	30.4	40.7
Other %	18.3	27.8	20.3	24.3	16.2	8.0	6.8
Total Expenditures ($ millions)	363.4	50.3	134.6	95.6	191.8	N.A.	N.A.

PAYROLLS AS PERCENT OF OPERATING EXPENDITURES

	1950	1955	1960	1970	1972
Postal Service[g]		76.5	71.3	82.9	84.9
Public Schools[h]			82.0	79.0	73.6
Public Libraries[i]		71.4	68.6	64.9[j]	
Bell Telephone Companies[k]	63.0		58.9	51.2	51.9
General Motors[l]	27.3	27.6	29.3	34.3	30.5

FIGURE 8. EXPENSE COMPARISONS

a. U.S. Bureau of the Census, Statistical Abstract, 1973, Table 220, p. 137. Data for 1968

b. Illinois Libraries, "Illinois Public Libraries, Statistics 1973-74," October, 1974, p. 605. (A $5 million difference between sum of listed categories (including "other") and given total has been lumped with "other".)

c. The University of the State of New York, Public and Association Libraries, Statistics 1972, Table 1, p. iv, 1.

d. Olson, Edwin E. et. al., Survey of Federal Libraries, 1972, Table 15, p. 24. Data for (FY) 1972.

e. Olson, Edwin E. et. al., op. cit., Table 6, p. 14. Data for (FY) 1972.

f. Baumol, W.J. and Marcus, M., Economics of Academic Libraries, p. 10-11, 34. Data for 1968-1969.

g. U.S. Postal Service, Annual Report, 1972-73, p. 43, and U.S. Post Office Dept., Annual Report, 1970, p. 140, 1960, p. 138, 1955, p. 63.

h. Adapted from U.S. Bureau of the Census, Statistical Abstract, 1973, Table 160, p. 107, Table 685, p. 433.

i. U.S. Bureau of the Census, Statistical Abstract, 1973, Table 220, p. 137.

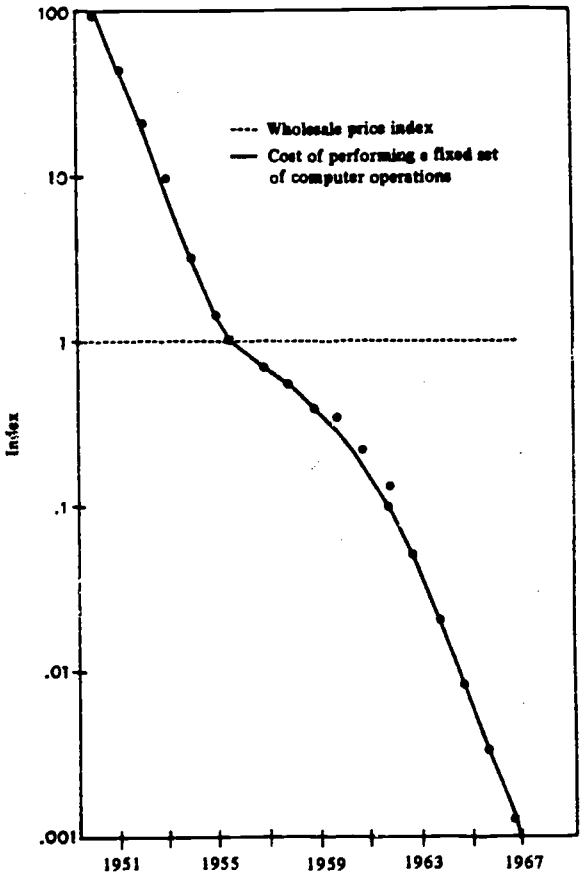
j. This number is for 1968.

k. U.S. Bureau of the Census, Statistical Abstract, 1973, Table 802, p. 494.

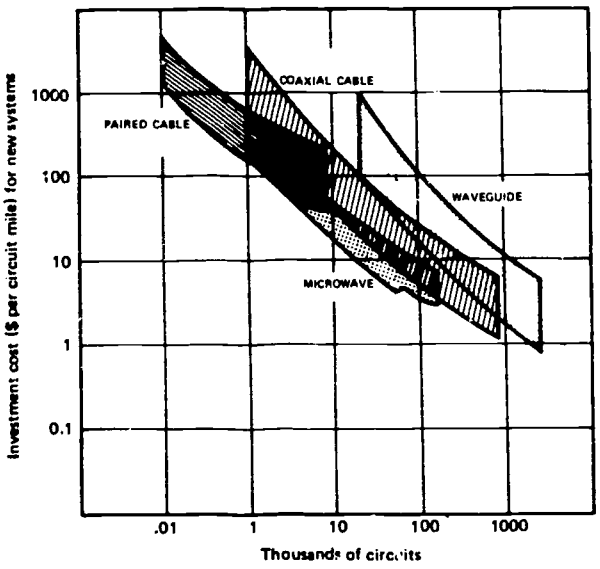
l. General Motors, Annual Report, 1973, p. 31, 43, 1970, p. 28, 1965, p. 37, 1961, p. 30, 1955, p. 42, 1950, p. 40.

FIGURE 8 (Continued): Expense Comparisons

Comparison of Cost of Computation
with Wholesale Price Index



Baumol, W.J. and Marcus, M., p. 48



Costs of alternate methods of information transmission.

Cost trends for terrestial transmission of information are down while carrying capacity is up. Paired cable is the original telephone technology still in use; the others are later developments. The increases in the handling capacity of the four transmission systems represent developments over time as well as technical improvements. The investment costs are expressed as a range. This chart is adapted from staff papers prepared for the President's Task Force on Communications Policy, 1969.

FIGURE 9. COST TRENDS IN COMPUTER AND COMMUNICATION TECHNOLOGIES

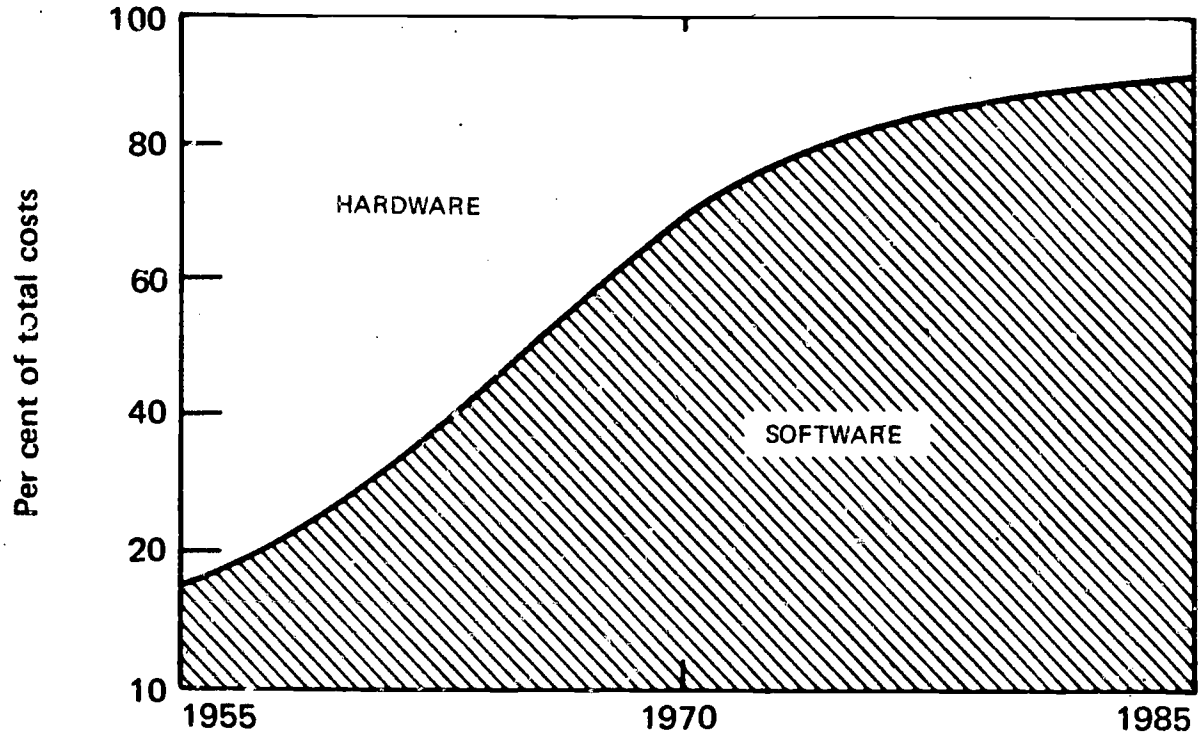


FIGURE 10. **Hardware/software cost trends**

Hardware/Software cost trends in computer systems show a pronounced shift toward a higher proportion of software costs. The tasks that any particular computer system actually does are specified only in part by how the physical system (hardware) is built. Programs of instructions (software) must be fed into the system to complete the specification. This complementarity (and, indeed, interchangeability) of hardware and software blurs the boundary between technology suppliers and the computer software supply industry, which we count among the information industries. The trend estimates are by Barry Boehm, in *Software and its Impact: A Quantitative Assessment,* RAND paper P4947, December 1972, p. 5.

Who is served, by whom, with what and on what terms is thus determined far less by the apparent overabundance of information than by

1. the cost of getting the right information to the right people at the right time in the right form, and
2. by differences in how costs are borne and benefits gained among the various suppliers of information resources and among their many varied clienteles.

It is therefore appropriate to proceed next to a more detailed description of the public and private sectors of information resource suppliers, and of the clienteles they serve.

The services supplied by the various elements of the information industries that we shall have to consider are sufficiently heterogeneous that there is a risk, not altogether unavoidable, of meaninglessly comparing apples and oranges. Meaningful comparison can be facilitated, however, to the extent that information systems are characterized in terms of the basic functions of creating, storing, processing, distributing and using information that they perform. In the next section we therefore develop this functional characterization in somewhat greater detail.

3. Functions of Library and Other Information Services

All library and other information services embody -- albeit to varying extents and in varying ways -- certain common basic functions. The differences among them, which will be stressed below, are best understood by reference to these common traits, listed in Figure 11.

The creation of information is perhaps most often visualized as the act of the poet or novelist creating a new literary work, the scientist writing up a new discovery, or the corporate staff preparing a company's annual financial report. But even in these activities there is an element of processing preexisting information that is gathered, perhaps modified, and organized into a new work built on but distinct from its sources. Authors and publishers are commonly identified with the performance of these functions. The resulting products typically are books, newspapers, magazines, reports and data bases, the latter a term newly in vogue that covers a wide and ill-defined range of information files encompassing directories, collections of citations, scientific data, or court cases, etc.

The storage function includes processes for appropriately organizing the information to be stored, for storing the information and for maintaining and managing the storehouses. Storage in this sense is an important characteristic function of publishers and of libraries. Publishers store information in packages such as books or periodicals and libraries, in turn, store these packages.

The usefulness of the storage function depends heavily on a selection function namely the processes for choosing what should be obtained and stored and what should be purged from storage. It also includes an access function, namely the processes for identifying and finding desired information in the storehouses.

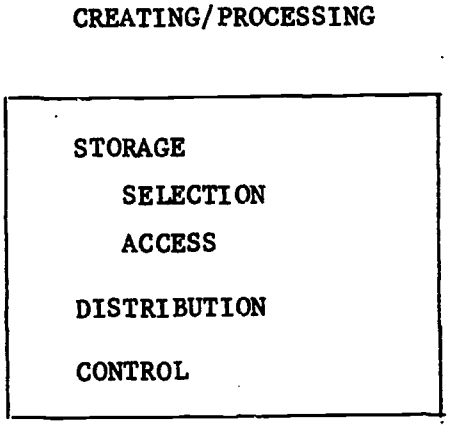


FIGURE 11. INFORMATION FUNCTIONS

Also important is a distribution function that encompasses processes for transferring information from producer to storehouse, among storehouses and from storehouses to users.

Overarching all these production functions is a control function that includes the processes for orchestrating the selection, storage, access and distribution functions.

As we shall see in Section 6, these family likenesses engender both a profound interdependence and severe competition among information services and libraries. The interdependence is a direct consequence of the interdependence of the basic functions. Current competitive pressures stem from the previously noted breakdown of the historical patterns of information use, of market structure, or public intervention that had developed independently in the "classical" information industries and presumably were adapted to the particular users, markets and technologies of each. Today, however, and in the foreseeable future, these patterns are in a rapid state of flux that it has become fashionable to term revolutionary. There are strong pressures for change on all the factors that distinguish one family member from the other.

Perceiving these factors of differentiation (Figure 12) is therefore as important for our analysis as noting the family relationships.

Costs Borne By:
* users
  personally
  organizational unit
* general public
  direct taxation
  indirect subsidy
  passed-through costs (e.g. of advertising)

Type (and Span) of Information Sources:
* direct gathering (as by observation, experiment, poll, survey, etc.)
* primary documents (newspapers, books, official records, accounting or operating records, professional journals, etc.
* secondary documents (indexes, directories, etc.)

Timeliness of Information:
* immediate
* periodical
* occasional

Storage Medium:
* hard-copy media (paper, microform, etc.); digital or analog
* electronic media (computer memories, magnetic tapes, etc.); digital or analog

Distribution Medium:
* physical transportation
* electronic telecommunications

Clientele:
* general public
* limited constituencies (by subject matter interest, by organization, or other affinities)
* scope of geographic coverage

Mix of Basic Functions:
* creating/processing
* storage
  selection
  access
* distribution
* control
* using

Types of Use:
* educational, cultural
* entertainment
* decision-making
  etc.

Institutional Type:
* private (profit or non-profit) or governmental
* primary unit or subunit

Quality

Responsiveness and Marketing:
* producer-initiated
* user-initiated

Extent of Assistance to User Search or Analysis:
* none
* clerical or routine
* consulting
* turnkey service

FIGURE 12. OPERATIONAL FACTORS DIFFERENTIATING INFORMATION SERVICES (examples only: mixes possible; not exhaustive)

4. Who Are The Clients? - From Libraries to Mass Media

Public Libraries

A measure of clientele that public libraries use widely is "population served". The concept is more accurately rendered as population eligible for service according to jurisdictional or geographic criteria. This measure is illustrated in Figure 13.

Who actually uses libraries is more difficult to tell. Knight and Nourse[7] quote 1966 Statistics on Public Libraries of the American Library Association to the effect that 52 million individuals or 26% of the national population of 199 million were registered with public libraries at that time.

Knight and Nourse[8] also report that a Gallup Poll taken for the National Commission on Libraries in 1967 showed that only 30 percent of the adult public were library users. Only 10 percent were heavy users. Thirty-five percent of these adult users said they did so to help their children with school work.

The importance of considering both actual use and eligible clients is underscored by the data in Figure 14 about the main public library in New Haven. While students constitute 51 percent of the users of that library and professional people only 13 percent, both types of users amount to roughly 4 percent of their eligible category. The conclusion that this library bears the brunt of service to New Haven students would therefore be unwarranted. Indeed what the other 96 percent do is not known.

Bernard Berelson's 1949 study, The Library's Public,[9] went beyond such gross statistics in compiling evidence that geographic proximity, age, level of education, sex, race, marital status, and socioeconomic status are important factors in differentiating actual clients from

	Illinois[a]	New York[b]		
	1971-72	1957	1967	1972
"served" by libraries	79.6%	91.2%	99.8%	99.8%
not "served"	20.4%	8.8%	0.2%	0.2%
Total population (millions)	11.1	14.8	17.5	18.2

FIGURE 13. PERCENT POPULATION "SERVED" BY PUBLIC LIBRARIES

a. Illinois Libraries, "Statistics of Library Systems in Illinois," December, 1972, Table 1, p. 842.

b. The University of the State of New York. Public and Association Libraries, Statistics/1972, Table 1, p. iv, 1.

Occupation	Numbers of Library Users	% of Library Users	Numbers of Potential Users (in Total Pop.)	% of Potential Users that are Library Users
Student	1187	51.3	33,200	3.6
Teacher	163	7.0	3,100	5.2
Professional	294	12.7	7,200	4.1
Skilled Worker	127	5.5	13,200	1.0
Business-Managerial	256	11.0	9,800	2.7
Unskilled Worker	46	2.0	23,700	0.2
Unemployed	53	2.3	3,100	1.7
Retired	83	3.6	18,600	0.4
Housewife	106	4.6	16,600	0.7

FIGURE 14. OCCUPATION DISTRIBUTION OF USERS OF MAIN LIBRARY

Schlessinger, B.S., Users and Uses of the New Haven Free Public Library, Table 12, p. 46.

non-users. City dwellers, the young, the well educated, the middle class, single people and whites are significantly more frequent and more intensive library users than their complements on each of these scales. More recent studies cited by Martin[10] show these findings as holding through the late sixties. The pattern carries forward into the seventies in studies of San Francisco,[11] New Haven,[12] and the State of Colorado.[13]

Great variations of reach are evident in other measures as well. Figure 15 illustrates differences in accessibility of print and audiovisual materials as reflected in the percentage of these materials that are catalogued in the public and nonpublic libraries of Illinois. The wide range of populations served by Illinois libraries is evident from Figure 16 whose significance derives from a high correlation between the magnitudes of the population served, the expenditures and the collections of public libraries. In 1971-72 the opening hours of these same libraries ranged from 3 to 77 hours per week and the annual fees charged to non-residents for library use from $1 to $35.[14]

While 99 percent of the population of New York State was "served" by that state's public libraries, 100 percent of the population of the New York City metropolitan area, but only 20 percent of the 45 thousand inhabitants of Franklin County in the northern part of the state, was within 5 miles of a library.[15]

College and University Libraries

For college and university libraries, the disparity between eligible clientele and actual users might be expected to be less than for public libraries, given the combination of self-selection and compulsion inherent in library use in the academic context. Overall patterns of intra-

	Percent of Sample	
	Public	Non-Public
Print materials		
All materials cataloged	75%	80%
Part of collection cataloged	23%	19%
None of collection cataloged	2%	1%
All materials classified	75%	84%
Part of collection classified	21%	15%
None of collection classified	4%	1%
Audiovisual materials		
All materials cataloged	60%	54%
Part of collection cataloged	27%	21%
None of collection cataloged	13%	25%
All materials classified	55%	48%
Part of collection classified	32%	27%
None of collection classified	13%	25%
Maintain a shelflist	87%	80%

FIGURE 15. ORGANIZATION OF COLLECTIONS IN THE SAMPLE OF LIBRARY MEDIA PROGRAMS

Wert, Lucille M., "Illinois School Library Media Survey," Illinois Libraries, p. 595.

(a) Illinois Public Library
by Population Served*

Population Served	Number of Libraries	Percent
0 - 4,999	288	54%
5,000 - 9,999	79	15
10,000 - 24,999	92	17
25,000 - 49,999	52	10
50,000 - 99,999	18	3
100,000 - 150,000	2	-
Over - 150,000	1	-

* Based on FY 1973 statistics

Personal Communication, Illinois State Library, Research and Statistics, December 1974.

(b) Illinois Public Libraries --
Distribution of Volumes Held

Volumes Held	*Number*	*Percent*
0 - 4,999	79	16.2
5,000 - 9,999	120	24.6
10,000 - 14,999	93	19.1
15,000 - 19,999	44	9.0
20,000 - 24,999	31	6.4
25,000 - 49,999	67	13.8
50,000 - 74,999	24	4.9
75,000 - 99,999	13	2.7
100,000 - 499,999	15	3.1
500,000 - 999,999	0	—
1,000,000 and over	1	0.2
Total	**487**	**100.0**

Illinois Libraries, "Meeting the Challenge: Illinois State Library's Long-Range Program for Library Development in Illinois, 1972-77," November, 1972, p. 741.

FIGURE 16. VARIATION IN ILLINOIS PUBLIC LIBRARIES

institutional useage cannot, however, be discerned since the major source of data on this score, the U. S. Office of Education's Library Statistics of Colleges and Universities[16] devotes only 3 out of 71 included variables to user description and that under the general headings of "opening fall enrollment", "total enrollment", and "undergraduate full time enrollment".[17] More significant, however, is the well known fact, illustrated by Figure 17, that educational level attained is unevenly distributed among the members of any given age group as reflected both by the declining proportion enrolled in successively higher levels of education and by sex.

Figure 18 clearly shows the high variation in the reach of library services to schools. Elementary schools, though universally attended according to law, are uniformly more poorly served than the high schools, at least in terms of standards set by professional associations or state education agencies.

Federal Libraries

The reach of the over 2000 federal libraries has a wide and complex pattern (Figure 19). Some of them serve the general public directly; others, especially the military libraries, serve the cross-section of the public that happens to be in military service. In other cases, direct service is only to personnel of the agency harboring the library. The three national libraries (Library of Congress, National Library of Medicine and National Agricultural Library) play special roles cutting across the public and private sectors in ways that will be analyzed in more detail in section 9. In addition, the United States Information Agency operates 132 libraries and 30 reading rooms throughout the world.[18]

YEAR	TOTAL			MALE			FEMALE		
	Elementary School	High School	College	Elementary School	High School	College	Elementary School	High School	College
Estimates									
1950	21,406	6,656	2,214	11,000	3,344	1,515	10,406	3,312	699
1960	32,441	10,249	3,570	16,711	5,184	2,339	15,730	5,065	1,231
1970	36,676	14,715	7,413	18,767	7,422	4,401	17,909	7,294	3,013
Projections									
1975	32,915	16,114	9,700	16,865	8,159	5,833	16,051	7,956	3,867
1980	34,565	15,133	11,449	17,698	7,670	6,896	16,867	7,463	4,554
1985	42,026	14,523	11,854	21,515	7,315	7,139	20,511	7,207	4,716
1990	47,960	18,037	12,684	24,572	9,094	7,517	23,387	8,943	5,167

FIGURE 17. ESTIMATES AND PROJECTIONS OF SCHOOL POPULATIONS (IN THOUSANDS)

U.S. Bureau of the Census, Statistical Abstract, 1973, Table 164, p. 110.

(a) PERCENTAGE OF WISCONSIN PUBLIC SHCOOLS WITH BOOK COLLECTIONS MEETING AT LEAST MINIMUM STANDARDS

	1965-66	1967-68	1969-70	1972-73
Elementary Schools	9	17	14	24
Junior High Schools	15	41	28	40
Senior High Schools	12	50	37	45

Pichette, William, "Budgets Up, Goals Away: Public School Media Centers and Standards," Wisconsin Library Bulletin, p. 260.

(b) PERCENT OF PUBLIC SCHOOLS WITH CENTRALIZED LIBRARIES

Enrollment size of school system and grade level of school	1958-59	1962-63	Change
All school systems with 150 pupils or more	50.4	58.9	+8.5
Elementary	34.1	44.4	+10.3
Secondary	96.7	97.4	+.7
Combined	87.7	89.6	+1.9
25,000 pupils or more	62.2	72.2	+10.0
Elementary	53.2	64.6	+11.4
Secondary	97.2	97.6	+.4
Combined	83.7	76.7	-7.0
12,000 to 24,999 pupils	53.5	60.5	+7.0
Elementary	41.1	48.6	+7.5
Secondary	98.5	98.8	.3
Combined	89.0	90.1	+1.1

U.S. Dept. of Health, Education, and Welfare. Office of Education, An Evaluative Survey Report on ESEA Title II: Fiscal Years 1966-68, Part II, p. 110.

FIGURE 18. ASSESSING THE REACH OF SCHOOL LIBRARIES

(c) **MEETING STATE SCHOOL LIBRARY STANDARDS:** for library books, periodicals, and audiovisual materials in June 1968.

Educational level of School	Percent meeting standard for no. of books	Percent meeting standard for no. of periodical subscriptions	Percent meeting standard for no. of audiovisual materials
Elementary	46.3	44.0	36.8
Secondary	60.9	66.9	46.5

Ibid., p. 76.

(d) **MEETING AMERICAN LIBRARY ASSOCIATION STANDARDS (1960):** for library books, periodicals, and audiovisual materials in June 1968.

Educational level of school	Percent meeting standard for no. of books	Percent meeting standard for no. of periodical subscriptions	Percent meeting standard for no. of audiovisual materials
Elementary	13.4	3.4	12.1
Secondary	23.5	8.8	17.8

Ibid., p. 77.

FIGURE 18 (Continued): ASSESSING THE REACH OF SCHOOL LIBRARIES

(a) Types of Federal Libraries

- 2,313 federal libraries were identified in FY 1972.

  of these: 43% were special or technical libraries (health, science and special)
  37% were general (quasi-public) libraries
  18% were educational (academic, quasi-academic, and school) libraries
  2% were Other libraries (Presidential and Systems Headquarters).

- 1,744 libraries provided substantial data in the Federal Library Survey.

  These included: 37% special or technical
  36% general
  24% educational
  3% other libraries.

- 64% of all federal libraries identified were in the military departments of the Executive Branch.

- Military Libraries included: 22% special or technical
  42% general (quasi-public)
  33% educational
  3% Systems Headquarters

- $191,825,882 in total operating expenditures were reported in FY 1972. Of this, about half was spent by the three national libraries (Library of Congress, National Library of Medicine, and National Agricultural Library).

Olson, Edwin E. et al, Survey of Federal Libraries, 1972, p. 1.

FIGURE 19. SUMMARY ASSESSMENT OF REACH OF FEDERAL LIBRARIES

(b) DISTRIBUTION OF LIBRARIES IN GOVERNMENTAL ORGANIZATIONS

by Average Number of Current Periodical Titles Held

Under 300	300-500	500-1000	1000-2000	Over 2000
Legislative Branch	Executive Office of President	Air Force	Labor	Federal Reserve
Judicial Branch	Defense	State Dept.		
Justice Dept.	Army	Interior		
Treasury	Navy	HEW		
VA	Agriculture	Smithsonian		
GSA	Commerce	NASA		
Boards, Comm.	HUD	EPA		
Quasi-Official Agencies	Transportation			
	USIA			
	AEC			
	Other Independent Agencies			

Olson, Edwin et al, Survey of Federal Libraries, 1972, Table 20, p. 31.

FIGURE 19 (Continued) SUMMARY ASSESSMENT OF REACH OF FEDERAL LIBRARIES

Federal information institutions of interest here cover a wider range than those designated as libraries. Figure 20 lists 858 banks of personal information about individuals maintained by agencies of the Federal Government, categorizes them, and describes patterns of public access.

As a consequence of the Federal Depository Library Act of 1962, diverse public and private libraries have been designated as regional depositories that must maintain extensive collections of federal publications and provide interloan reference and advisory service to libraries within their region. The University of the State of New York reports for example, that "In 1964, depository libraries were, for the most part, widely and equitably distributed across the State in public and academic facilities. Of the Upstate central libraries: 5 were depositories; 14 were in the same city as a depository; and 28 were within 25 miles of a depository. Since then depositories have been established in additional strategic locations, e.g., Plattsburgh, New Paltz, and on Long Island."(19)

While statistical summaries are not available, the richness of government information services accessible to the public, at least in principle, may readily be inferred from Figure 21.

Variations in availability and quality of service are as evident in the federal system as in other parts of the library world. The region comprising Iowa, Kansas, Missouri and Nebraska has only 3% of the total number of Federal Libraries in the United States, while 14% are located in the southeast region including Alabama, Florida, Georgia,

-NUMBER OF DATA BANKS, COMPUTERIZATION AND NUMBER OF RECORDS

Agency	Number of data banks	Number of computerized data banks	Number of data banks not reporting number of records	Number of records
ACTION	6	5	0	351,700
Administrative Conference of the United States	0	0	0	0
Administrative Office of the U.S. Courts	9	9	4	757.000
Appalachian Regional Commission	3	2	3	0
Civil Aeronautics Board	1	1	0	0
Civil Service Commission	13	8	4	18,972,800
Department of Agriculture	6	5	0	5,539,200
Department of Commerce	8	8	3	204,165,500
Department of Defense:				
Department of the Air Force	73	36	13	18,001,109
Department of the Army	385	382	12	34,467,849
Department of the Navy	20	12	6	6,154,368
Miscellaneous Department of Defense offices and agencies	19	13	3	2,626,090
Department of Health, Education, and Welfare	61	60	0	402,428,158
Department of Housing and Urban Development	27	25	6	9,862,305
Department of the Interior	1	0	0	79,800
Department of Justice	19	12	4	139,031,722
Department of Labor	4	3	1	24,000,000
Department of State	2	1	1	243,135
Department of Transportation	18	17	2	6,194,430
Department of the Treasury	46	38	7	155,571,458
Environmental Protection Agency	4	4	0	41,200
Equal Employment Opportunity Commission	5	5	0	131,000
Export-Import Bank of the United States	0	0	0	0
Farm Credit Administration	3	1	0	2,900
Federal Communications Commission	12	12	5	2,253,441
Federal Deposit Insurance Corporation	2	0	0	30,000
Federal Home Loan Bank Board	0	0	0	0
Federal Maritime Commission	0	0	0	0
Federal Mediation and Conciliation Service	1	1	0	1,000
Federal Power Commission	1	0	0	1,100
Federal Reserve Board	1	0	0	1,369
Federal Trade Commission	1	1	1	0
General Services Administration	2	1	0	119,000,160
Indian Claims Commission	0	0	0	0
Interstate Commerce Commission	1	0	0	1,750
National Aeronautics and Space Administration	1	0	1	26,931
National Credit Union Administration	1	0	1	512
National Labor Relations Board	0	0	0	0
National Mediation Board	0	0	0	0
National Science Foundation	4	4	1	375,505
Office of Economic Opportunity	13	13	3	108,360
Office of Emergency Preparedness	2	2	0	1,905,000
Office of Management and Budget	3	2	0	2,083
Railroad Retirement Board	9	4	5	15,468,000
Securities and Exchange Commission	6	6	0	679,500
Selective Service System	1	1	0	14,660,811
Small Business Administration	4	2	0	384,000
Special Action Office for Drug Abuse Prevention	1	0	0	23,000
Subversive Activities Control Board	0	0	0	0
Tennessee Valley Authority	8	7	3	146,150
U.S. Atomic Energy Commission	6	6	0	1,088,600
U.S. Commission on Civil Rights	3	1	1	379
U.S. Information Agency	2	2	0	17,696
U.S. Postal Service	2	2	0	23,000
U.S. Tariff Commission	2	2	2	0
Veterans Administration	29	21	1	72,604,326
White House	7	4	0	151,940
Total	858	741	93	1,245,699,494

(a)

FIGURE 20. SOME FEDERAL DATA BANKS

—CATEGORIES OF DATA BANKS

Agency	Administrative	Evaluative	Statistical	Total
ACTION	4	2		6
Administrative Conference of the United States				0
Administrative Office of the U.S. Courts	3		6	9
Appalachian Regional Commission	3			3
Civil Aeronautics Board	1			1
Civil Service Commission	7	3	3	13
Department of Agriculture	4	1	1	6
Department of Commerce	7		1	8
Department of Defense:				
Department of the Air Force	64	7	2	73
Department of the Army	244	74	67	385
Department of the Navy	11	6	3	20
Miscellaneous Department of Defense offices and agencies	13	4	2	19
Department of Health, Education, and Welfare	46		15	61
Department of Housing and Urban Development	20	1	6	27
Department of the Interior	1			1
Department of Justice	4	14	1	19
Department of Labor	3		1	4
Department of State	2			2
Department of Transportation	11	1	6	18
Department of the Treasury	36	8	2	46
Environmental Protection Agency	4			4
Equal Employment Opportunity Commission	5			5
Export-Import Bank of the United States				0
Farm Credit Administration	3			3
Federal Communications Commission	11	1		12
Federal Deposit Insurance Corporation	2			2
Federal Home Loan Bank Board				0
Federal Maritime Commission				0
Federal Mediation and Conciliation Service	1			1
Federal Power Commission	1			1
Federal Reserve Board	1			1
Federal Trade Commission	1			1
General Services Administration	2			2
Indian Claims Commission				0
Interstate Commerce Commission	1			1
National Aeronautics and Space Administration	1			1
National Credit Union Administration	1			1
National Labor Relations Board				0
National Mediation Board				0
National Science Foundation			4	4
Office of Economic Opportunity	5		8	13
Office of Emergency Preparedness	2			2
Office of Management and Budget	3			3
Railroad Retirement Board	9			9
Securities and Exchange Commission	3	3		1
Selective Service System	1			6
Small Business Administration	2	2		4
Special Action Office for Drug Abuse Prevention			1	1
Subversive Activities Control Board				0
Tennessee Valley Authority	5		3	8
U.S. Atomic Energy Commission	3	2	1	6
U.S. Commission on Civil Rights	2	1		3
U.S. Information Agency	2			2
U.S. Postal Service		2		2
U.S. Tariff Commission	2			2
Veterans Administration	28		1	29
White House	7			7
Total	592	132	134	858

(b)

FIGURE 20 (Continued): SOME FEDERAL DATA BANKS

Agency	—PUBLIC ACCESS						
	Direct	Upon request	In accordance with agency procedures and/or with FOIA	Public information	No access	No information provided	Total
ACTION			6				6
Administrative Conference of the United States							0
Administrative Office of the U.S. Courts		[1] 9					9
Appalachian Regional Commission			3				3
Civil Aeronautics Board			1				1
Civil Service Commission				[1] 4	9		13
Department of Agriculture		5				1	6
Department of Commerce				[1] 2	6		8
Department of Defense:							
Department of the Air Force			20	1	45	7	73
Department of the Army			14	2	53	2	71
Department of the Navy			16		3	1	20
Miscellaneous Department of Defense offices and agencies			4		13	2	19
Department of Health, Education, and Welfare			10		51		61
Department of Housing and Urban Development				[1] 14		13	27
Department of the Interior						1	1
Department of Justice			3		5	11	19
Department of Labor			2			2	4
Department of State			1			1	2
Department of Transportation		3	1	7	4	3	18
Department of the Treasury			12	4	28	2	46
Environmental Protection Agency						4	4
Equal Employment Opportunity Commission				[1] 5			5
Export-Import Bank of the United States							0
Farm Credit Administration						3	3
Federal Communications Commission			10		2		12
Federal Deposit Insurance Corporation					2		2
Federal Home Loan Bank Board							0
Federal Maritime Commission							0
Federal Mediation and Conciliation Service					1		1
Federal Power Commission					1		1
Federal Reserve Board						1	1
Federal Trade Commission				1			1
General Services Administration			2				2
Indian Claims Commission							0
Interstate Commerce Commission						1	1
National Aeronautics and Space Administration						1	1
National Credit Union Administration						1	1
National Labor Relations Board							0
National Mediation Board							0
National Science Foundation				[1] 3	1		4
Office of Economic Opportunity		2		2	5	4	13
Office of Emergency Preparedness					2		2
Office of Management and Budget					3		3
Railroad Retirement Board			4			5	9
Securities and Exchange Commission			3	2	1		6
Selective Service System			1				1
Small Business Administration			3		1		4
Special Action Office for Drug Abuse Prevention			1				1
Subversive Activities Control Board							0
Tennessee Valley Authority			4	4			8
U.S. Atomic Energy Commission			3			3	6
U.S. Commission on Civil Rights				3			3
U.S. Information Agency						2	2
U.S. Postal Service						2	2
U.S. Tariff Commission						2	2
Veterans Administration			29				29
White House					7		7
Total	0	14	158	54	243	76	544

[1] Statistical information only.

(c)

FIGURE 20 (Continued): SOME FEDERAL DATA BANKS

a. U.S. Congress. Senate. Committee on the Judiciary, Subcommittee on Constitutional Rights, Federal Data Banks and Constitutional Rights: A Study of Data Systems on Individuals Maintained by Agencies of the U.S. Government, Part III, Vol. 1, Table 1, p. XLIX.

b. Ibid., Table 2, p. L.

c. Ibid., Table 7, p. LVI.

Directory of Federally Supported Information Analysis Centers

Compiled by the National Referral Center

In consultation with the Interagency Ad Hoc Group on Information Analysis Centers

LIBRARY OF CONGRESS WASHINGTON 1974

(a)

DIRECTORY OF COMPUTERIZED DATA FILES & RELATED SOFTWARE

Available from Federal Agencies

March 1974

(b)

A DIRECTORY OF INFORMATION RESOURCES IN THE UNITED STATES

FEDERAL GOVERNMENT

With a Supplement of Government-Sponsored Information Analysis Centers

Revised Edition

Science and Technology Division

National Referral Center

LIBRARY OF CONGRESS • WASHINGTON • 1974

(c)

FIGURE 21. SAMPLE FEDERAL INFORMATION SERVICES

a. Library of Congress, Directory of Federally Supported Information Analysis Centers, p. i.

b. U.S. Dept. of Commerce, Directory of Computerized Data Files and Related Software: Available from Federal Agencies, 1974, p.i.

c. Library of Congress, Federal Government: A Directory of Information Resources in the U.S., p. i.

Kentucky, Mississippi, North Carolina, South Carolina and Tennessee. In dollar terms, 30% of federal library expenditures are incurred by the libraries located in the Washington, D. C. area and, at the other extreme, only 2% by the libraries in Alaska, Idaho, Oregon and Washington.(20)

Special Libraries

The category of special libraries encompasses libraries "usually built around a special collection limited by subject or form in accordance with the interests of its users; ... these libraries ... operate in support of a special mission or activity determined by the purposes and objectives of their sponsoring organizations"(21)

As shown in Figure 22, this category cuts across all preceding ones and encompasses two new elements: libraries found in business or industrial organizations and those operated by various types of non-profit entities such as professional societies or trade associations. It is that 55% or so of special libraries that lie outside our earlier categories that is of primary interest in our context, since they predominantly serve private interests rather than broad segments of the public.

It is clear from Figure 23 that here also there is a wide range of variation both in intended clientele and in the size of the special libraries themselves.

How many special libraries there are is difficult to specify owing to the fluidity of the definition. The data of Figure 1 put a lower bound in the neighborhood of 6-7 thousand in the United States, while the Directory of Special Libraries and Information Centers(22) lists some 14 thousand in the United States and Canada.

	I College and univ.	II Company	III Govt. agency	IV Public library depts.	V Other organi-zations	TOTAL
TOTAL	2258	2221	1239	464	2576	8758
PERCENTAGE OF TOTAL	25.8	25.4	14.1	5.3	29.4	100.0

FIGURE 22. NUMBER OF SPECIAL LIBRARIES BY TYPE OF ORGANIZATION

Kruzas, Anthony T., Special Libraries and Information Centers: A Statistical Report on Special Library Resources in the U.S., Table 1, p. 13.

Industry	No. Cos.	No. Lib.	Year Library Founded Range	Median	Volumes in Collection Range	Median	Mean	Books Purchased in One Year Range	Median	Mean	Periodical Subscriptions Range	Median	Mean	Total Library Area (Sq. Ft.) Range	Median	Mean
Aircraft, missiles	14	73	1930-1958	1953	70-32,300	3,150	6,328.0	30-5,000	400	717.3	4-1,500	226	334.5	200- 7,000	500	1,964.4
Chemicals	22	112	1900-1959	1947	70-50,000	4,063	5,926.2	3-1,824	162	267.4	15-1,250	185	247.8	151-12,100	1,424	2,159.8
Drugs, pharm.	7	18	1888-1958	1943	115-40,000	3,600	12,406.2	15-2,400	400	569.3	12-1,800	480	529.6	180-10,000	3,400	3,986.5
Electric machinery	15	101	1892-1959	1953	100-32,000	2,457	4,806.9	10-1,500	200	337.7	18-1,000	165	239.7	120-30,700	990	2,114.0
Food products	6	11	1904-1949	1940	4,000-17,000	6,250	8,498.5	40-1,423	210	422.4	71- 650	400	366.2	600- 8,500	1,500	3,052.0
Instruments	3	17	1912-1954	1944	845-31,600	2,500	5,625.8	50- 325	142	162.4	100- 800	390	410.9	600- 8,500	1,180	1,901.3
Machinery, non-elect.	3	5	1940-1955	1945	[illegible]- 9,313	5,062	4,987.0	30- 300	160	188.0	105- 800	350	357.4	500- 1,600	1,000	1,012.0
Office & Computing mach.	3	17	1926-1958	1956	525- 8,200	4,368	4,250.4	98-1,470	351	520.3	45-1,800	276	447.0	150- 3,300	1,432	1,524.1
Petroleum	12	61	1919-1955	1940	200-18,000	3,500	5,415.2	11-3,640	140	376.5	6-1,265	150	231.8	100-10,000	800	1,623.2
Primary metals	5	23	1908-1958	1951	200-14,500	4,475	4,851.6	13- 800	225	236.8	7- 749	200	242.1	235- 4,500	747	1,141.0
Rubber	5	11	1914-1940	1935	2,500-17,000	9,000	8,600.0	40- 471	250	245.2	125- 410	225	237.0	1,200- 3,600	2,240	2,346.7
Stone, clay, glass	4	9	1925-1955	1942	1,600-15,000	6,500	6,641.7	30- 525	180	221.5	150- 375	312	281.3	720- 4,500	2,765	2,687.5
Transportation equip.	3	14	1917-1955	1943	2,000-34,000	5,448	9,703.4	110-1,150	330	428.0	37-1,200	151	380.1	400- 7,000	1,175	2,684.3
Nuclear products			1947-1958	1953	700-47,000	10,576	14,739.8	210-4,800	1,249	1,414.4	89-2,860	495	730.8	714-16,000	2,710	4,643.8
All Industries	108	484	1888-1959	1948	70-50,000	4,000	6,457.4	3-5,000	217	441.5	4-2,860	201	313.0	100-30,700	1,242	2,163.9

Source: Bedsole, D.T. Library Systems in Large Industrial Corporations. Ph.D. thesis, University of Michigan, 1961.

FIGURE 23. DATA ON SIZE OF COLLECTION,
484 SPECIAL LIBRARIES IN 108 LARGE MANUFACTURING FIRMS

Strable, Edward G., Special Libraries: A Guide for Management, p. 11-13.

Mass Media

The foregoing evidence shows that libraries reach a small proportion of the population with wide variations in usage weighted toward the upper socio-economic levels of the population. As we shall see in Sections 9-11, similar observations apply for other, less classical, information services.

Newspapers have a far wider reach, with some socio-economic variation (Figure 24). 73% of adults in a 1973 survey of newspaper readership had "read any daily yesterday" and 92% had "read any daily in the past 5 weekdays".(23)

There is still sharper contrast in the pervasiveness of television (Figure 25). Not only do 99.8% of U. S. households have television sets, but household watching-time averages over 6 hours a day within a seasonal range of 5-7 hours.(24) In 1973, 93% of U. S. households had telephone service.(25)

As described in Sections 7 and 15, libraries are experimenting with television, including cable television. The findings of a mid-1973 statewide survey of the attitudes, opinions and behavior of citizens of Colorado show major differences between what people expect of libraries and of television (Figure 26). The Colorado survey is unusual in that it surveyed the clientele of libraries, not merely librarians' views about their clientele.

	Percent read any daily yesterday	Percent any daily in past 5 weekdays
Total Population	73	92
Some college or more	81	97
High school graduate	77	94
1-3 years of high school	68	90
Grammar school or less	62	82
$15,000 and over	82	97
$10,000 - 14,999	79	95
$ 5,000 - 9,999	69	91
Under $5,000	61	79

FIGURE 24. NEWSPAPER READERSHIP

Simmons, W.R., 1973 Daily Newspaper Readership Demographic Tables, p. 5-6.

	Refrigerator		Irons	Television		Cars	
				Black and White	Color	One or More	Two or More
	1971[a]	1972[b]	1972[b]	1971[a]	1971[a]	1971[a]	1971[a]
All Households	83.3	99.9	99.9	77.6	43.3	79.5	30.2
				99.8 % with TV			
Annual income:[c]							
Under $3,000				77.0	16.1		
$3,000-4,999				79.7	26.5		
$5,000-7,499				75.3	39.7		
$7,500-9,999				74.5	50.3		
$10,000-14,999				77.7	58.4		
$15,000-24,999				81.8	68.3		
$25,000 and over				82.1	79.5		

FIGURE 25. HOUSEHOLDS WITH CARS AND SELECTED ELECTRICAL APPLIANCES

a. U.S. Bureau of the Census, Statistical Abstract, 1974, Table 542, p. 332.

b. Ibid., Table 1174, p. 693.

c. Total money income (before taxes) of primary family or primary individual in 12 months immediately preceding interview.

	RANK ORDER: BY PROPORTION NEEDING OR WANTING (1)	BY PROPORTION USING LIBRARY (2)	BY TENDENCY TO USE LIBRARY (3)
NEWS & CURRENT EVENTS	1	43	67
MUSIC FOR ENJOYMENT	2	52	65
WEATHER CONDITIONS/FORECASTS	3	71	71
SPECIAL TV PROGRAMS FOR ENTERTAINMENT	4	72	72
UPCOMING SPECIAL TV PROGRAMS	5	73	73
CONSUMER INFORMATION ON PRODUCTS	6	16	42
AVAILABLE MOVIES/PLAYS	7	68	70
LOCATING PRODUCTS & SERVICES IN THE AREA	8	50	63
TAXES	9	37	56
SERVICES OF CITY/COUNTY/STATE	10	25	47
AVAILABLE SCHOOLS & COURSES	11	36	52
RECENT MOVIES TO WATCH	12	70	69
NON-FICTION BOOKS FOR ENJOYMENT	13	1	7
GENERAL SELF-IMPROVEMENT	14	18	38
BEST-SELLING NON-FICTION	15	2	11
ECOLOGY	16	12	26
EDUCATION	17	8	19
MEDICAL & HEALTH CARE	18	42	55
SOCIAL SECURITY	19	56	64
BEST-SELLING FICTION	20	7	12
PERSONAL LEGAL INFORMATION	21	53	62
GARDENING	22	13	25
CRAFTS	23	11	21
FICTION BOOKS	24	4	5
LOCAL HISTORY	25	5	8
HISTORY	26	3	2
REPAIRS AROUND THE HOUSE	27	21	39
LOCAL ORDINANCES	28	41	51
GENERAL REFERENCE MATERIAL FOR STUDY	29	6	3
AUTO REPAIRS	30	40	48
ENTERTAINMENT FOR CHILDREN	31	20	31

FIGURE 26. RANK ORDERINGS OF THE TYPES OF INFORMATION

Colorado State Library, A Survey of Attitudes, Opinions and Behavior with Regard to Library Services, Vol. 1, Table V-2, p. 54.

(1) Corresponding to question: Do you need ____?
(2) " " " : Do you use library for ____?
(3) " " " : Would you use library for ____?

5. Benefits and Burdens: The Interlibrary Loan System

The unequal geographic and demographic distribution of information resources and usage depicted in the preceding section has not gone unnoticed and various equalization mechanisms have been devised. Notable among these is the interlibrary loan system whose antecedents in the U.S. can be traced at least as far back as 1850, when the Boston Public Library was lending regularly to out-of-town students in certain special branches of knowledge.(26)

By 1972, interlibrary loan requests received by all types of libraries were estimated to number between six and ten million (Figure 27). Sixty-one percent of these requests are estimated to have been filled. Interlibrary lending in New York State showed vigorous growth in the period between 1957-1964 (Figure 28).

As was the case for demographic and geographic characteristics of clients so there is wide variability in the status of individual libraries or types of libraries in the relative magnitude of their interlibrary loan borrowing or lending. Figures 29-31 illustrate the phenomenon for public, special academic and federal libraries.

The evaluation of the New York State public library system published in 1967(27) attributes the rise in usage of the service (Figure 28) to the linking of isolated libraries into regional systems which in turn are able to call on the State Library and beyond for backup resources. Figure 32 illustrates the characteristics of this hierarchical flow. By 1970 the New York State Commissioner of Education's Committee on Library Development was looking forward toward embedding this interlibrary loan system in the

Type of Library	Loan Requests Received
Academic	1,850,000
Public	2,235,000
Special	387,000
Federal	1,098,000
State	500,000
Total all libraries	6,070,000

FIGURE 27. ESTIMATED VOLUME OF INTERLIBRARY LENDING IN 1972 FOR ALL TYPES OF LIBRARIES

Palmour, Vernon E. et. al., Resource and Bibliographic Support for a Nationwide Library Program, Table 3-1, p. 22.

7 yrs.

System (b)	Materials Borrowed on Interlibrary Loan Other Than Bulk or Deposit Loans		% Increase
	1957	1964	16 %/yr.
Upstate — Total	76,271	229,432	201%
G	2,058	20,808	911
D	249	2,362	849
O	757	6,659	780
R	1,307	10,389	695
I	999	6,447	545
F	2,553	16,000	527
H	2,648	14,985	466
B	1,074	4,585	327
Q	2,176	9,238	325
M	1,329	5,379	305
S	771	2,913	278
A	10,354	31,777	207
P	1,614	4,419	174
J	7,959	20,880	162
L	1,241	2,719	119
E	11,991	25,338	111
K	23,312	29,483	26
N	3,879	4,657	20
C	a	10,394	a

FIGURE 28. MATERIALS BORROWED ON INTERLIBRARY LOAN 1957—64

SYSTEM LIBRARIES (c)

a. Comparable Statistic not available.

b. The systems were coded for anonymity.

c. The University of the State of New York, Emerging Library Systems: The 1963-66 Evaluation of the New York State Public Library System, Table 20, p. 104.

Activity	Public Libraries	Special Libraries
Lending		
Total	2,235,000	387,000
Filled	1,165,000	314,000
Percent Filled	52%	81%
Borrowing		
Total	1,068,000	353,000
Filled	760,000	327,000
Percent Filled	71%	93%

FIGURE 29. ESTIMATED MAGNITUDE OF ANNUAL INTERLIBRARY LOAN ACTIVITY FOR PUBLIC AND SPECIAL LIBRARIES, 1972

Palmour, Vernon E. et. al., Resource and Bibliographic Support for a Nationwide Library Program, Table B-1, p. 175.

(a) INTERLIBRARY TRANSACTIONS, 1967-1968 [a]

	All Colleges and Universities		Private Universities	Public 4-Year Colleges (less than 500 students)	Private 2-Year Institutions
	No. of Transactions	%	%	%	%
Items Borrowed	878,000	41	23	100	57
Items Lent:					
Non-Returnable	599,000	28	41	--	11
Returnable	644,000	31	35	--	32
Total	2,141,000	100	100	100	100

(b) INTERLIBRARY COOPERATIVE PROGRAMS, FALL 1971 [b]

	All Colleges and Universities %
Receive Materials	34.6
Provide Copies	22.6
Provide Materials	33.2

FIGURE 30. LENDERS, BORROWERS AND COPIERS IN INTERLIBRARY LOAN TRANSACTIONS

a. Price, Bronson, Library Statistics of Colleges and Universities, Analytic Report, Fall 1968, Table 10, p. 61.
Note:
Price, Bronson and Holleday, Doris C., Library Statistics of Colleges and Universities, Fall 1969, Analytic Report. There is no interlibrary loan data requested on questionnaire form (p. 78).

b. Smith, Stanley, Library Statistics of Colleges and Universities, Fall 1971, Analytic Report (Part C), Table C-20, p. 57.

(a) INTERLIBRARY LOANS

	Loans	Borrowed
Library of Congress[a]	116,481	643
National Library of Medicine[a]	120,117	100
National Agricultural Library[a]	15,600	11,700
All Federal Libraries Reporting Some Data[b]	732,000	521,572

a. Olson, Edwin E. et. al., Survey of Federal Libraries, 1972, Table 13, p. 21.

b. Ibid., Table 6, p. 14.

FIGURE 31. FEDERAL INTERLIBRARY LOAN STATISTICS

(b) RATES OF BORROWING AND LENDING IN INTERLIBRARY LOAN BY REGION

Region	% of Total Volumes Held	Interlibrary Loans per Volume Held		Ratio of Lending to Borrowing
		Borrowing	Lending	
I: Connecticut Maine Massachusetts New Hampshire Rhode Island Vermont	3	.022	.003	0.146 : 1
II: New Jersey New York Puerto Rico Virgin Islands	4	.013	.026	1.912 : 1
III: Delaware (c) Maryland Virginia West Virginia	8	.022	.013	0.593 : 1
IV: Alabama Florida Georiga Kentucky Mississippi North Carolina South Carolina Tennessee	10	.015	.021	1.382 : 1
V: Illinois Indiana Minnesota Michigan Ohio Wisconsin	4	.017	.016	0.908 : 1
VI: Arkansas Louisiana New Mexico Oklahoma	6	.017	.009	0.522 : 1
VII: Iowa Kansas Missouri Nebraska	2	.015	.002	0.191 : 1
VIII: Colorado Montana North Dakota South Dakota Utah Wyoming	4	.009	.046	5.186 : 1
IX: Arizona California Hawaii Nevada American Samoa	17	.009	.005	0.567 : 1
X: Alaska Idaho Oregon Washington	1	.025	.002	0.102 : 1
Washington Area	31	.012	.012	0.992 : 1
Elsewhere in World	10	.010	.009	0.878 : 1

c. The District of Columbia and surrounding area have been treated separately from the rest of Region III.

d. Olson, Edwin E. et. al., Survey of Federal Libraries, 1972, Table 42, p. 83b, 78.

FIGURE 31 (Continued) FEDERAL INTERLIBRARY LOAN STATISTICS

(a) System	Total Requests Received	Total Forwarded To State[1]	% Forwarded	Total Filled By State Library	State Library's Rate of Success
A.....	41,401	7,596	18%	4,708	62%
E.....	30,370	1,917	6	1,082	56
J.....	24,565	858	3	417	49
F.....	16,930	6,794	40	3,935	58
H.....	16,482	10,101	61	6,512	64
R.....	10,999	3,461	31	2,003	58
G.....	9,972	3,039	30	1,756	58
O.....	7,660	2,239	29	1,442	64
P.....	5,724	2,562	45	1,695	66
N.....	5,620	2,137	38	1,284	60
M.....	5,160	2,115	41	1,026	51
L.....	4,600	1,132	25	661	58
D.....	2,596	333	13	197	59
Totals[2]...	182,070	44,284	24	26,718	60

[1] From monthly TWX (Teletype Writer Exchange) Request summaries.
[2] For 13 systems.

FIGURE 32. RELATIONSHIP OF TOTAL REQUESTS RECEIVED BY (b) SYSTEMS TO PERCENTAGE FORWARDED TO STATE LIBRARY AND STATE LIBRARY'S RATE OF SUCCESS FOR 1964

(Where comparable statistics were available)

a. The systems were coded for anonymity.

b. The University of the State of New York, Emerging Library Systems: The 1963-66 Evaluation of the New York State Public Library System, Table 21, p. 107.

broader system sketched in Figure 33. As shown in Figure 34, reciprocal borrowing privileges and expanded interlibrary loan services were also among the most common activities of consortia of academic libraries. Figure 35 illustrates the importance of the interlibrary loan function among the activities of groups of public libraries in forty-six of the fifty states.

The ways of interlibrary loans are not all smooth. Problems cited by librarians responding to a survey conducted in 1973 are tabulated in Figure 36. The flavor of these problems comes through more explicitly in a 1972 report on another survey:

> "The need for more real cooperation was still considered a major library problem in 1971, in spite of heavy emphasis in terms of money and effort through the LSCA years (1957-to date). Indeed, thirty of the respondents to the study felt libraries were further apart today than in the past. Competition for funds was frequently mentioned as a major deterrent. Often contributing to the apparent declining relationships are: rivalry among types of libraries; college and university libraries placing stricter regulations on use by outsiders; unexpected pressures; e.g., newly established community colleges and burgeoning urban universities place unforeseen demands on public libraries." (28)

A report of the Division of Evaluation of the State Education Department in New York comments as follows:

> "As has been pointed out elsewhere in this report, the interlibrary loan is by no means an innovation developed by the library system. Nevertheless, the establishment of systems has lifted it from the realm of courtesy and the informal to the status of a legal right for the user and a systematic and major responsibility of all of the library units which make up a library system. Unfortunately, this is a state of affairs not fully understood by most library users, by many community library staffs, or by some staff of the library systems." (29)

It is therefore unlikely that the general public is aware of its legal right.

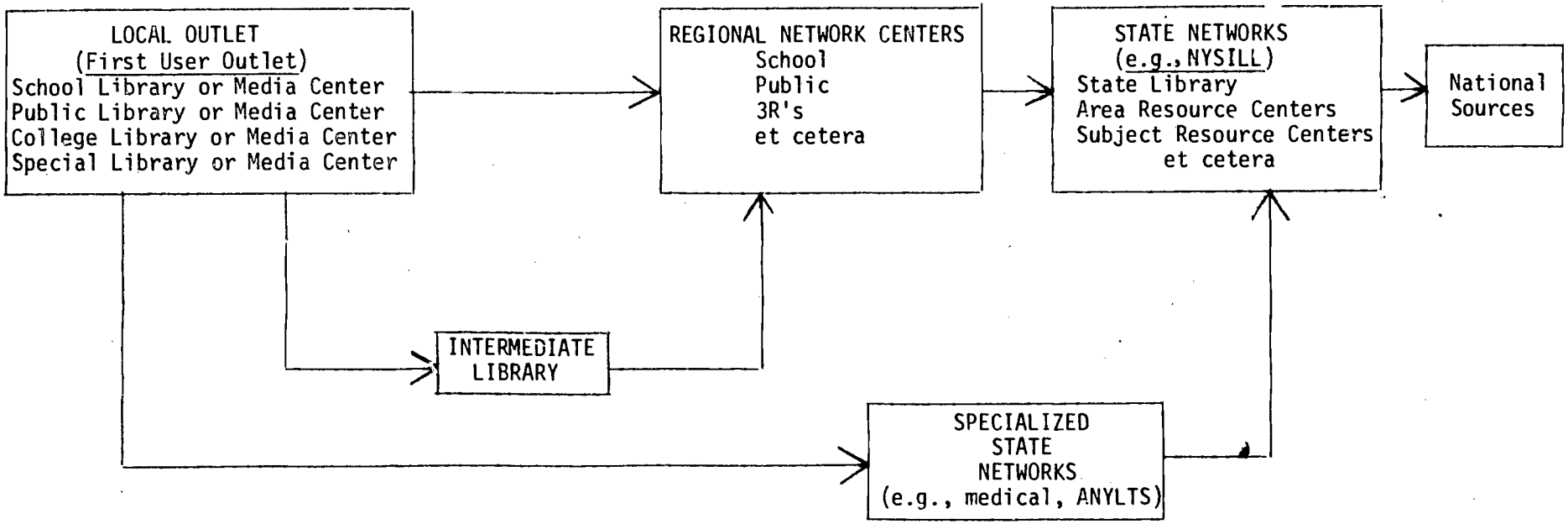
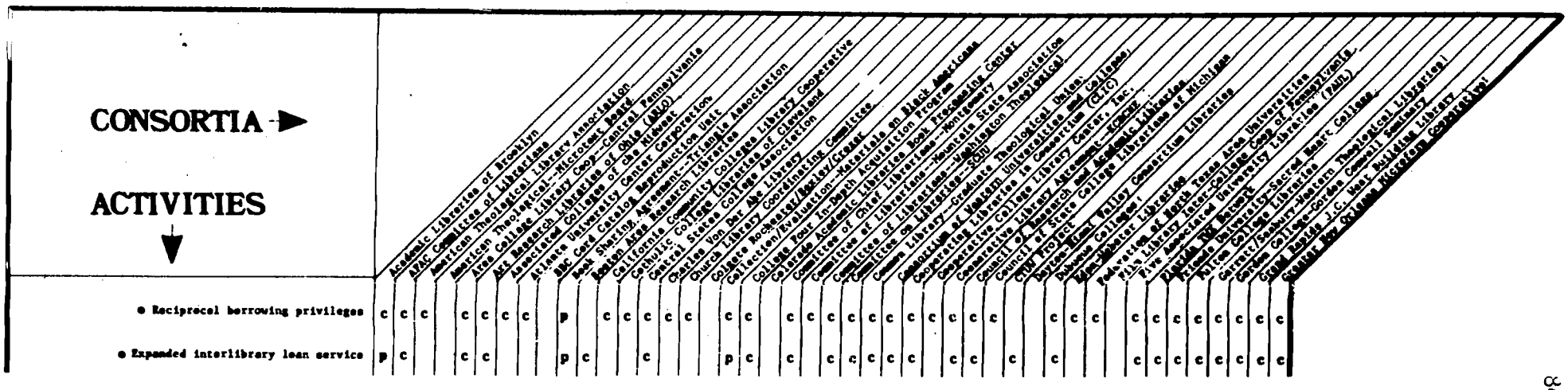


FIGURE 33. REFERENCE AND INTERLIBRARY LOAN NETWORK
(FOR INFORMATION RETRIEVAL AND TRANSFER)

The University of the State of New York, Committee on Library Development, Report of the Commissioner of Education's Committee on Library Development, p. 10.



c = current

p = projected

FIGURE 34. **Activities in Which Consortia are Engaged**

Delanoy, Diana D. and Cuadra, Carlos A., Directory of Academic Library Consortia, Table 2, p. 199.

Functions Performed	Number of Networks(1)	Percent of Networks
Interlibrary loan	118	85
Communications	108	78
Verification of citations	88	63
Location of materials	107	77
Cooperative collection building	52	37
Joint acquisitions	37	27
Joint cataloging	29	21
Joint materials processing	26	19
Other	28	20

1. N = 139

FIGURE 35. CHARACTERISTICS OF STATE SYSTEMS AND NETWORKS

Palmour, Vernon et. al., Resource and Bibliographic Support for a Nationwide Library Program, Table C-2, p. 197.

Most Pressing ILL Problems	Percentage of Respondents Identifying Problem(1)
Communications	33
Verification of citations	33
Location of materials	48
Requested materials not available (not held, in use, non-circulating, etc.)	61
Current ILL restrictions	24
Delay in receiving materials (posted or delivery system)	57
Loss of in-house use of materials loaned	9
Cost of providing ILL service (staff time)	50
Other	7

1. Multiple responses are included in the table.

FIGURE 36. PERCENTAGE DISTRIBUTION OF MOST PRESSING ILL PROBLEMS OF LIBRARIES WITHIN THE STATES

Palmour, Vernon E. et. al., Resource and Bibliographic Support for a Nationwide Library Program, Table C-5, p. 213.

Further on, the same report continues:

> The teletype connection between the upstate systems and the State Library expedites the process of getting the request to Albany and getting a report back to the system. Nevertheless, the entire interlibrary loan procedure is cumbersome and much too time consuming to meet the needs of many borrowers. The time lag problem is essentially a management one and should be approached on that basis. ...
>
> Serious staff failures in connection with interlibrary loans are occurring at several levels. There is a failure in many systems to make a real effort to acquaint users with the possibilities of the interlibrary loan device. This is not only a matter of failing to publicize services in a general way on a local and regional basis. It also involves a failure to educate both system and local staffs in the implications of a truly effective interloan service; to train them to recognize when a particular patron's needs go beyond the resources of the library or system he is using; and to encourage, at all levels, recourse to other sources. (29)

Seven years later, however, one still sees interlibrary lending described as "a privilege [that] should be treated with responsibility and should be reciprocal."(30) Although promulgated only two years apart, the tone of the 1968 National Interlibrary Loan Code(31) and of the New York State Interlibrary Loan Manual of 1970(32) are worlds apart in this respect.

6. Publishers and Libraries: Alliances and Conflicts

In the world of information services, the public and private sectors are inextricably bound together. The closeness of these multiple ties is evident from Figure 37, adapted from an analysis by John P. Dessauer of "Where the Bookbuyer's Money Goes". According to Dessauer, 51 percent of all book purchases are directly related to education, and he estimates that, with direct consumer acquisitions for educational purposes included, 67 percent of purchases are related to education. Curtis Benjamin (personal communication) estimates this percentage to be no higher than 45 percent.

An unknown proportion of the 34 percent of book sales accounted for by libraries, schools and institutions is very directly tied to the flow of tax dollars and other public funds to these institutions, as is a portion of the seventeen percent of books bought directly in college stores to the extent that public scholarship funds and other forms of support assist in these purchases. Tax dollars are also used to buy periodicals whose publication is often tax-subsidized, as through page charges honored by payments through government research grants or contracts, and also through the second-class mail cross-subsidy.

In any case, libraries along with other educational institutions, broadly defined, share with commercial publishers a common interest in the amount and the routing of tax and other public dollars flowing into transactions between them. This common interest is as likely to influence the strategies of both parties as are any differences between them. The common stake is in increasing the absolute flow of money. The differences arise from diversions of this flow away from classical concerns.

Distribution Channel / Book Category	General Retailers	College Stores	Libraries (Excluding School Libraries)	Schools and Institutions	Direct to Consumer	Other	$ Millions	% of Total
Trade	265	62	111	83			543	18
Religious	98	32	23	(2)			179	6
Professional	50	59	101	(2)	(7)		307	10
Mass Market Paperbacks	213	38	20	88			371	12
Book Club	(3)			(2)	233		233	8
Mail Order Publications	(3)	(5)	3	(2)	144+89(1)		157	5
University Press	(3)	(5)	16	(2)			44	2
School (ElHi) Text	(3)	15	43	456			477	16
College Text	(3)	294(4)		22	(7)		375	13
Subscription-Reference			11	(2)	286		309	10
$ Millions	655	513	328	698	752	49	2,995	
% of Total	22	17	11	23	25	2		100
		51%(6)						

FIGURE 37. DOMESTIC BOOK SALES - 1972 (CONSUMER PRICES)

Adapted from Dessauer, John P., "Where the Book Buyers' Money Goes," Publishers Weekly, p. 42-43.

(1): 144 mail order publications; 89 direct sales by professional, educational and trade publishers.

(2): Balance of 49 spread among these categories; 40 million probably to school libraries; unknown amount of school store sales.

(3): Balance of 29 spread among these.

(4): Does not include used books.

(5): 13 million balance.

(6): With direct consumer acquisitions for educational purposes estimate rises to 67% education-related.

(7): Other estimates (Curtis Benjamin, personal communication) suggest that 50% of professional books and a "substantial" proportion of college texts are sold by direct mail to consumers.

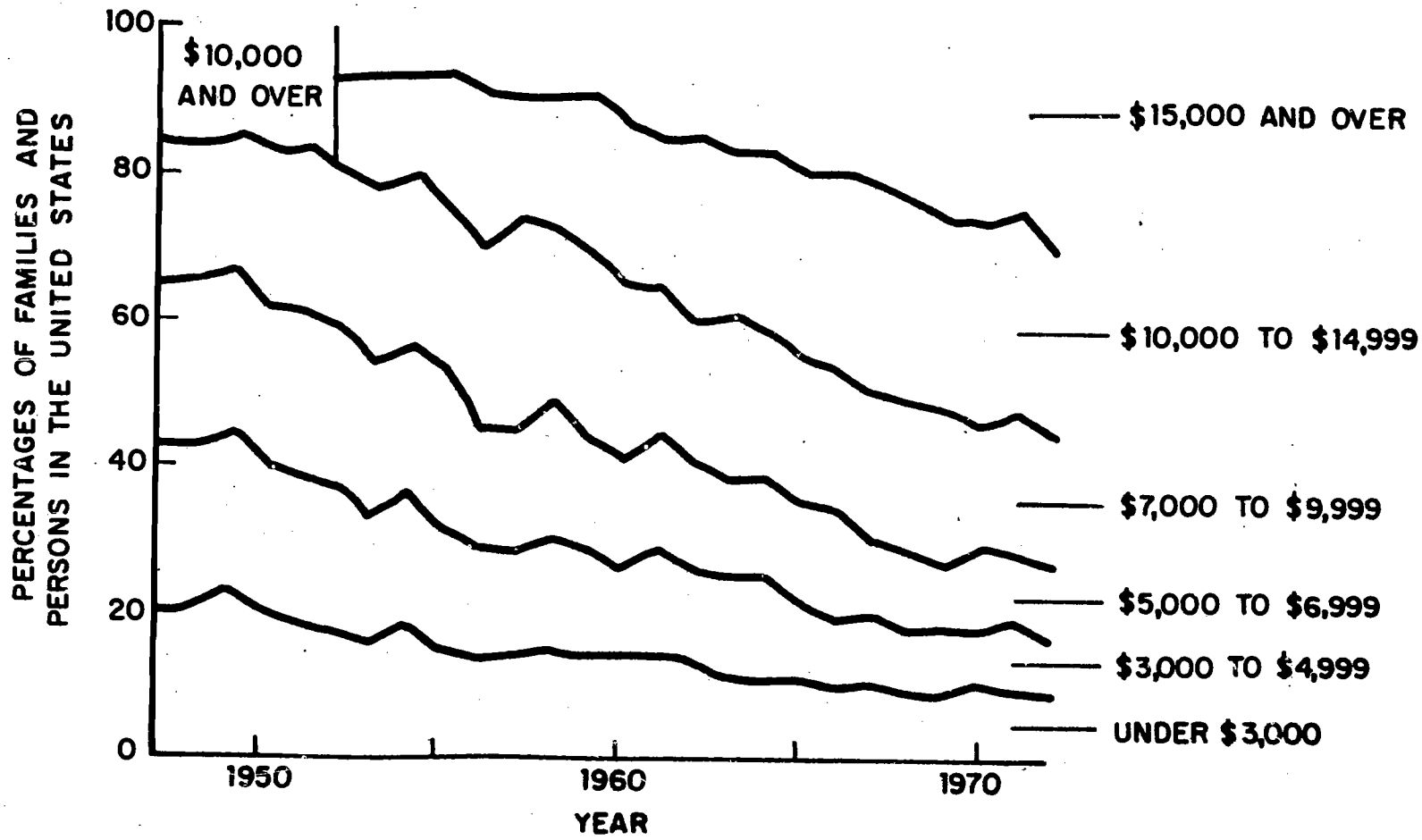
FIGURE 37 (Continued): DOMESTIC BOOK SALES - 1972

The basic issues are therefore the allocation of new functions and the reallocation of older or modified functions and of the resources with which to perform these functions. These issues are as likely to arise within a sector as across sectors and are therefore better understood as matters of allocating benefits and burdens than as divisions between the public and the private sector. Where the growth in total books-and-periodicals dollars is at stake, the private and the public sector are, as suggested by Figure 37, likely to be allies since both stand to gain. As illustrated by the data on interlibrary loans, the net borrowers are as likely to be at odds with the net lenders within the library world as with anyone outside their world. Within a diversified corporate enterprise encompassing both book publishing and non-book information services, internal rivalries are as likely as cross-sectoral rivalries.

From the viewpoint of the information user, the importance of these civil and border wars arises from how they affect the balance of information goods and services available through direct payment for goods or services received (49 percent for books in Figure 37) versus goods and services obtained "free" (up to 51 percent for books in Figure 37). How direct and indirect payments flow and who receives their benefits is therefore the primary issue from the information users' viewpoint. Although there is a (decreasing) price differential between public documents sold by the United States Government Printing Office and those sold by private publishers, this public/private distinction is of less consequence to the user than the distinction between a book borrowed at no direct cost from a library and one bought for cash from either a public or private source.

In an analysis of the allocation of U. S. incomes, Boulding[33] shows how "in the last twenty-five years in the United States we have halved the proportion of the poor by almost any standard" (Figure 38) but that we have accomplished this "almost entirely by the general and widely distributed increase in per capita real incomes, as a result of increasing productivity, and that we have not made any relative redistributions" (Figure 39). Moreover, as shown in Figure 40, "90 percent of the American people pay roughly 20 percent of their incomes in taxes. Only the richest 5 percent and the poorest 5 percent pay more". However, as we shall see in Section 13, there are wide variations in the local property taxes that most directly support public libraries, as well as in library usage, as noted in Section 4. In information services, as in many others, the ideals of equality of opportunity and of local decision-making are not necessarily consonant with one another.

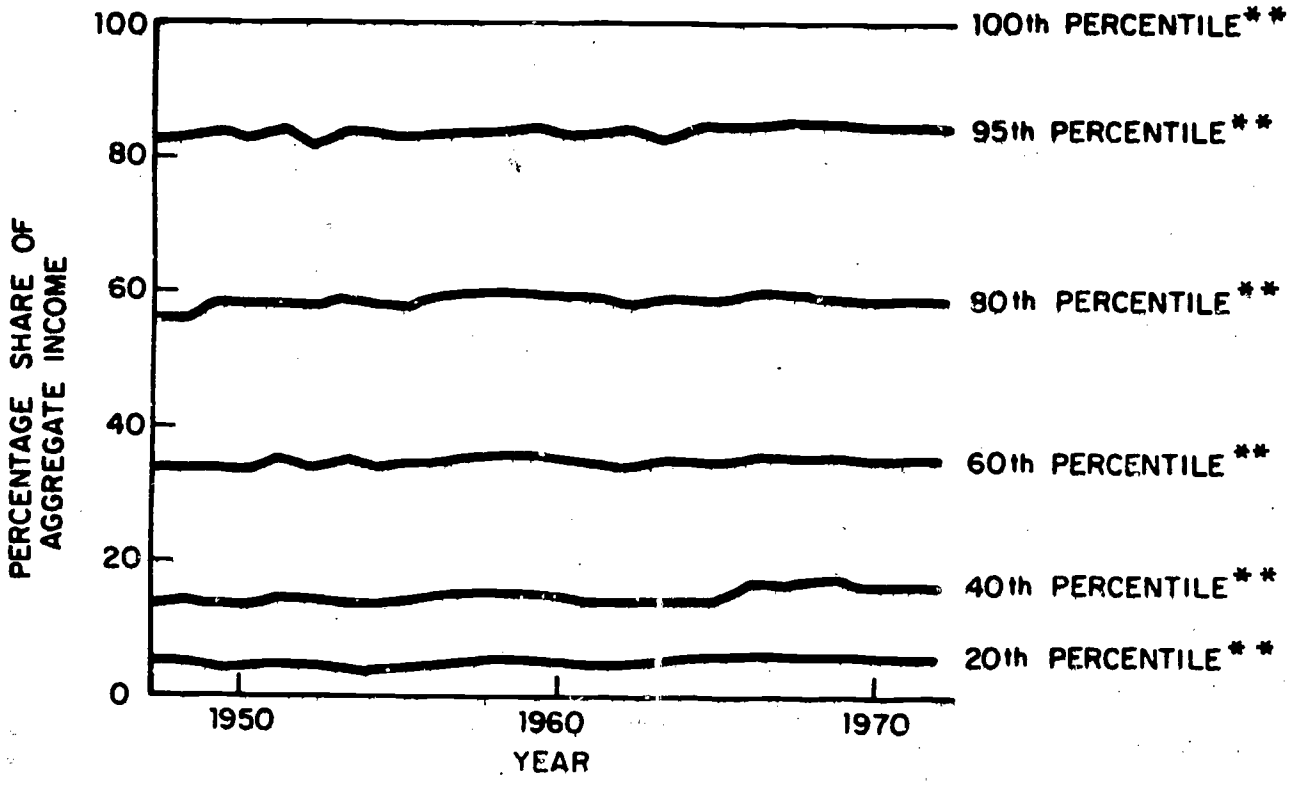
With respect to newer information services, therefore, the most important question is to whom they are to be supplied by what combination of direct or indirect payments, made by whom. The question presents itself most sharply for services based on new technologies with clearly identifiable incremental costs, where the question of who is to pay for what explicitly presents itself afresh.



* U.S. Bureau of the Census, Current Population Reports, Series p-60, No. 85.

FIGURE 38. PERCENTAGE OF FAMILIES BY FAMILY INCOME U.S.A., 1947-1972 * (IN CONSTANT 1972 DOLLARS)

Boulding, Kenneth E., The Management of Decline, p. 9.

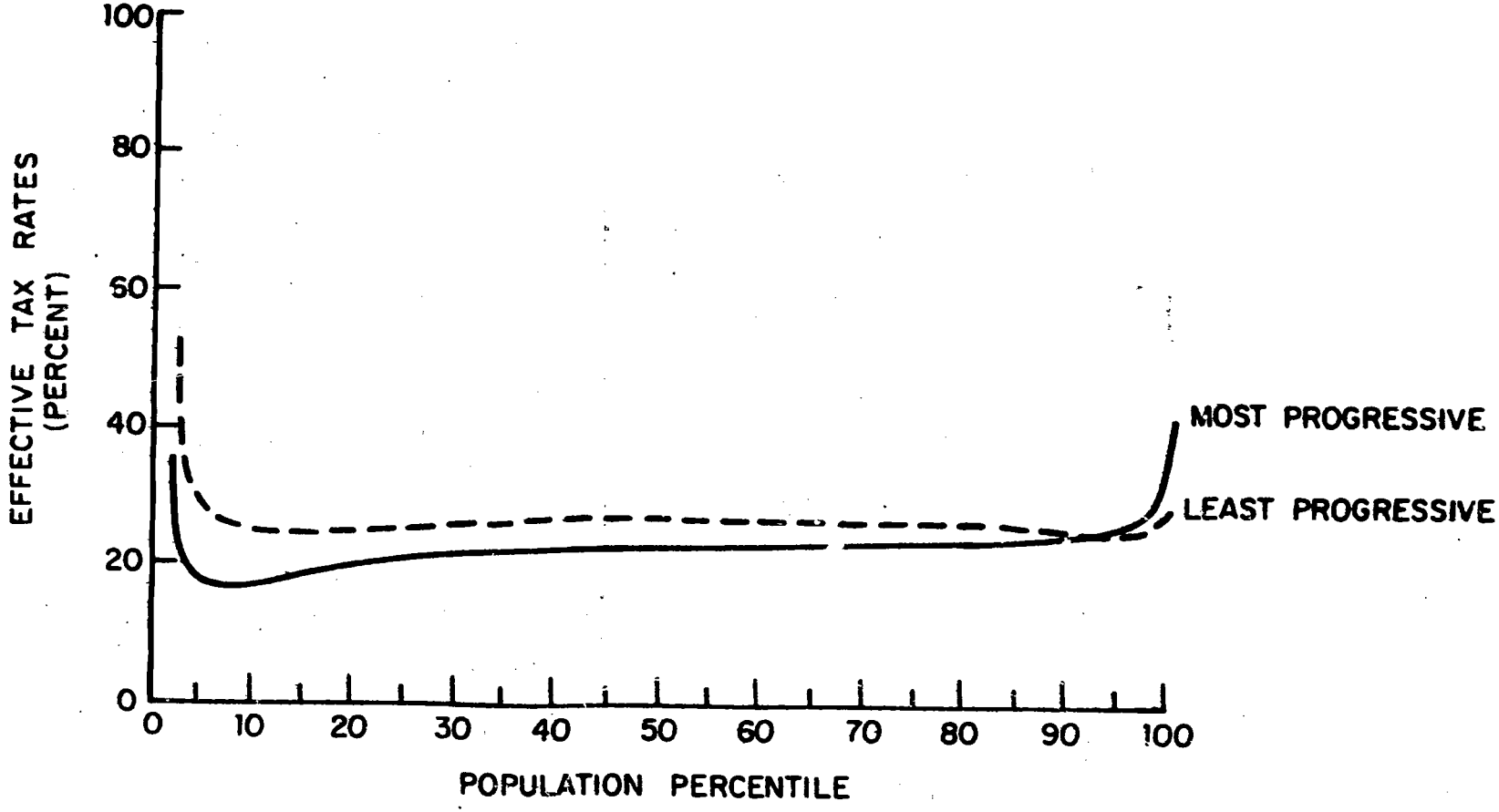


* U.S. Bureau of the Census, Current Population Reports, Series P-60, No. 85.

** Percentiles by family income level.

FIGURE 39. PERCENTAGE SHARE OF AGGREGATE INCOME RECEIVED BY EACH FIFTH OF FAMILIES AND UNRELATED INDIVIDUALS U.S.A., 1947-1972*

Boulding, Kenneth E., The Management of Decline, p. 10.



* Benjamin A. Okner and Joseph A. Pechman, "Who Paid the Taxes in 1966?", The American Economic Review.

FIGURE 40. EFFECTIVE RATES OF FEDERAL, STATE, AND LOCAL TAXES UNDER THE MOST AND LEAST PROGRESSIVE INCIDENCE VARIANTS, BY POPULATION PERCENTILES, 1966
U.S.A., 1966 *

Boulding, Kenneth E., The Management of Decline, p. 12.

7. From Classical to Nonclassical Information Services

While very classical in conception, interlibrary loan services have, as we saw in Section 5, enjoyed new growth as a tool for widening access to information resources without risking the impracticalities -- financial and operating -- of duplicating major collections toward the absurd point, for example, where the equivalent of the Library of Congress might be available within a five-mile walk for every inhabitant of the United States.

The resulting complexities of negotiating what all parties would regard as a fair arrangement is illustrated in even as limited a circle of participants as Columbia, Harvard, and Yale Universities, and the New York Public Library, the four partners in the newly formed Research Libraries Group. The hope is expressed that common gains might be sufficient to offset common operating expenses, thereby alleviating some of the problems of mutual allocations of burdens: "Significant potential for monetary savings ... lies in cooperative action on serial acquisitions. Effective curtailment of the substantial duplication of serial titles among the RLG libraries might well, through reduction of both purchase and processing costs, generate monies to support the bibliographic- and service oriented activities of the consortium."(34)

It is evident that the success of this and similar activities depends in part also on the effect that reduced purchases of periodicals, if any, would have on the suppliers of periodicals. We have, however, been unable to find statistics on the birth and death of periodicals, their costs, their subsidies, etc. Indeed, no one seems to be watching this objectively, although emotional diatribes abound.

The practice of photocopying to satisfy interlibrary loans adds yet another dimension to the problem. As is evident from Figure 30, in 1967-68 significant proportions of interlibrary loans were met by what are called "nonreturnable items", which one can only surmise are euphemistically-described copies. Unfortunately, trend data on this score are not available. As indicated in Figure 30, data on this score disappear altogether from the 1969 report on library statistics of colleges and universities and reappeared in the 1971 data only by number of participating institutions, without transaction volumes being given. It is hard to avoid the suspicion that these important data were suppressed as sensitive intelligence in the war over the Copyright Revision Bill.*

---

* "Questions on Interlibrary Loans Transactions were not asked in the 1967 and 1969 academic library surveys. They were asked in the 1968 survey (items $13; 14(2)); in the 1971 survey (items 42(1); 42(2); 42(3)); in the 1973 survey (items 45, 46) and in the 1975 survey (items 47.48).

"The data were published in the 1968 survey in Table I, columns 11, 12, 13 and in the 1971 survey in Part B, Table 4, columns 3, 4 and 5 and in Part C, Table 20, columns 4, 5, 6, 7, 8 and 9.

"The inclusion or exclusion of data depends on recommendations of advisory groups, staff judgment and financial resources and their review by our supervisors in NCES and OMB who make the final decisions on the content and number of questions.

"During the last 17 years of my connection with library statistics, I have never heard any comments about library data collections and their relation to copyright legislation; to my knowledge no suggestions or requests to this effect have been expressed to OE and NCES by librarians, publishers, or anyone else.

"However, the adoption of the UNESCO Library Statistics Standard in 1970 which requests these items specifically made NCES decide to keep this item in every survey since we are to report on this every third year to UNESCO."

Library Surveys Branch
National Center for Education Statistics
U. S. Office of Education

The growth of copying is an important element in shifting benefits and burdens. Typically, direct costs of reproduction are borne by users directly, but publishers complain -- not without some justification -- that they bear some of the cost of widespread copying for foregoing revenues they would otherwise have obtained from the sales of additional copies of original publications. We note how the importance to the information user of the ease and flexibility of copying have lead to the rapid growth of one of the principal suppliers of this type of equipment (Figure 41). The practice is so widespread as to make its prohibition as impractical to enforce as Prohibition. Other means will have to be found to give all concerned a fair share of costs and benefits. In any case, since most copying is beyond the control of librarians, the pitting of librarians against publishers is a red herring.

The pattern of development of audio-visual materials has followed a different course, marked to date by a still relatively low penetration into the classical library world. As Figure 42 shows, only two percent of the nearly sixty million titles in thirteen hundred federal libraries reporting this information referred to audio-visual materials. In some instances, the acquisition of audio-visual material shows marked growth, as evidenced by

(a) XEROX CORPORATION OPERATING REVENUES

1967-1973

Year	Operating Revenues ($ millions)
1967	739
1968	896
1969	1,483
1970	1,719
1971	1,961
1972	2,419
1973	2,990

Annual Growth Rate: 25-30 %

Moody's Industrial Manual, 1974, p. 2679

(b) XEROX AND THE WORLD COPY MARKET, 1973

	Estimated no. of copies, 1973 (billions)	% of copies
Worldwide	2,600	100.0
Xerox's competitive market	300	11.5
Xerox's sales, total	60	2.0
U.S. sales	33	1.1
outside U.S. sales	27	0.9
Projection for market outside U.S. in next 5 years (1978).	81	--

Xerox Corporation, Annual Report, 1973, p. 20

FIGURE 41. ESTIMATING THE IMPORTANCE OF COPYING TO USERS

(c) COPIES OF COPYRIGHTED MATERIAL, NETHERLANDS 1972

	no. of copies (millions)
Total number of copies made in the Netherlands, 1972	4,000
Number of copies of copyrighted material, total	136
Business companies	55
Primary and secondary educational institutions	60
Other educational institutions, including university libraries	21

Lottman, Herbert R., "Photocopying: How is Europe Handling the Problem?", Publishers Weekly, p. 27.

FIGURE 41 (Continued): ESTIMATING THE IMPORTANCE OF COPYING TO USERS

Total number of titles: 59,905,876.

Categories of titles:

Book stock (including microforms)		32 %
Documents (including microforms)		52 %
All other printed material (including microforms)		8 %
Audio-visual material		2 %
Motion pictures	22 %	
Sound recordings	42 %	
Other	36 %	
All other library materials		5 %

FIGURE 42. TOTAL TITLES, AS DISTINCT FROM VOLUMES, IN THE COLLECTIONS OF 1301 FEDERAL LIBRARIES

Olson, Edwin E. et. al., Survey of Federal Libraries, 1972, p. 29.

Wisconsin school library data shown in Figure 43. Whether this does anyone any good or not is another matter detailed elsewhere.(35) How typical Wisconsin is of a national trend is difficult to tell since national statistics on this score (Figure 44) are available only through 1968.

There also is evidence of shifting patterns of public and private alliances, as illustrated by the following commentary:

> "The Committee for Full Funding of Education Programs has mounted a successful effort for six years to hold the line against the Nixon administration's downgrading of federal aid to education. But the alliance of education groups began to show signs of stress during the past year while extension of the Elementary and Secondary Education Act was under consideration in Congress.
>
> "The smaller groups in the coalition, representing library, publishing, and audio-visual interests, wanted to go down the line against consolidation of categorical programs because they were convinced they would lose out on the state level in competition for unearmarked funds under the consolidation formulas. They lost out to the big educational organizations, epitomized by the National Education Association, which want large sums of money for school districts without strings attached." (36)

We have already noted in Figure 15 how school libraries catalogue significantly fewer of the audio-visual materials than their print materials.

But focusing on classical libraries, federal or school, fails to tell an adequate story respecting audio-visual materials. By far the largest collections of such materials are in the hands of commercial organizations such as Warner Communications and Gulf and Western that own stocks of movies (of Warner and Paramount, respectively), and the TV networks that own large collections of audio and video tapes. While movie prints are by tradition rented out for a fee, the network collections are not generally available. There is some commercial distribution of audio cassettes based on network programs by The Center for Cassette Studies, Inc. of North Hollywood, California and by Xerox University Microfilms, of Ann Arbor, Michigan.

	1965-66	1967-68	1969-70	1971-72
Books	3.57	4.00	4.25	4.84
Periodicals	.50	.60	.69	.87
A-V Materials	.86	1.37	2.20	2.89
Other Library Expenses	.34	.37	.40	.55
Total	5.27	6.34	7.54	9.15

FIGURE 43. PER PUPIL EXPENDITURES
OF WISCONSIN SCHOOL LIBRARIES

Pichette. William, "Budgets Up, Goals Away: Public School Media Centers and Standards," Wisconsin Library Bulletin, p. 259.

Purchase of Library Materials	1960		1965		1968	
	$	%	$	%	$	%
Books	24.7	90.5	45.3	89.5	53.8	88.3
Periodicals	1.7	6.2	3.0	5.9	4.1	6.7
Audiovisual	.9	3.3	1.7	3.4	2.5	4.1
Other Library Materials	--	--	.6	1.2	.5	.8
Total	27.3	100.0	50.6	100.0	60.9	100.0

FIGURE 44. U.S. PUBLIC LIBRARY EXPENDITURES (in $ millions)

U.S. Bureau of the Census, Statistical Abstract, 1973, Table 220, p. 137.

Financial and other information services to industry are making growing use of the audio cassette medium. In other instances, experimental deposit of video tapes in university libraries has led to litigation (CBS vs. Vanderbilt). Video tapes produced specifically for instructional television are stockpiled by special libraries such as the Great Plains National Instructional Television Library in Lincoln, Nebraska, which rents these out according to a complicated fee schedule. It reports having paid royalties of $260,000 to program producers in fiscal 1974, for a total of over 1.5 million over the last twelve years.(37)

Some sectors of the public, including librarians, have become interested in cable television as a medium complementing traditional library services through the use of the access channels mandated by the Federal Communications Commission and the practice of many local franchising authority of requiring cable licenses to provide cable drops at libraries, schools, and other public buildings. However, the reach of the cable industry is still far less than hoped for by optimistic public and private promoters. As shown in Figure 45, the penetration of cable television is still small compared to that of over-the-air television, in spite of initial rapid growth from a small base.

Other types of nonclassical services seem important enough both as illustrations and in terms of their visible rates of growth as to warrant detailed examination in the following sections.

The information "explosions" illustrated in Figures 4 and 5, and the rising costs of labor illustrated in Figures 7 and 8 are among the factors that, over the last decade or two, have brought increased attention to the management of the selection and access functions of information systems. Cataloging and other aids to access have seemed particularly amenable

YEAR	OPERATING SYSTEMS	TOTAL SUBSCRIBERS	SUBSCRIBERS ANNUAL GROWTH RATE (%)
1952	70	14,000	
1953	150	30,000	114
1954	300	65,000	116
1955	400	150,000	130
1956	450	300,000	100
1957	500	350,000	16
1958	525	450,000	28
1959	560	550,000	22
1960	640	650,000	18
1961	700	725,000	11
1962	800	850,000	17
1963	1,000	950,000	12
1964	1,200	1,085,000	14
1965	1,325	1,275,000	18
1966	1,570	1,575,000	24
1967	1,770	2,100,000	33
1968	2,000	2,800,000	33
1969	2,260	3,600,000	29
1970	2,490	4,500,000	25
1971	2,639	5,300,000	18
1972	2,841	6,000,000	13
1973	2,991	7,300,000	22
1974	3,158	8,700,000	19

Annual Growth Rate (1963-73): 25 %

FIGURE 45. GROWTH OF THE CATV INDUSTRY
(as of January 1 of each year)

Television Factbook, Services Volume, p. 84-a.

to the use of computer and communications technology. The policy issues related to new developments in this realm are detailed in Section 8.

Precisely where the shoe pinches is, however, far from clear in the absence of functional cost data. Figure 46 illustrates functional categories considered in one of several embryonic projects aimed at filling this void. A similar project, at Purdue University, started from the observation that "up-to-date cost data are not available for the distribution of library expenses among different categories of users and end uses" and that "there has been no attempt to collect cost accounting data to measure the cost of performing library functions".(38)

Although the library is traditionally visualized as a place where one goes to read a book or take one out, reference librarians in particular have long performed additional question-answering functions. Not only do they answer questions about where to find materials in the library, but they also formally or informally will answer substantive questions that may involve limited look-up in source materials. By way of illustration, the types of services offered by the New Haven Public Library to their clients are shown in Figure 47.

In New Haven these reference services are available either in person or by telephone.

> "Telephone service is manned for the full 69 open hours in the week. The three lines are covered by one professional and one trained non-professional. If necessary, another non-professional may be called to handle the third line. The non-professionals use a small collection of ready-reference type sources, while the professional librarial does all searching and answers the more difficult questions." (39)

This service is provided without direct charge to the user.

Collection Development

- Selection
- Acquisition
- Books
- Periodicals
- Continuations
- Acquisitions Searching

Reference

- Direct user information
- Consultation
- Bibliography generation
- Indexing

Collection Preservation

- Binding
- Security
- Replacement
- Repair
- Reprography

Bibliographic Control

- Cataloging
- Card Production
- Cataloging Searching
- Catalog Maintenance

Access Services

- Circulation
- Shelving
- Paging
- Reader privileges
- Reserve operations

Administration

- Personnel
- Budget preparation
- Fiscal control
- Fund raising
- Training
- Vendor Contacts
- Performance Evaluation

FIGURE 46. LIBRARY PROGRAM ELEMENTS - COLUMBIA UNIVERSITY LIBRARY

Courtesy of Association of Research Libraries Systems and Procedures Exchange Center

(a) Reference Question Type

Type[1]	Personal Telephone		Branch Telephone		In-Person	
	Number	%	Number	%	Number	%
Directory	488	38.4	2	1.1	91	20.2
Fact	321	25.3	18	9.7	115	25.5
Library Holdings	461	36.3	165	89.2	244	54.3

[1] Directory questions include those questions concerning "(1) an individual's or firm's address or telephone; (2) the full name of an individual, firm or organization; (3) a description of a particular manufacturer's product or a service; or (4) the ubiquitous question that begins with 'Who is ...'." For purposes of this study, spelling was also included in this category. Fact questions refer to all questions, other than those covered in the above category, that require looking up a specific answer in any document. Questions falling in the Library Holdings category concern whether the Library owns particular material (including fiction) and require use of the card catalog, periodical file, or other similar tool.

FIGURE 47. REFERENCE USES OF NEW HAVEN PUBLIC LIBRARY

(b) Reasons for Reference

Reason	Telephone Users		In-Person Users	
	Number	%	Number	%
Personal	498	43.9	157	37.0
Job-Related	404	35.6	103	24.3
School-Related	202	17.7	155	36.5
Committee-Club	19	1.8	9	2.2
Other	10	1.0	-	-

(c) Occupations of Reference Users

Occupation	Telephone Users		In-Person Users	
	Number	%	Number	%
Business	365	34.4	69	17.5
Students	199	18.7	168	43.2
Housewives	145	13.6	15	3.8
Professionals	138	13.0	68	17.4
Teachers	87	8.2	28	7.2
Skilled	69	6.5	17	4.3
Retired	29	2.8	8	2.0
Unskilled	15	1.4	8	2.0
Unemployed	15	1.4	10	2.6

a. Schlessinger, Bernard et al, Users and Uses of the New Haven Free Public Library, Table 57, p. 92, 84.
b. Ibid., Table 55, p. 91.
c. Ibid., Table 53, p. 90.

FIGURE 47 (Continued): REFERENCE USES OF NEW HAVEN PUBLIC LIBRARY

Newspapers and radio and television stations answer questions on a similar basis. Calling these organizations for baseball scores, weather information, and the like, is a widespread practice. When it was discontinued in 1971, the New York Times' formal information bureau handled an estimated 250,000 calls a year using a staff of eight people.(40) There is a small but growing group of organizations that describe themselves as supplying information -- on demand and for a fee -- to a depth ranging from the casual query that might be made of a newspaper to elaborate consulting or research services.

Finally, and related to the cataloging and access services is the class of so-called data-base services. Typically, the information supplied by such services is of a type that has traditionally bee found in indexes, directories, tables of statistical data, and other tabulations. Where such information is packaged in books sold directly to the public or made available through libraries, these services are classical. Beyond certain rates of use, information of this type is better suited economically and operationally for storage in computers and for electronic rather than physical transmission than are the more voluminous and less structured types of information contained in other types of publications. Telecommunications and computing technology permit more rapid and thorough gathering of the information and supplying it on demand in a limited variety of forms tailored to the particular requirements of an individual user, rather than periodic publication of a collection of data, as traditionally.

The distinctive feature of all these cases is a tendency toward direct user charges that is as pronounced in the public sector as it is in the private sector, reflecting once again the primary importance on focusing on the incidence of benefits and burdens rather than on the public/private distinction.

8. Accessing Library and Other Information Services

The card catalog with its entries by author, title, and subject, is familiar to every library user. Without it, storage of books in any but a small and oft-used personal collection would simply be valueless dead storage. The index, such as is often found in the back of a book, is another valuable tool of access affording -- when available -- command over greater depth of detail than is typically encompassed in a catalog entry.

Traditionally, each library has prepared its own catalog cards as part of the process undergone by a newly acquired book or other library item. Different conceptions of the nature and detail of catalog entries or of the format of these entries and of the classification systems (Library of Congress, Dewey Decimal, etc.) that categorize books and often their locations on shelves have grown up owing to the idiosyncrasies of librarians, their clients, or the specialized character of their collections. One of the consequences of the information and cost "explosions" has been a growing realization of the duplication of effort and resultant waste ensuing from this process.

Since the early 1960's, the Library of Congress has undertaken the MARC (MAchine Readable Cataloguing) project to take advantage of foreseen economies that computer processing might afford in catalog preparation and use including, most importantly, the possibility of distributing the resulting records electrically or otherwise to other libraries throughout the country thereby assisting in the elimination of duplicative cataloguing of books already processed at the Library of Congress. At first, the MARC project addressed itself to new books only. Since 1970, Project RECON

(Retrospective CONversion of LC catalog records to MARC format) was begun.(41)

Ideally the economies of scale inherent in the MARC conception might be fully realized through every other library using the MARC catalog entry precisely as prepared at the Library of Congress. In practice this ideal is not realized owing to the need to accommodate transitions from existing systems, to a continuing need felt by librarians and their clients for adapting LC entries to particular local operational or substantive needs, and to gaps in the MARC coverage. Computer programs to provide tailoring therefore proved necessary.

The availability of MARC records further suggested the possibility, related to interlibrary loans and other resource-sharing and equalization techniques, of tracking holdings among various libraries in a cooperating group so as to permit easier determination of the location and availability of an item anywhere in the group.

In 1967, libraries in Ohio banded together to create the Ohio College Library Center (OCLC), a not-for-profit corporation chartered by the State of Ohio. Since then, OCLC has become a primary source of MARC-based services and supporting computer software. As of 1974, OCLC's computer system was linked by telecommunications to over two hundred terminals, not only in Ohio, but across the country.

In many cases, the users of OCLC's services are themselves groupings serving a region through shared cataloguing, technical processing, and other bibliographic and operational services. Among these are NELINET (New England Library Information Netowrk), organized in 1966 under the New England Board of Higher Education; SLICE (Southwestern Library Interstate Cooperative Endeavor) begun in 1971 to serve six Southwest states;

SOLINET (Southeastern Library Network), organized in early 1973. The growth of the movement is reflected by the creation, late in 1974, of a Council for Computerized Library Networks (CCLN), whose charter membership includes the aforementioned along with six other similar organizations.(42)

As of June, 1974, OCLC's data base comprised over 900,000 bibliographic records based on both the Library of Congress' MARC tapes and cataloguing done by participating libraries for material not covered by the Library of Congress. From inputs from the Library of Congress and the other participating libraries, that data base was growing at a rate of 1,000 records a day. By mid-1974, NELINET was reporting a production of nearly 250,000 catalogue cards a month for the forty-nine libraries that it serves, and 45,000 new catalogue records a month contributed to the common collection by its participants. Indeed, in September, 1974, the NELINET News Letter reported that "As a result of the large number of new institutions waiting to be brought on-line, OCLC has been forced to declare a temporary moratorium of from 6 weeks to two months on making changes in existing members' profiles. Modifications to new profiles in the process of being debugged or corrections to existing profiles necessitated by inadvertent program problems are not included in the moratorium."(43)

The potential economic and operating advantages of such cooperative ventures are evident, as are the risks of a failure in the centralized operation affecting all participants at once.

Of greater importance here is the fact that these not-for-profit cooperatives have grown up with the support of local or state taxation (OCLC), of federal government tax support (OCLC and others, through the

National Science Foundation), and of private foundation support (SOLINET, through the Andrew W. Mellon Foundation and the Council on Library Resources, the latter supported principally by the Ford Foundation).

Two issues related to the development of these new institutions seem particularly important in our context.

First, as exemplified by The Cooperative Membership Agreement signed by participants in NELINET, the development of these organizations has brought to the fore a set of cost accounting issues which have rarely surfaced and perhaps not even been recognized in the traditional library world and are not in explicit evidence in such more traditional instruments as the American Library Association's non-binding National Interlibrary Loan Code. The whole gamut of problems of accounting for shared resources, of advertent or inadvertent cross-subsidies among services and other accounting and pricing issues long characteristic of such information utilities as the Post Office and the telephone system surface in full glory. We develop this point further in Sections 14 and 15.

The constitution of these cooperatives has also drawn the fire of organizations in the private sector claiming that the OCLC and its affiliates or imitators provide at a subsidized rate services to a clientele which could also be served by for-profit organizations in the private sector. Information Dynamics Corporation, Richard Abel and Company, and Inforonics Incorporated are among the organizations offering similar services.

It is not within the scope of this study to pass judgment on the relative merits of competing claims in this area. There are, however, significant underlying policy options whose consequences deserve analysis.

Chief among these are the effects of scale and of technological change.

Except for the capital costs of new buildings, ongoing library operations are characterized by relatively small costs of additional resources. These come in increments as small as one more book; they range upward through the one more journal subscription, one more part-time helper to the one more full-time professional.

The larger increments characteristic of computer and communications technology force explicit attention to the effects of economies of scale and of varying inputs in activities like OCLC, and in others that are described in Sections 9-11, such as the National Library of Medicine's Medline service and similar private sector services. Trends in the relative proportions of various cost components of Medline are shown in Figure 48. Average cost projections made before the service was initiated are shown in Figure 49. What happens to such averages when capacity is added in practice is illustrated in Figure 50.(44)

What are projections of economies of scale in this area? What about incentives for both continuity and innovation over long periods of time? What about rights of privacy and rights of access to information?

Would the consumer be best served by a single organization serving the country or even extending internationally? If a single system, should it be public or private? Regulated or unregulated? Do difficulties (economic, reliability, civil-libertarian, etc.) arise such as to indicate that multiple, regional, or overlapping national services would be preferable?

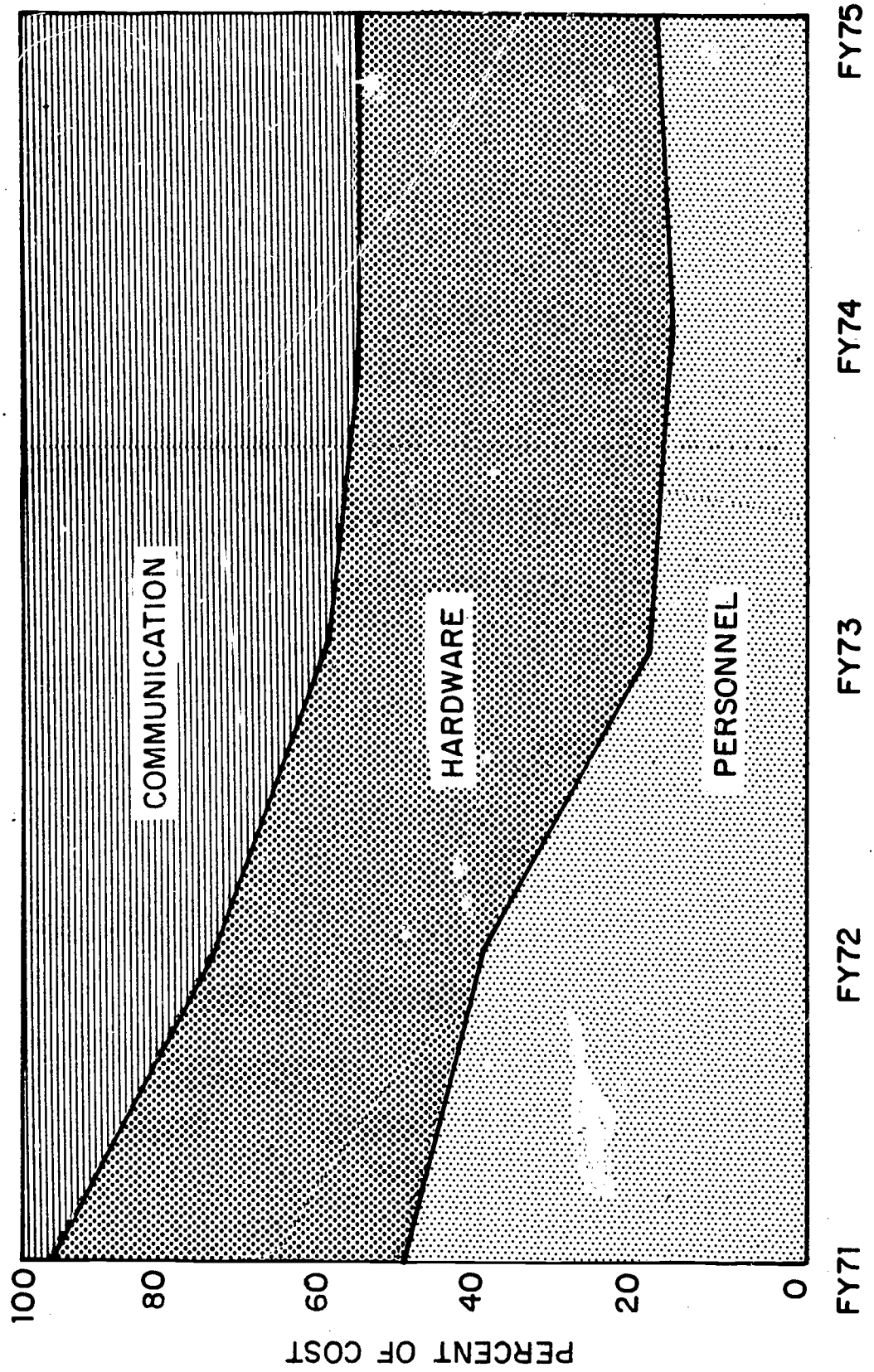


FIGURE 48. COST TRENDS FOR SEARCH SERVICES

McCarn, Davis B. Presentation to the Information Industry Association, p. 13.

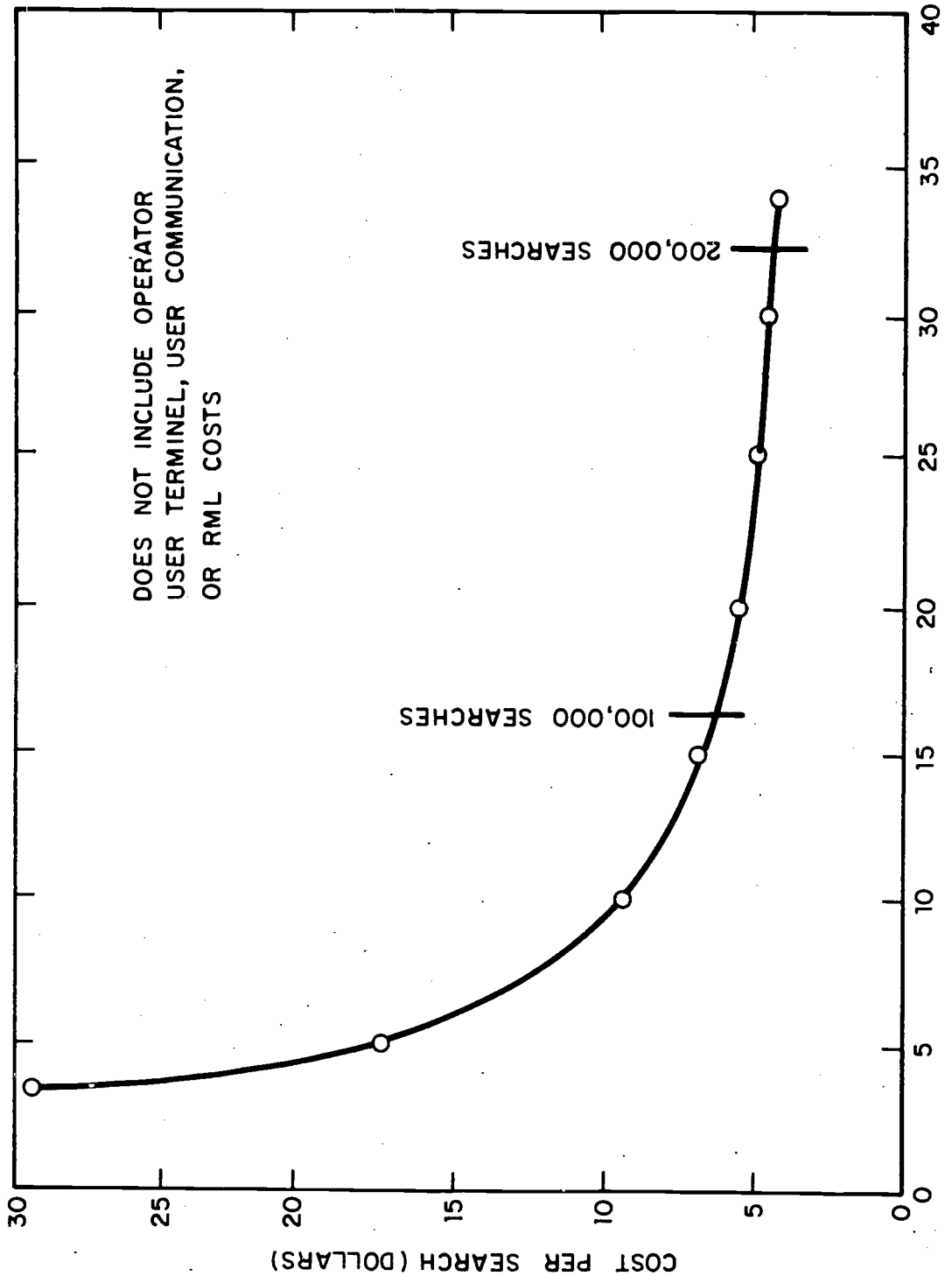


FIGURE 49. COST OF MEDLINE SEARCHES

McCarn, Davis B., Presentation to the Information Industry Association, p. 15.

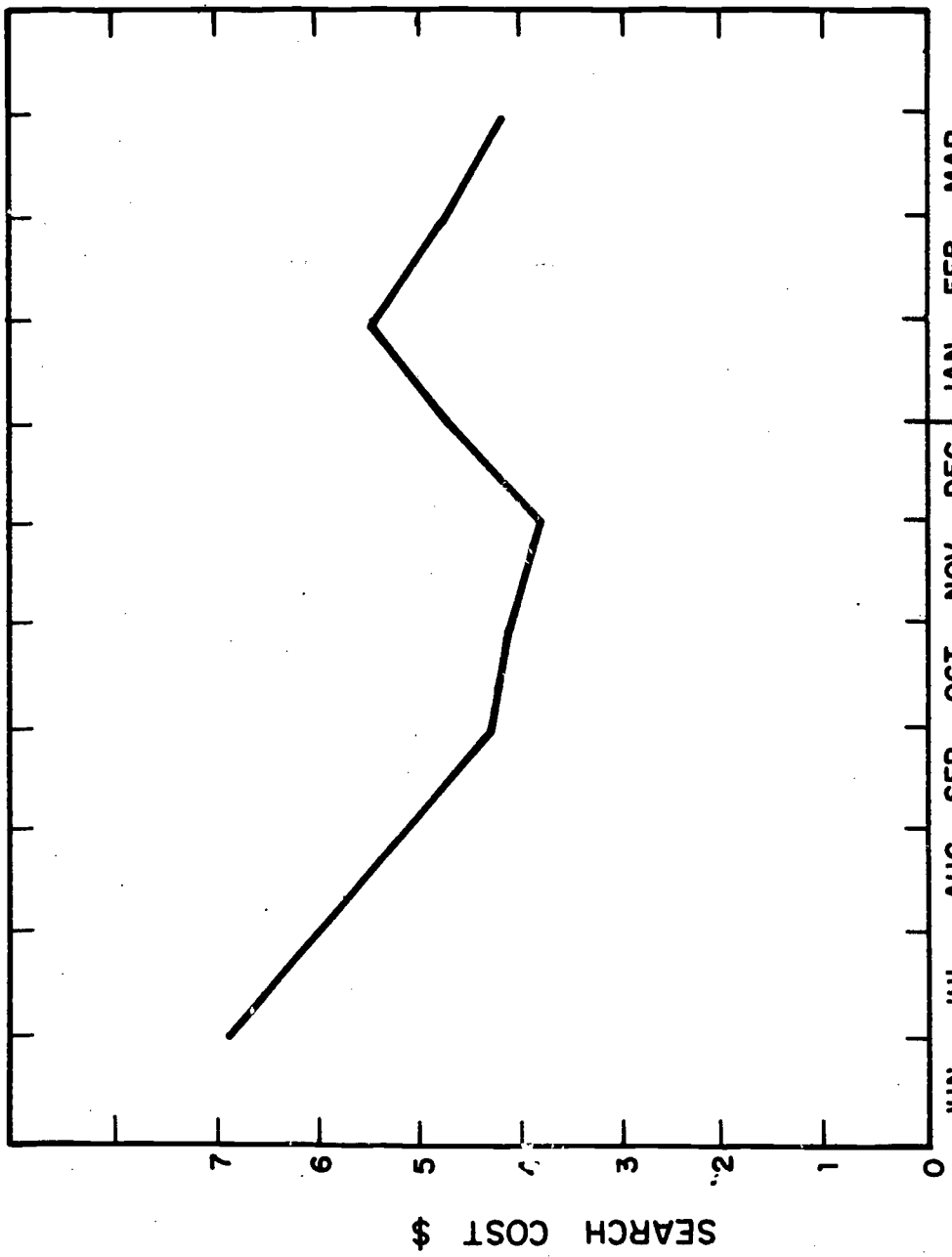


FIGURE 50. MEDLINE
COST PER SEARCH TO U.S. GOVERNMENT

McCarn, Davis B., Presentation to the Information Industry Association, p. 14.

If more than one system, should these develop along the currently observable line where not-for-profit cooperatives serve not-for-profit institutions and profit-making organizations serve the profit-making sector? Or would a mixed system in which tax support might benefit private for-profit organizations or in which cross-subsidies from the private for-profit sector subsidize non-profit users be preferable? We note that the OCLC system is now being used by seventeen federal agencies ranging from Army Engineers through the Department of Transportation to the Smithsonian Institution.(45)

Is it sound public policy to recoup prior investment by the Library of Congress and by the agencies that supported the development of the OCLC to have federal agencies be beneficiaries of the result? Or would the public interest be better served beyond the experimental stage by throwing further development open to a free competitive market?

In the historical context, such questions are not likely to be resolved by appeal to simplistic divisions of public or private interests. As in the case of private publishers, whose income depends in such a heavy proportion on the expenditures of tax-supported institutions, a libertarian argument in the Ayn Rand tradition would have a hypocritical ring. Conversely no evidence we have seen suggests arguments more compelling than growing precedent for excluding private for-profit enterprise from this market. Regard for and abuses of civil liberties have been evident in both sectors as well.

The debates over similar issues that characterize the current climate in the computer and telecommunications fields (Sections 14, 15) will also spill over into the world of library and other information services world as computer and telecommunications-based services become increasingly prevalent.

9. Data Base and On-Demand Services

As noted in Section 8, technological advances in computers and telecommunications have had a notable effect on techniques for indexing and abstracting conventional information sources and on collecting and exploiting the statistical information arising from transactions or scientific research and the kind of information found in directories of various kinds. The brevity and specificity of these data in some cases, their numerical character in others, combine to make these types of data more amenable than others to economical storage and distribution by computing and telecommunication techniques.

One result is the convergence of two hitherto distinct streams, one with its sources in the financial and business community, the other in the science and technology establishment.

In the first stream we note the long history of common reference works associated with the names of Standard & Poor's,(46) Dun & Bradstreet,(47) Moody's,(48) in the financial realm; the various Bowker directories in the library world; the New York Times Index;(49) the Commerce Clearing House Congressional Index,(50) Shepard's Acts & Cases by Popular Names: Federal and State,(51) and the United States Codes Annotated(52) in legal circles; and many more. Typically, these works are published periodically and are accessible to individuals through purchase or through consultation at public or other libraries which commonly carry them.

More and more such works are becoming available in computerized form.

Similar developments have taken place in the scientific and technical area where various types of reference tools, some with long histories, have recently become available in computerized form. Figure 51, for example,

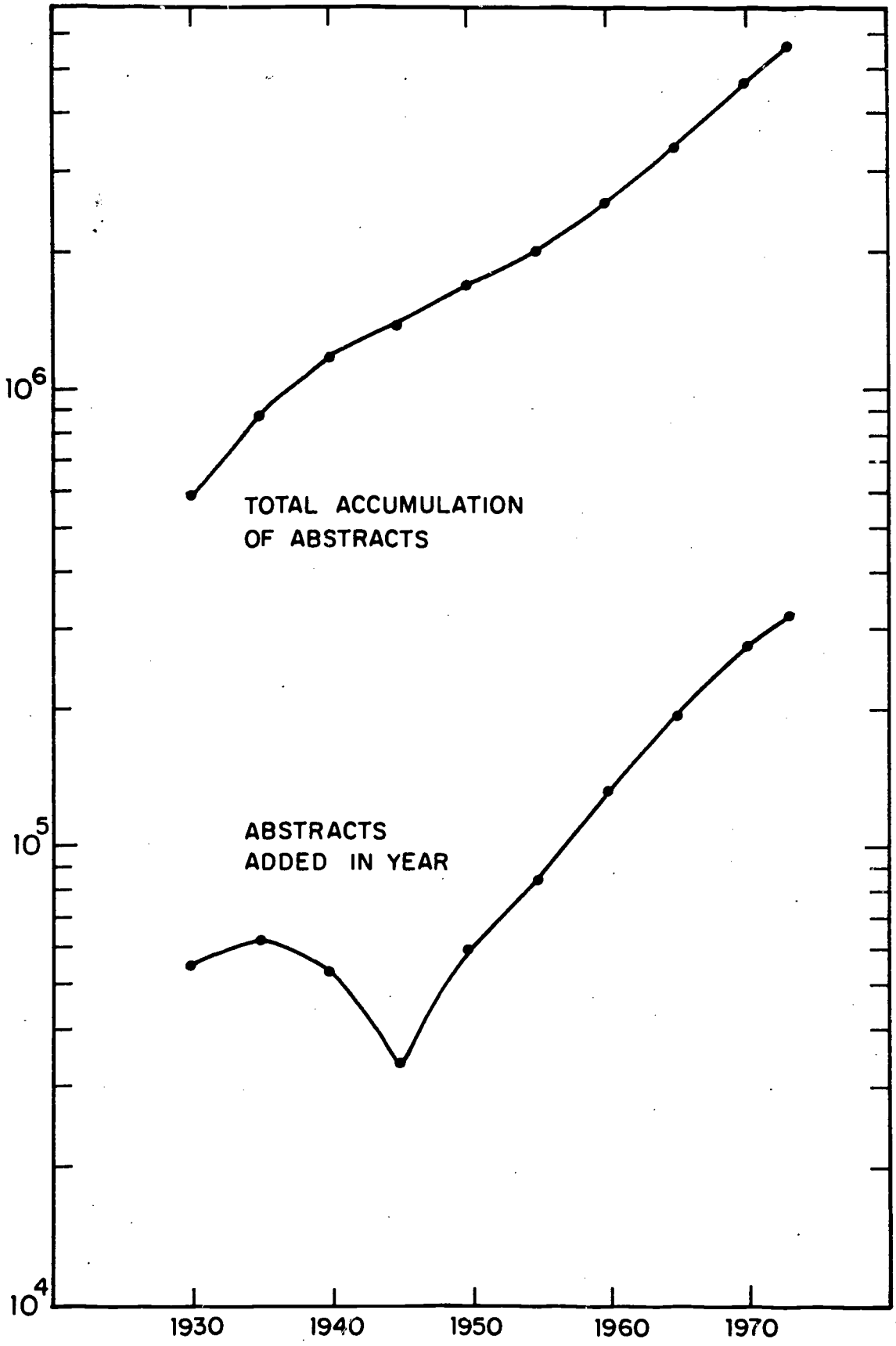


FIGURE 51. CHEMICAL ABSTRACTS SERVICE
PRODUCTION AND PUBLICATION OF ABSTRACTS

American Chemical Society, CAS Today: Facts and Figures About Chemical Abstracts Service, p. 28-29.

illustrates the growth of Chemical Abstracts. Since 1968, CA Condensates, a computerized version of this material giving full bibliographical data plus a part of the subject index as represented by key words, has been available on computer tape. Biological Abstracts, Medlars (National Library of Medicine), Government Reports Announcements (National Technical Information Service) and numerous others are in this category.

Many of these data bases and their users tend to be focused on science and technology. However, Figure 52, which shows data adapted from affiliations in the various divisions of the Special Libraries Association, indicates a fairly even division between membership in divisions categorized as business-oriented and those categorized as science- and technology-oriented. If one looks not only at how librarians see themselves, but also at the categories of clients and their interests, the diversified picture shown in Figure 53 emerges.

By contrast, the National Science Foundation, whose programs are the most visible government and research development programs on information science and technology, focuses exclusively on the suppliers and users of scientific and technical information.(53)

The survey of ERIC Data Base Search Services issued by the Educational Resources Information Center (ERIC) of the National Institute of Education in July, 1974, provides an illuminating overview of data base services used in the educational realm. The document "lists and describes briefly the organizations which are currently providing computerized searches of the ERIC data base." In addition, however, "Major non-ERIC files that are accessible are also shown."(54) Whether or not direct charges to users

SCIENCE AND TECHNOLOGY DIVISIONS	
Science-Technology	15.4 %
Aerospace	1.6
Biological Sciences	6.9
Chemistry	2.5
Engineering	2.7
Food Librarians	1.2
Geography and Map	3.0
Metals/Materials	1.8
Military Librarians	3.1
Natural Resources	1.9
Nuclear Science	1.1
Petroleum	1.3
Pharmaceutical	1.9
Physics-Astronomy-Mathematics Prov.	0.8
Transportation	1.5
Total Science and Technology Divisions	46.7

OTHER DIVISIONS	
Business and Finance	10.7 %
Advertising and Marketing	3.5
Documentation	6.9
Educational Provisional	1.3
Insurance	1.4
Newspaper	2.2
Picture	1.8
Public Utilities	1.2
Publishing	2.3
Museums, Arts, and Humanities	6.0
Social Science	8.9
Total, Other Divisions	46.2

NO DIVISION AFFILIATION	
Total, No Division Affiliation	7.0 %

FIGURE 52. SPECIAL LIBRARIES, MEMBERSHIP, JUNE 30, 1974

Adapted from Special Libraries, "Members Tally by Chapter and Division," p.47s.

	1973		1978		Annual Growth Rate %
	$ millions	%	$ millions	%	
Professionals:					
Stockbrokers, traders	58	6.2	85	5.3	8
Scientists, technologists, medical personnel	17	1.8	26	1.6	9
Attorneys	13	1.4	32	2.0	20
Librarians	13	1.4	22	1.4	11
Real estate brokers, developers	10	1.1	18	1.1	12
Subtotal	111	--	183	--	11
Commercial:					
Marketing data	291	31.4	469	29.4	10
Business credit	244	26.3	359	22.5	8
Consumer credit and related	220	23.7	443	27.8	15
Economic and financial	25	2.7	44	2.8	12
Products and services	15	1.6	26	1.6	12
General information	2	0.2	29	1.8	--
Subtotal	797	--	1370	--	11
Consumer Services:	20	2.2	40	2.5	15
Total	928	--	1593	--	11

FIGURE 53. CURRENT AND PROJECTED DATA BASE MARKET SEGMENTS

Giuliano, Vincent E. and Kvaal, Robert J., Outlook for Data Base Publishing, Table 10, p. 38.

are made is also indicated, although this information applies only to searches of the ERIC files not to the other accessible files (Figure 54).

Of the 119 organizations listed in the survey, 57 percent serve only their own members or members of a limited group of institutions. Twenty-four percent will serve outsiders under special circumstances, and eighteen percent are open to all comers.

As for direct charges, 23 percent of the organizations make no direct charges to any one for any service. Seventy-four percent charge some of their clients for some of their services, and three percent charge all clients for every service.

The pricing practices are too diverse and too obscure to permit summarization. Figure 55 is an illustrative sample of pricing practices and their variability.

In spite of the variations in detail, it is clear that the introduction of computerized data base search services into the educational realm has produced a marked change in practice from that customary in libraries where the coin-operated copying machine usually marks the only intrusion of direct charging to clients. The pattern is much closer to the conventions now widely followed in charging for computer services in educational institutions.

Libraries often act as retailers, so to speak, for such services, but in many cases some other organization within or outside the institution served by the library operates the service terminals. In many cases, the data bases are maintained elsewhere and two commercial firms, Lockheed Information Systems and System Development Corporation are among the intermediary "wholesalers". The sources of the data bases themselves are varied. As shown in Figure 54, Lockheed provides access to such varied data bases as CA Condensates -- supplied by Chemical Abstracts Service, an arm of the American Chemical Society -- CAIN, a product of the National Agricultural

SUMMARY: CLIENTELES AND CHARGING PRACTICES

	Colleges and Universities	Local or State Educational Authorities; Regional or Other Educational Centers; etc.	SDC	Lockheed	Other Private	Total	Percent
Total No. of Organizations	64	48	1	1	5	119	
		Clientele					
In-House or In-Group	41	27				68	57.1
Mixed	15	14				29	24.4
Open	8	7	1	1	5	22	18.5
		Charging Practice					
No Charge for Anyone for Anything	11	16				27	22.7
Charge for Some People or Something	51	30	1	1	5	88	73.9
Charge Everyone for Everything	2	2				4	3.4

Adapted from Embry, Jonathan D. et. al., Survey of ERIC Data Base Services, July 1974, p. 7-25.

FIGURE 54. ORGANIZATIONS PROVIDING COMPUTERIZED SEARCHES OF THE ERIC DATA BASE

(a) SUMMARY: AVAILABLE DATA BASES

	Colleges and Universities	Local or State Educational Authorities; Regional or Other Educational Centers; etc.	SDC	Lockheed	Other Private	Total
AIM/ARM	11	8			2	21
API						
BA Previews	2				1	3
BIORESEARCH Index	1					1
CA Condensates	5	1			2	8
CAIN	4					4
CICP	1					1
CIJE	62	46			5	113
CMA						
COMPENDEX		1			1	2
CT	2				1	3
EC						
EMA						
FIDO		1				1
FSTA					1	1
GEO-REF	1					1
GRA	17	2				19
INFORM						
INSPEC						
ITT	14					14
MARC	1					1
MEDLINE	2				1	3
METADEX						
NYT/IB						
PA	4					4
PANDEX	1					1
RIE	64	48			5	117
SCI	2					2
SPIN	1					1

FIGURE 54. ORGANIZATIONS PROVIDING COMPUTERIZED SEARCHES OF THE ERIC DATA BASE

	Colleges and Universities	Local or State Educational Authorities; Regional or Other Educational Centers; Etc.	SDC	Lockheed	Other Private	Total
SSCI	5					5
STAR	15	2			2	19
TRANSDEX						
Lockheed: All or Most	9	16		1	3	29
SDC: All or Most	7	6	1		3	17
Others	5	5			3	13

Adapted from Embry, Jonathan D. et. al., Survey of ERIC Data Base Services, July 1974, p. 7-25.

(b) DATA BASES AVAILABLE THROUGH LOCKHEED AND SDC

LOCKHEED FILES:			SDC FILES:	
AIM/ARM	EC	PANDEX	API	GRA
CA Condensates	EMA	RIE	CA Condensates	INFORM
CAIN	GRA	SSCI	CAIN	MEDLINE
CIJE	INFORM	TRANSDEX	CIJE	RIE
CMA	INSPEC		COMPENDEX	SCI
COMPENDEX	PA		GEO-REF	

Embry, Jonathan D. et. al., Survey of ERIC Data Base Services, July, 1974, Table 4, p. 5.

FIGURE 54 (Continued): ORGANIZATIONS PROVIDING COMPUTERIZED SEARCHES OF THE ERIC DATA BASE

ACRONYM	FILE NAME (SOURCE)	ACRONYM	FILE NAME (SOURCE)
AIM/ARM	Abstracts of Instructional Materials/Abstracts of Research Materials in Vocational and Technical Education (Center for Vocational and Technical Education, Ohio State Univ.)		Technical Information Service) Also known as the NTIS file.
		INFORM	Abstracted Business Information (ABI, Inc.)
API	Abstracts of Refining Literature (American Petroleum Institute)	INSPEC	Information Services in Physics, Electrotechnology, and Computers and Control (Institution of Electrical Engineers)
BA Previews	Biological Abstracts (Biosciences Information Service)	ITT	Textile Technology Digest (Institute of Textile Technology)
BIORESEARCH Index	(Biosciences Information Service)	MARC	Machine Readable Cataloging (Library of Congress)
CA Condensates	Chemical Abstracts (Chemical Abstracts Service)	MEDLARS	Medical Literature Analysis and Retrieval System (National Library of Medicine)
CAIN	Bibliography of Agriculture - Cataloging and Indexing (National Agricultural Library) Also known as the NAL file.	MEDLINE	MEDLARS On-Line (National Library of Medicine) A subset of MEDLARS.
CICP	Current Index to Conference Papers (Macmillan Information)	METADEX	Metals Abstracts Index (American Society of Metals)
CIJE	Current Index to Journals in Education (Macmillan Information)	NYT/IB	New York Times Information Bank (New York Times)
		PA	Psychological Abstracts (American Psychological Assoc.)
CMA	Chemical Markets Abstracts (Predicasts)	PANDEX	Current Index to Scientific and Technical Literature (Macmillan Information)
COMPENDEX	Computerized Engineering Index (Engineering Index Inc.) Also known as the EI file.	RIE	Research in Education (National Institute of Education)
CT	Chemical Titles (Chemical Abstracts Service)	SCI	Science Citation Index (Institute for Scientific Information)
EC	Exceptional Children Abstracts (Council for Exceptional Children)	SPIN	Searchable Physics Information Notices (American Institute of Physics)
EMA	Electronics Markets Abstracts (Predicasts)	SSCI	Social Science Citation Index (Institute for Scientific Information)
FIDO	Fugitive Information Data Organizer (San Mateo Education Resources Center - SMERC)	STAR	Scientific and Technical Aerospace Reports (National Aeronautics and Space Administration) Also known as the NASA file.
FSTA	Food Science and Technology Abstracts (International Food Information Service)	TRANSDEX	Bibliography and Index to the United States Joint Publications Research Service (JPRS) Translations (Macmillan Information)
GEO-REF	Geological Reference File (American Geological Institute)		
GRA	Government Reports Announcements (National		

(c) DESCRIPTION OF DATA BASES

Embry, Jonathan D. et. al., Survey of Eric Data Base Services; July, 1974, Table 2, p. 4.

FIGURE 54 (Continued): ORGANIZATIONS PROVIDING COMPUTERIZED SEARCHES OF THE ERIC DATA BASE

ORGANIZATION	POPULATION SERVED	FILES AVAILABLE (UPDATE FREQUENCY)	INQUIRY SUBMISSION		SEARCH OUTPUT	COST PER SEARCH	TURN-AROUND TIME	SEARCH SYSTEM USED	NOTES	DATE ENTRY PREPARED
			METHOD	FORMAT						
CALIFORNIA (Contd.)										
Southern California Area Information Network (SCAIN) Whittier College Box 364 Whittier, California 90608 Telephone: (213)693-0771 Contact: Dr John E. Dean	1) Members of subscribing school districts 2) Open	RIE (Quarterly) CIJE (Quarterly) All Lockheed and SMERC files.	Telephone Walk-in	Natural language.	Abstracts	Computer time plus staff time (typically $15. - $30.)	1-3 weeks	DIALOG (Through SMERC)	Microfiche and hard copy available on request.	5/9/74
COLORADO										
ERIC Clearinghouse for Social Studies/Social Science Education (ERIC/CHESS) 855 Broadway Boulder, Colorado 80302 Telephone: (303)443-1383 Contact: Kathleen Mitchell	Social Studies educators	RIE (Quarterly) CIJE (Quarterly	Mail Telephone Walk-in	Natural language.	Abstracts	No charge	2 weeks	RIC (Through ERIC Facility)		4/25/74
University of Denver Graduate School of Librarianship Denver, Colorado 80210 Telephone (303)753-3650 Contact: Philipp Heer	Open	RIE (Monthly) CIJE (Monthly) Most Lockheed and SDC files.	Mail Telephone Walk-in	Natural language. Negotiation with requester preferred.	Abstracts	Computer, communication, and staff costs. (Typically $15. - $20. RIE & CIJE)	3-5 days	DIALOG ORBIT	Searches reviewed before delivery.	5/29/74
University of Northern Colorado University Library Greeley, Colorado 80639 Telephone: (303)351-2264 Contact: Cynthia Turner	University of Northern Colorado community	RIE (Monthly) CIJE (Monthly) AIM/ARM	Mail Telephone Walk-in	Natural language. Negotiation with requester preferred.	Abstracts	RIE: $2.50 CIJE: $2.50	2 weeks	NCEBOCS System	Provides computer services for NCEBOCS.	5/8/74
Northern Colorado Educational Board of Cooperative Services (NCEBOCS) 830 South Lincoln Longmont, Colorado 80501 Telephone: (303)772-4420 Contact: Allen Buckner or Cheryl Chase	Priorities: 1) Members of contracting agencies 2) Open	RIE (Quarterly) CIJE (Quarterly) AIM/ARM	Mail Telephone Walk-in	Natural language. Negotiation with requester preferred.	Abstracts	$25 per search for first file; $6. each additional file.	14 days	NCEBOCS System	Cost includes search negotiation, coding, computer time, editing and evaluation of output, selection of most pertinent material, but does not include microfiche and/or hard copy of documents, which are available on request.	4/16/74
CONNECTICUT										
Area Cooperative Educational Services (ACES) Educational Resources Center 12 Village Street North Haven, Connecticut 06473 Telephone: (203)562-9967 Toll free number for Connecticut users only (800)922-1567 Contact: Mrs. Beverly Goodman	1) Connecticut educators 2) Open	RIE (Quarterly) CIJE (Quarterly) All Lockheed files.	Mail Telephone Walk-in	Natural language. Negotiation with requester mandatory.	Abstracts	1) No charge to members of subscribing organizations 2) Others: RIE & CIJE $25.; search in depth $35. (Includes all relevant files and provides selected hard copy material.)	10-15 days	DIALOG	Manual search of local files made if appropriate. Microfiche or hard copy furnished upon request.	4/22/74
New England Research Applications Center (NERAC) Mansfield Professional Park University of Connecticut Storrs, Connecticut 06268 Telephone: (203)486-4533 TWX: (710)420-0571 Contact: Dr. Daniel U. Wilde	Open	RIE (Quarterly) CIJE (Quarterly) AIM/ARM BA Previews CA Condensates MEDLINE STAR (Plus others)	Mail Telephone Teletype (TWX)	Natural language. Negotiation with requester preferred.	Abstracts	All files: $60. for "Educators" (Rates for others quoted on request.)	7 days	In-house system	Search output reviewed by information specialists before being returned to client. Specializes in strategy design, search negotiation, computer operation, and output review. Offices in New York City, Philadelphia, and Boston.	4/10/74

FIGURE 55. ILLUSTRATIVE PRICING PRACTICES

Embry, Jonathan D. Et. al., Survey of ERIC Data Base Services, July 1974, p. 9.

Library, one of the three major federal libraries, and PANDEX, an index to scientific and technical literature that is a proprietary product of Macmillan Information. It is clear here again that the public and private sector, the tax dollar and the investor's dollar are inextricably interwoven, at least in this sample of the data base world.

10. Private Sector Data Base Services

The variety of data base services provided by the private sector is much greater than might be inferred from the limited sample described in the preceding section. Moreover, as suggested by the prices in Figure 56, at least some of these services are "wholesale" services oriented toward institutional rather than individual clients, including among them libraries and other agencies that serve as "retailers".

As shown by Figure 57, the traditional printing, publishing, and related industries are moderately concentrated. The patterns of entry into less classical information services are varied. There is much experimentation and variability in the combinations and proportions of creation, processing, storage, selection, distribution, and related functions performed by various enterprises.

The data bases may be proprietary, as in the case of McGraw Hill's F. W. Dodge and Standard & Poor's units, Dun and Bradstreet's Moody's Investors Service, Mead Data Central's law files and the New York Times' Information Bank. In other instances the data bases are public property, as is the case with census data and many of the bases accessed through the systems operated by Lockheed Information Systems and System Development Corporation.

In other instances, the files are public, but indexes to these files are compiled as proprietary data banks. Examples in this category include indexes to the reports made by U. S. corporations to the Securities and Exchange Commission prepared by Disclosure Incorporated, a subsidiary of the Reliance Group, in cooperation with the Securities and Exchange Commission, and the indexes to legal literature prepared by Mead Data

Product	Delivery Response	Degree of Customization	Typical Shape of Response	Traditional Classification	Typical Pricing
Periodic Report	Days	Low (standard report)	Book, printout, microfiche, magnetic tape	Single product line	Subscriptions $200-1,000/year
		High (personalized profile)	Printout, microfiche, magnetic tape (on-line file)	Job shop product	Subscriptions $500-2,000/year
Demand Report	Hours	Low	Preprinted sheet, printout, microfiche	Off-the-shelf item	$5-500/report
		High	Printout (on-line file)	Job shop product/personal service	$25-2,000/report
	Minutes (phone hold time)	Low to medium	Audio (human or mechanical), single page follow-through	Off-the-shelf item	$0.50-25.00/report
Interactive Search	Seconds to hours	Very high	CRT, teleprinter, detailed printout	Personal service	Subscription with use, charges of $300-3,000/month

FIGURE 56. CATEGORIES OF DATA BASE PRODUCTS AND SERVICES

Giuliano, Vincent E. and Kvall, Robert J., Outlook for Data Base Publishing, Table 1., p. 11.

Code	Industry and year [1]	Companies [2] (number)	Value of industry shipments [3] Total (million dollars)	Percent accounted for by:[4] 4 largest companies	8 largest companies	20 largest companies	50 largest companies	Primary product specialization ratio [5] (percent)	Coverage ratio [6] (percent)	Standard error of estimate [7] (percent)
	MAJOR GROUP 27. PRINTING AND PUBLISHING--Continued									
2721	Periodicals....1970....	(NA)	3,127.8	28	41	(NA)	(NA)	(NA)	(NA)	1
	1967....	2,430	2,066.8	24	37	56	72	89	97	(X)
	1966....	(NA)	2,717.8	28	41	(NA)	(NA)	(NA)	(NA)	2
	1963....	2,842	2,286.7	28	42	28	73	93	96	(X)
	1958....	2,342	1,680.8	31	41	22	69	96	97	(X)
	1954....	2,012	1,441.0	29	40	24	(NA)	96	97	(X)
	1947....	2,106	1,088.8	34	43	58	(NA)	94	96	(X)
2731	Book publishing....1970....	(NA)	3,437.3	21	38	(NA)	(NA)	(NA)	(NA)	2
	1967....	963	2,060.2	20	32	27	77	94	86	(X)
	1966....	(NA)	1,986.3	20	33	(NA)	(NA)	(NA)	(NA)	3
	1963....	836	1,534.8	20	33	56	78	93	86	(X)
	1958....	883	1,000.8	18	28	48	88	92	90	(X)
	1954....	804	668.2	21	33	21	(NA)	91	90	(X)
	1947....	636	463.8	18	38	48	(NA)	92	93	(X)
2732	Book printing....1970....	(NA)	938.3	23	33	(NA)	(NA)	(NA)	(NA)	3
	1967....	720	787.4	21	30	48	94	91	70	(X)
	1966....	(NA)	709.3	22	33	(NA)	(NA)	(NA)	(NA)	5
	1963....	662	548.8	19	30	48	86	78	88	(X)
	1958....	786	364.3	24	34	21	56	72	90	(X)
	1954....	298	321.3	21	35	53	(NA)	78	85	(X)
	1947....	(**)	92.3	(**)	(**)	(**)	(**)	(**)	(**)	(X)
2741	Miscellaneous publishing....1970....	(NA)	734.8	35	22	(NA)	(NA)	(NA)	(NA)	3
	1967....	1,443	606.3	28	48	64	72	93	88	(X)
	1966....	(NA)	496.2	33	43	(NA)	(NA)	(NA)	(NA)	8
	1963....	1,306	388.8	32	44	28	71	92	94	(X)
	1958....	1,088	312.7	28	40	55	86	88	97	(X)
	1954....	800	231.2	31	42	28	(NA)	86	98	(X)
	1947....	568	103.3	22	33	22	(NA)	93	78	(X)
2751	Commercial printing, except lithographic....1970....	(NA)	3,736.8	12	21	(NA)	(NA)	(NA)	(NA)	2
	1967....	11,865	3,235.5	14	21	29	38	86	83	(X)
	1966....	(NA)	3,208.3	14	20	(NA)	(NA)	(NA)	(NA)	4
	1963....	11,978	2,642.1	13	18	28	36	86	78	(X)
2752	Commercial printing, lithographic....1970....	(NA)	4,155.1	4	8	(NA)	(NA)	(NA)	(NA)	2
	1967....	8,718	3,138.4	3	8	12	25	88	83	(X)
	1966....	(NA)	2,781.4	5	8	(NA)	(NA)	(NA)	(NA)	3
	1963....	8,738	2,148.7	8	10	18	36	90	88	(X)
2753	Engraving and plate printing....1970....	(NA)	164.3	(S)	(S)	(NA)	(NA)	(NA)	(NA)	11
	1967....	568	137.8	21	38	38	82	81	81	(X)
	1966....	(NA)	173.8	(S)	(S)	(NA)	(NA)	(NA)	(NA)	13
	1963....	374	111.1	26	36	47	80	89	78	(X)
	1958....	330	86.2	26	35	48	58	92	83	(X)
	1954....	388	80.1	24	30	41	(NA)	93	78	(X)
	1947....	413	42.3	38	44	55	(NA)	96	80	(X)
	1935....	(NA)	(NA)	33	40	(NA)	(NA)	(NA)	(NA)	(X)
2761	Manifold business forms....1970....	(NA)	1,233.2	47	57	(NA)	(NA)	(NA)	(NA)	3
	1967....	494	983.3	47	57	89	91	91	90	(X)
	1966....	(NA)	833.8	47	57	(NA)	(NA)	(NA)	(NA)	2
	1963....	428	637.7	48	62	86	90	90	91	(X)
2771	Greeting card publishing....1970....	(NA)	868.8	72	85	(NA)	(NA)	(NA)	(NA)	1
	1967....	288	217.8	67	78	88	96	97	92	(X)
	1966....	(NA)	466.1	64	78	(NA)	(NA)	(NA)	(NA)	2
	1963....	238	348.0	67	71	82	92	96	96	(X)
	1958....	286	278.0	42	62	72	88	94	96	(X)
	1954....	288	268.8	42	27	72	(NA)	98	88	(X)
	1947....	161	123.8	38	55	74	(NA)	96	97	(X)
2782	Blankbooks and looseleaf binders....1970....	(NA)	461.2	38	48	(NA)	(NA)	(NA)	(NA)	4
	1967....	408	381.2	36	42	58	77	86	86	(X)
	1966....	(NA)	344.2	(S)	(S)	(NA)	(NA)	(NA)	(NA)	4
	1963....	380	268.2	33	44	27	78	88	86	(X)
2786	Bookbinding and related work....1970....	(NA)	353.3	10	18	(NA)	(NA)	(NA)	(NA)	3
	1967....	1,008	340.6	11	18	30	47	94	89	(X)
	1966....	(NA)	348.1	(S)	(S)	(NA)	(NA)	(NA)	(NA)	7
	1963....	1,088	298.2	12	17	28	44	96	83	(X)
	1958[11]..	966	183.0	10	18	(NA)	(NA)	94	86	(X)

See footnotes at end of table.

FIGURE 57. **Percent of Value of Shipments Accounted for by the Largest Companies in Each Manufacturing Industry: 1970 and Earlier Years**

Note: The figures shown in parentheses either have associated standard errors exceeding 15 percent or are not consistent with other Census series and related data. Thus, these estimates may be of limited reliability.

Standard Notes: - Represents zero. (D) Withheld to avoid disclosing figures for individual companies. (NA) Not available. (X) Not applicable. (S) Data suppressed because some of the largest companies were approximately the same size as others not included in the sample, and therefore a reliable numerator could not be computed. [r]Revised.
n.e.c. Not elsewhere classified. n.s.k. Not specified by kind.

[1]Industry codes and descriptions are based on the 1957 Standard Industrial Classification Manual (SIC) as modified through 1967. This classification system represented a substantial revision from the previous 1945 edition and was put into effect with the final reports in the 1959 census. However, the concentration ratios in 1958 were tabulated on the 1945 edition to preserve comparability to prior years. Also in 1959, establishments in Alaska and Hawaii were not included as part of U.S. industry totals since these States did not attain Statehood until 1959. Data and ratios for 1958 and prior years are shown in this report only if the industry definitions are so closely comparable that the concentration ratios could not be affected by the shifting of plants due to industry classification changes or by the change in treatment of Alaska and Hawaii. (See "Concentration Ratios in Manufacturing Industry: 1958," Part I, table 7, for comparability of old-new industry definitions.)

[2]The determination of company affiliation of establishments is based on census reports and publicly available records. Value of shipment totals for establishments have been summarized into company totals in each manufacturing industry. "Largest" companies are determined by each company's value of shipments in the specified industry.

[3]Value of shipments figures are not completely comparable between the years 1963-67 and prior years. They include for all establishments classified in the industry (a) value of products primary to the industry, (b) value of all secondary products which are primary to other industries, (c) value of miscellaneous receipts such as receipts for contract and commission work on materials owned by others, scrap, salable refuse, repairs, etc., and (d) value of resales--i.e., products resold in same condition as bought. In 1959 and prior years value of resales was excluded from value of shipments.

[4]The percentages consist of the sum of the value of shipments of the largest 4 companies (or 8, 20, or 50 companies), divided by the total value of shipments of the industry.

[5]The "primary product specialization ratio" measures the extent to which plants classified in the industry specialize in making products regarded as primary to the industry; that is, value of shipments of primary products of plants in the industry is expressed as a ratio of the total shipments of all products made by these establishments (excluding miscellaneous receipts, such as receipts for contract and commission work on materials owned by others, scrap and salable refuse, repair, etc.).

[6]The "coverage ratio" measures the extent to which all shipments of primary products of an industry are made by plants classified in the industry, as distinguished from secondary producers elsewhere; that is, value of shipments of the primary products made by plants classified in the industry is expressed as a ratio of the total shipments of primary products made by all producers, both in and out of the specified industry.

[7]A description of the standard error of estimate is given in the Introduction under "Qualifications of the Data". The percentage standard errors shown are approximate relative standard errors of level for 1970 and 1966.

[8]Value added by manufacture is shown for this industry rather than value of shipments because the latter contains a substantial and unmeasurable amount of duplication. The calculations for the 4, 8, 20, and 50 largest companies also are based on value added. The value added figure for 1963 and later years is adjusted value added; for 1958 and prior years it is unadjusted value added. Adjusted value added is calculated by subtracting the cost of materials including cost of resales from the value of shipments including resales and adjusting for the change in finished products and work-in-process inventories during the year. Unadjusted value added excludes value added by resales and any inventory change. The standard error shown for this industry is for value added by manufacturing.

[9]Not completely comparable to 1954 and later years because of a change in industry classification. For discussion of 1947 to 1954 comparability, see 1954 Census of Manufactures, Volume II, Industry Statistics, "Dairy Products."

[10]In 1954, industry 2027, Fluid Milk, was composed of two industries, 2026, Fluid Milk (only), and 2027, Fluid Milk and Other Products. In 1954 figures on value of shipments and share of value of shipments accounted for by the 4 and 8 largest companies have been recalculated on a basis comparable to 1958. In 1947 and earlier years, establishments primarily distributing fluid milk were classified as nonmanufacturing.

U.S. Dept. of Commerce, Annual Survey of Manufactures, 1970: Value-of-Shipment Concentration Ratios, Table 4, p. 18, 41.

FIGURE 57 (Continued). Percent of Value of Shipments Accounted for by the Largest Companies in Each Manufacturing Industry: 1970 and Earlier Years

Central under the sponsorship of the Ohio, New York, Missouri, Texas, and Illinois Bar Associations. This follows the tradition of private compilation of law indexes, noted in Section 9.

Figures 58 to 64 give descriptions of illustrative organizations providing various types of data base services to different clienteles. The range in size and diversity of operations is impressive, although the sampling does not do justice to the multiplicity of smaller organizations in the field. However, as Figure 2 shows, of the seventy-one organizations belonging to the Information Industry Association for whom dues data were available, thirty-one had annual grosses below one million dollars and sixty-one annual grosses below five million dollars.

The distinction between McGraw-Hill -- with annual operating revenues in 1973 of $470 million -- and Plenum Publishing Corporation with annual revenues in the same year of $10 million is clearly significant in scale. The differences in the relative roles that traditional publishing, non-traditional information services and other activities play in the several organizations represented in Figures 58-64 clearly suggest that the attitudes of these organizations toward the impacts of change will differ widely, and that indeed they will be affected differentially by changes in the pattern of operation of libraries. The interpretation of what is good for the private sector is likely to differ as much between McGraw-Hill or Xerox and Plenum Publishing Corporation as views on the merits of interlibrary loans are likely to differ between a major research library and a small library system in Central Illinois.

		1973 Operating Revenues	%
Books and Education Services		216,457,000	46.0
Elementary and High School	36 %		
Higher Education and Professional	29 %		
Continuing Education	8 %		
Other	11 %		
Publications and Research Services		134,115,000	28.5
McGraw-Hill Publications Company (18 trade journals; 2 newsletters)			
McGraw-Hill International Publications Company			
Opinion Research Corporation			
Information Systems			
F.W. Dodge Division		60,002,000	12.8
Sweet's Division			
Financial Services		36,026,000	7.7
Standard and Poor's Corporation (including computerized data bases and services)			
Broadcasting Operations (4 TV stations)		23,664,000	5.0
Total		470,264,000	100.0

FIGURE 58. OPERATING REVENUES OF MCGRAW-HILL DIVISIONS, 1973

McGraw-Hill, Inc., 1973 Annual Report, p. 4, 12.

(a) DUN AND BRADSTREET COMPANIES, INC.

Dun and Bradstreet, Inc.
The Reuben H. Donnelley Corporation
Corinthian Broadcasting Corporation
Dun-Donnelley Publishing Corporation
Moody's Investors Service, Inc.
Management Consulting Division

Dun and Bradstreet Companies, Inc., Annual Report, 1973, p. 27.

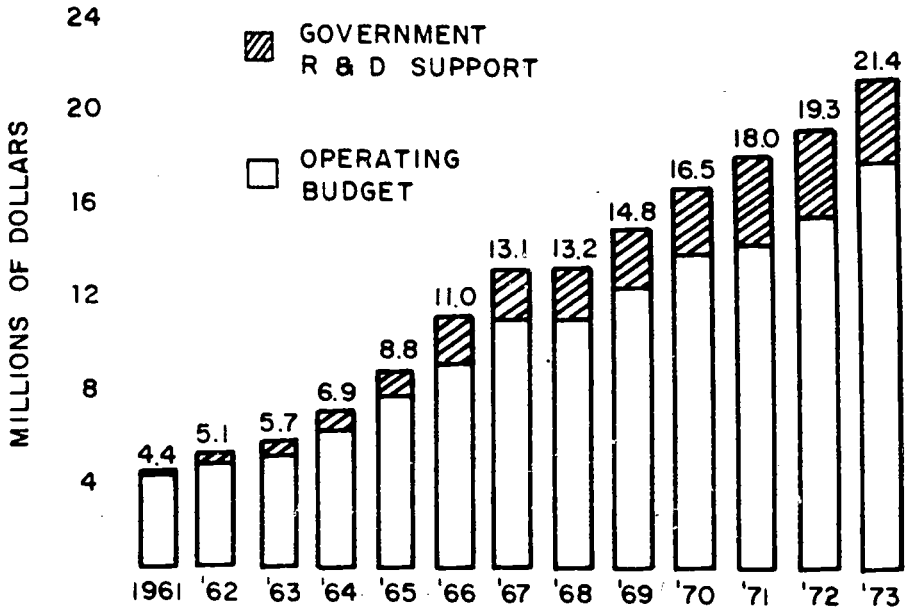
FIGURE 59. DUN AND BRADSTREET COMPANIES: SERVICES AND REVENUES

(b) DUN AND BRADSTREET OPERATING REVENUE, 1973

	1973 Operating Revenue ($ millions)	%
Business Information Services	197.4	43.1
Commercial Collections Credit Clearing House Recommendations Credit Reports and Reference Books International Reports and Reference Books Management Consulting Medical Support Services Municipal Reports Plant Site Locations and Area Development Surveys		
Publishing	148.8	32.5
Book Publishing Classified Telephone Directory Service Correspondence Courses Magazine Publishing Moody's Manuals Moody's Printed Investor Services Official Airline Guides		
Marketing Services	81.3	17.8
Data Universal Numbering System Direct Marketing Door-to-Door Distribution Dun's Market Identifiers Marketing Guides Market Research Retail Store Detailing Retailer Marketing Services Systems Development		
Broadcasting	30.2	6.6
5 TV stations TVS Television Network		
Total	457.7	100.0

Dun and Bradstreet Companies, Inc., Annual Report, 1973, p. 23.

FIGURE 59 (Continued). DUN AND BRADSTREET COMPANIES: SERVICES AND REVENUES



Since 1956 CAS has operated on a self-supporting basis. While the National Science Foundation has been a unique source of outside support for research and development, no funds from any outside source go toward subsidizing production or operating expenses.* Revenue from the sale of CAS publications and services must provide all funds necessary to produce these services, cover administrative expenses, and provide for necessary capital investment in facilities and new information-handling equipment and technology.

*An exception was a one-time grant of $190,000 from NSF in 1962 that helped CAS catch up in indexing for CHEMICAL ABSTRACTS.

FIGURE 60. CAS BUDGET 1961-73

American Chemical Society, CAS Today: Facts and Figures about Chemical Abstracts Service, p. 25-26.

(a) MEAD CORPORATION SALES

	Percent of Sales		Net Sales ($ millions)	
	1973	1972	1973	1972
Lumber and Plywood	56	58		
Newsprint	10	13	1,259.6	1,106.2
Pulp	31	27		
Other	3	2	39.0	22.6
Total	100	100	1,298.6	1,128.8

Mead Corporation, Annual Report, 1973, Financial Section, p. 2, 5.

FIGURE 61. MEAD CORPORATION INFORMATION SERVICES AND REVENUES

(b) MEAD CORPORATION DIVISIONS

Mead Paper, Industrial Products, Paperboard, Merchants, Interiors, Pulp and Forest Products Groups.

Mead School, Home and Office Products Group.

American Paper and Plastics; Sargent; Westab.

Mead Educational Services:
develops classroom aids and distributes a broad array of supplies for school systems.

Mead Advanced Systems.

Mead Technology Laboratories:
develops computer software; supplies information storage and retrieval systems for medical, military and governmental projects; and manufactures equipment for photographic processing, process control and chemical recovery.

Mead Dijit:
provides high-speed ink-jet imaging for computerized reports and profiles, personalized direct-mail letters, and addressing and labeling applications.

Mead Data Central:
offers research services for the legal and accounting professions through its interactive, time-shared information storage and retrieval system.

Mead Chemical Systems.

Mead Corporation, Annual Report, 1973, Financial Section, p. 12.

FIGURE 61 (Continued). MEAD CORPORATION INFORMATION SERVICES AND REVENUES

NEW YORK TIMES COMPANY REVENUES, 1973

	1973 Revenues ($ millions)	%
New York Times Newspaper	250.6	70.3
Other Newspapers	14.2	4.0
Magazines	62.6	17.6
Broadcasting	6.2	1.7
Other Activities	23.0	6.4
Total	356.6	100.0

New York Times Co., Annual Report, 1973, p. 25.

NEW YORK TIMES COMPANY DIVISIONS

The New York Times Company

Broadcasting Division

Information Services Division
(New York Times Information Bank
New York Times Index
New York Times Book Review Index)

Library Publishing Division
Arno Press
Microfilming Corporation of America

Magazine Division

The New York Times Music Corporation

News and Education Services Division
Cambridge Book Company
Teaching Resources Corporation
Teaching Resources Films
The New York Times News Service

Newspaper Affiliates

Quadrangle/The New York Times Book Co., Inc.

New York Times Co., Annual Report, 1973, p. i.

FIGURE 62. NEW YORK TIMES INFORMATION SERVICES AND REVENUES

	(a) 1973 Revenues ($ thousands) [a]
Journal Subscriptions	4,053
Books and Tapes	4,406
Outside Journals	1,409
Miscellaneous	49
Total	9,998

a. U.S. Securities and Exchange Commission, Form 10-K, Annual Report: Plenum Publishing, p. 6.

FIGURE 63. INFORMATION SERVICES AND REVENUES OF PLENUM PUBLISHING CORPORATION

(b) Description - Securities and Exchange Commission Form 10-K (b)

Business

The Registrant is principally engaged in the business of publishing and distributing advanced scientific and technical material. It markets its material throughout the world under the imprints of Plenum Press, Consultants Bureau, DaCapo Press, IFI/Plenum Data Division, and J. S. Canner & Company. The Registrant sells books and journals to a number of unaffiliated organizations in Canada, South America (books only), Europe and Asia. Each of these organizations is given an exclusive territory in which to market the Registrant's products. The Registrant and its subsidiaries maintain offices in New York, N.Y.; Wilmington, Delaware; Boston, Massachusetts; Arlington, Virginia and London, England.

The Registrant's principal markets are public and private libraries, technically oriented corporations, research organizations and individual scientists. Except in its reprint division, the Registrant does not generally sell to book stores, although substantial orders for its material are placed by ultimate customers through certain book dealers. The Registrant's principal methods of marketing are by direct mail and by advertising in scientific publications, including its own journals. The Registrant makes a wide distribution of its catalogs of published material as well as plans for new publications.

The Registrant secures copyrights on all of its publications in its own name or in the name of its subsidiaries or divisions. In some cases, pursuant to written agreement, the copyright is secured in the name of the author of the publication or a learned society or other organization. Copyrights on translations of foreign journals are limited to the translations themselves and do not cover the original foreign language works. Most publications printed by the Registrant's DaCapo Press subsidiary are reprints of works in the public domain which are not subject to copyright protection or are works copyrighted by others who have sold to the Registrant certain rights for publication, either for a fixed sum payment or under a royalty agreement.

FIGURE 63 (Cont'd.). INFORMATION SERVICES AND REVENUES OF PLENUM PUBLISHING CORP.

The Registrant does not perform any printing operations in facilities owned by it. It uses outside printing and binding services, with much of the material being prepared by the Registrant for printing. The Registrant has contractual arrangements with one printing company which does all of its translation journal printing.

Backlog is not significant in the Registrant's business because orders are filled on a current basis. The Registrant currently employs approximately 250 employees on a full time basis.

During fiscal 1973, the Registrant published a total of 119 journals, of which 91 were translations of Russian scientific journals. The Registrant's Russian Language Translation Program is undertaken pursuant to a contract with an agency of the Russian Government which has been extended from time to time. This agreement provides for payments to the Soviet Union for material translated and published by the Registrant. It also provides for the receipt by the Registrant of certain advance information with respect to scientific books and journals to be published in the Soviet Union, and for other editorial assistance to the Registrant.

The Soviet Union has become a signatory to the Universal Copyright Convention. The Registrant's present contract remains in effect. The Registrant is negotiating with the Soviet Union for further extensions of the contract. No such extension has been executed and the Registrant believes that if such an extension is obtained, the amount payable to the Soviet Union on a per annum basis will be materially more than the amount required to be paid at this time.

The translation work required for the publication of the Registrant's Russian material is done primarily by scientists and technical persons in the United States and elsewhere who have other principal occupations. The Registrant has relations with approximately 230 such persons, most of whom have been rendering translation services to the Registrant for a period of years. The availability of technically qualified persons who can translate Russian material in a manner which is used by the Registrant may limit the Company's ability to expand this area of its activities. To this time the Registrant has been able to obtain the required translators to enable it to meet its needs.

FIGURE 63 (Cont'd.). INFORMATION SERVICES AND REVENUES OF PLENUM PUBLISHING CORP.

In addition to the Russian Language Translation Journals, the Registrant published 28 journals in its English Language Journal Program in fiscal 1973.

The Registrant has recently announced a translation journal program covering the first scientific journals out of Mainland China since the cultural revolution. Leading Chinese scientific journals will be published on a cover to cover basis in English. It is intended that the first issues will be published in 1974, however, there can be no assurance that sufficient subscriptions will be obtained for these journals to establish a viable program.

During fiscal 1973 the Registrant published, as part of its Scientific Book Publishing Program, approximately 140 titles and had an active back list of approximately 1,100 titles as of December 31, 1973. During 1972 the Registrant published approximately 150 titles in this Program.

The Registrant's IFI/Plenum Data Division, which publishes and markets "Uniterm Index to U.S. Chemical Patents", also offers for sale a complete data base in magnetic tape form of the Uniterm Index file from 1950 on with a current up-date service. This division also operates a research bureau for chemical patents which commenced operations during fiscal year 1970. In February of 1972 the IFI/Plenum Data Division purchased E. I. Du Pont's system for machine retrieval of patent information. During 1972, the Du Pont system was merged into the Registrant's then existing system and resulted in an expanded system for machine retrieval of patent information. (See Note D of Notes to Consolidated Financial Statements.)

The Registrant also has obtained an option to acquire data with respect to foreign patents and in the event that there is sufficient interest manifested by the Registrant's customers, the service will be expanded to include an index to foreign patents.

Plenum Limited, the Registrant's English subsidiary, publishes scientific journals and books and provides sales and warehouse facilities for the United Kingdom. Plenum Limited also performs cold type composition services for the translated journals published by the Registrant.

FIGURE 63 (Cont'd.). INFORMATION SERVICES AND REVENUES OF PLENUM PUBLISHING CORP.

The Registrant's Da Capo Press subsidiary publishes reprints of learned works and during fiscal 1973 published approximately 125 titles compared to approximately 185 titles in the prior year. This subsidiary is engaged in joint ventures with two Dutch publishers for three series of books.

The Registrant, through its J. S. Canner & Company operation, also engages in the purchase and sale of back-issue periodicals to libraries, colleges, universities and other users.

Although the vast majority of the Registrant's products are unique, the market in which it operates both for the procurement of manuscripts and the sales of its products is highly competitive. The principal method by which the Registrant competes is an attempt to obtain rights to works which is believes will be significant in their fields and of interest to readers. The Registrant believes it is one of the largest publishers in the field of cover-to-cover translation of Russian scientific material in the world. Several other companies have contracts with the Russian Government similar in many ways to the contract of the Registrant described above. In addition, other publishers with greater financial resources than the Registrant are engaged in the publication of original English language scientific materials as well as the reprints of out-of-print books and other books generally not available. The Registrant's J. S. Canner & Company operation competes with a number of other companies at least two of which the Registrant believes have substantially greater resources.

(b) U.S. Securities and Exchange Commission, Form 10-K, Annual Report: Plenum Publishing, p. 1-5.

FIGURE 63 (Cont'd.). INFORMATION SERVICES AND REVENUES OF PLENUM PUBLISHING CORP.

Cheshire Inc.
Cheshire Publishing Propriety Ltd.
Basic Systems, Inc.
R.R. Bowker Co.
Everyweek Educational Press Ltd.
Ginn and Co.
Gower Press, Ltd.
International Publishing Corp. of London
Learning Materials Inc.
Professional Library Service
Publishing Corp. of London
Unipub, Inc.
University Microfilms Ltd. London
Wesleyan University Press

Note: The revenues by services are not given in financial reports of Xerox.

FIGURE 64. INFORMATION SERVICES AND REVENUES OF XEROX CORPORATION INFORMATION SERVICES

Moody's Industrial Manual, 1973, p. 2678

11. Who Are The Clients: Pricing of Nonclassical Services

Figures 55 and 56 illustrate something of the variability in pricing of data bank services. Figures 65 and 66 illustrate how complex billing can be in contrast to the price quotation for a standard printed reference work.

The relationship between libraries and these commercial information services is also complex. Private businesses, including those supplying information services, use libraries as one among their sources of information. Figure 67 summarizes a schedule of fees set by Harvard University libraries for non-members of the University. Corporate users explicitly are recognized at a fee of $250 per year set for borrowing privileges for a corporation.

We have already noted in Figures 54 and 55 how private companies supply access to public data bases to libraries which in turn provide access through their terminals to individuals. At this time the evidence suggests that this is viewed as a mixed blessing. It provides, on the one hand, greater exposure for the service as well as revenue, but on the other hand, a potential for competition through underpricing by virtue of tax or other cross-subsidies or varying practices in the allocation of costs and cost recovery through pricing. Figure 68 summarizes how these matters are viewed by the library world.

That the public-at-large might be priced out of usage of such services has not gone unnoticed. In 1973, the Securities and Exchange Commission contracted with Disclosure Inc. for a study of the place that public libraries might take as a link between the Securities and Exchange Commission and the public-at-large.

Mead Data Central, Inc., in cooperation with sponsoring organizations, makes LEXIS available on a subscription basis. Subscription charges for LEXIS are made up of three elements:

1. Equipment and communications charges
2. Use charges (including a minimum monthly use commitment)
3. Installation and training charges

Equipment and Communications Charges

Equipment and communications charges cover all costs, including maintenance, for a LEXIS research terminal (a video display unit, an associated hard-copy printer, and communications equipment) installed in a subscriber's office, and all communications costs between that terminal and MDC's computer center in Dayton, Ohio.

The charge for the initial research terminal installed in a subscriber's office is $500 a month ($220 for equipment and $280 for communications). The charge for each additional research terminal installed by the same subscriber in the same city as the initial research terminal is $375 a month. The charge for each additional terminal installed by the same subscriber in a city other than the same city as the initial research terminal is $450 a month.

These charges apply to terminals installed in the states of Illinois, Missouri, New York, Ohio, and Texas, the District of Columbia and some other large metropolitan areas, a list of which can be obtained from an MDC representative. Installation of LEXIS research terminals elsewhere must be by special arrangement and possibly at a special charge.

Minimum Monthly Use Commitment and Use Charges

There are two classes of subscription. Schedule A has a minimum monthly use commitment of $1,000; Schedule B has a minimum monthly use commitment of $2,500.

Use charges in each class are divided into three categories:

1. Research Time (Peak Hours)
2. Research Time (Off-Peak Hours)*
3. Search Time

Research Time is the total time a user is in contact with MDC's central computer, from the time he transmits his identification number until he terminates communications with the computer.

Peak Hours are the following:

Monday through Friday
9:00 a.m. to 7:30 p.m. — Eastern Time
8:00 a.m. to 7:30 p.m. — rest of U.S.

Off-Peak Hours are the following:

Monday through Friday
7:30 p.m. to 12:00 p.m. — Eastern Time
7:30 p.m. to 11:00 p.m. — Central Time
7:00 a.m. to 8:00 a.m.
7:30 p.m. to 10:00 p.m. — Mountain Time
6:00 a.m. to 8:00 a.m.
7:30 p.m. to 9:00 p.m. — Pacific Time

Saturday
10:00 a.m. to 4:00 p.m. — Eastern Time
9:00 a.m. to 3:00 p.m. — Central Time
8:00 a.m. to 2:00 p.m. — Mountain Time
7:00 a.m. to 1:00 p.m. — Pacific Time

Search Time is that small portion of Research Time beginning with the transmission of a search request to the central computer and ending with the appearance on the research terminal of a statement that a certain number of documents (e.g., cases) satisfy the request. Search Time does not include the time in which messages, replies or documents are displayed on the terminal screen; in which the user is typing requests or instructions, or reading or thinking; and in which the hard-copy printer is operating.

*MDC reserves the right to eliminate or to modify the off-peak rate for subscriptions entered into after June 30, 1975.

FIGURE 65. PRICE SCHEDULE: MEAD DATA CENTRAL, INC.

Use charges in each category are measured to the nearest second. They are as follows:

Schedule A

Research Time (Peak Hours)	$ 97 an hour
Research Time (Off-Peak Hours)	48 an hour
Surcharge for Search Time	195 an hour

Schedule B

Research Time (Peak Hours)	$ 77 an hour
Research Time (Off-Peak Hours)	48 an hour
Surcharge for Search Time	195 an hour

To eliminate inequities, any unused portion of the minimum monthly use commitment or any use above the minimum monthly commitment is accumulated and carried forward within each calendar quarter. There is no carryforward from one calendar quarter to the next.

There is no additional use commitment for additional terminals.

Installation and Training Charges

Each subscriber pays a nonrecurring installation and training charge of $2,500 for the first research terminal installed in its offices ($250 for installation and $2,250 for training). This charge covers the training of all individuals selected by the subscriber to receive training in the use of the service. This charge also covers, for each individual trained, a comprehensive set of written instructional and reference materials dealing with all aspects of service use.

For each additional research terminal the subscriber pays a nonrecurring installation charge of $200. There are no additional training charges with respect to additional terminals.

Individuals selected by the subscriber are trained in the intellectual discipline (search framing and strategy) necessary to use LEXIS, as well as in mechanical operation. MDC has developed techniques for assisting lawyers to acquire both skills easily and naturally. The training program for LEXIS users involves three phases:

1. Introduction to mechanical operation
2. Exploration of search techniques
3. Practice use

FIGURE 65 (Continued). PRICE SCHEDULE: MEAD DATA CENTRAL, INC.

Mead Data Central, Inc., LEXIS: Charges and Training, p. 1-3.

I. TERM
If Subscriber provides his own terminal, the subscription is for a minimum of 6 months. After 6 months, the subscription continues automatically unless canceled. 30 days' prior written notice is required for cancellation.

If Subscriber has The Times lease the terminal for him, the subscription must be for a minimum of 1 year. Renewals will be automatic, and also for a period of 1 year, unless 30 days' prior written notice of cancellation is given.

II. START-UP PERIOD
The start-up period is defined as the first 2 months of a subscription, starting when the installation is certified to be operational.

Unlimited access is permitted during the days and hours of normal operation (Monday through Friday, 8 A.M. to 12 midnight, eastern time, major holidays excepted; also most Saturdays, 9 A.M. to 5 P.M.).

A flat amount of $625 per month is charged to cover costs of installation, start-up and training.

III. TERMINALS AND OTHER EQUIPMENT
Terminals may be selected from among the models specified by The Times as compatible with The Information Bank system.

Terminals may be purchased or leased by Subscriber, or leased by The Times on behalf of Subscriber. Costs may vary with specific terminal and printer models and with specific communications devices and facilities.

Typical costs are:

Incoterm CRT terminal SPD 10/20 monthly rental	$163
Centronics printer monthly	$133
Maintenance for each of the above monthly	30
Telephone data sets (Modems): For leased-line connections monthly	55
For dial-up connections monthly (approximate figure)	115

Above prices are as of this date and are given as samples only.

Microfiche readers or reader-printers are not marketed by The Times. (A variety of models ranging in price from $100 to over $2,000 are available.)

IV. COMMUNICATIONS
May be provided by Subscriber; or

May be arranged with a common carrier through The Times; or

May be provided by The Information Bank through its network as part of the service. However, The Times reserves the right not to provide network service to a given location, or to discontinue service to a given location upon adequate notice. Network communications are available only in the Continental U.S.

V. SUBSCRIPTION RATES
Rates are effective at the start of the third month of subscriptions (see Section II) and do not include costs of terminals and other equipment (see Section III), communications costs (unless communications are provided through The Information Bank network as part of the service), and the costs of microfiche.

Rates vary with the number of hours of usage (connect time) according to the following table:

Without Communications Per Minute

Hours/ Month	All Zones
First 10	$.75
Second 10	.68
Third 10	.63
Fourth 10	.58
Fifth 10	.54
Over 50	.50

Rates for service including communications will be supplied on a location-by-location basis.

Access is at any time that the system is in operation.

Subscribers will be billed a minimum of 4 hours of service per month.

Flat-rate Option:
Subscribers may contract for up to 25 hours of service per month at a flat rate of $875. Additional hours may be purchased on a connect-time basis in accordance with the rate schedule above.

VI. MULTIPLE SUBSCRIPTIONS
On second and subsequent subscriptions by the same subscriber, whether or not for the same locations, hours logged on all terminals will be pooled for billing purposes.

VII. RE-SALE OF SERVICE
Special terms may be arranged for subscribers wishing to re-sell Information Bank materials.

VIII. MICROFICHE
Microfiche of The New York Times is available to subscribers at $75 a month. Sets for past years (1969-1973) are available at $600 a year.

FIGURE 66.

The New York Times Information Bank

Subscription Rates and Other Terms

July 1974

New York Times Information Bank, Subscription Rates and Other Terms, p. 1.

Widener Library, Harvard University[a]
Alumni may use books in the Library without fee, and may borrow books for an annual fee of $75.00.

"Scholars residing nearby" may be granted use of books within the library for any one month of a given year. Those who wish to borrow books, or read in the library more than one month, pay: $125 for 3 months, $175 for 6 months, or $300 for a year.

Gutman Library, Harvard Graduate School of Education[b]
User cards may be purchased by anyone at $10 for 6 months, or $20 for one year. These cards do not include borrowing privileges.

Special borrowers' cards are available at $20 for 6 months, and $35 for one year, also available to anyone.

Baker Library, Harvard Business School[c]
Free privileges for use of materials on site for 3 months. Borrowing privileges for an individual at $50 per year. Borrowing privileges for a corporation at $250 per year.

FIGURE 67. USER FEES FOR UNIVERSITY LIBRARIES

a. "Use of Harvard College Library by Visiting Readers" dated September 1970; facts verified as still being current by telephone 30 September 1974, but unnamed person at Widener said the "rates might go up".

b. Mimeographed memo, dated June 1974.

c. Telephone conversation with Mr. Weiher, 495-6405, at Baker Library, 30 October 1974.

Financing of Offline Centers

The Georgia Center provides offline search services at no cost to any member of the state university system. Fees charged to other users account for only 3–6% of the Center's annual operating costs; the remainder of GIDC's operating costs are supported by the University's Office of Computing Activities. Ohio State's MIC has been partially supported by the library budget throughout the period of its NSF development funding and the library budget is expected to support operational costs beyond the grant period. There is no charge to Ohio State users and a modest marketing effort beyond the campus has produced only minimal income. UCLA has emphasized development of services for the state university system and post-grant operations will be supported by allocations from the University-wide Library Automation Program. Again, fees to outside users are applied but account for only a small percent of the Center's budget.

Original development at the Computer Search Center at the Illinois Institute of Technology Research Institute (IITRI) was funded by the National Science Foundation's Office of Science Information Services; it is the only center included in the survey that currently operates on a full cost recovery basis. New services are offered only when sufficient revenues accumulate or can be projected to fund them, and staff are allocated to computer search activities only to the extent that actual demand supports them; most of the Center's staff are shared with other research and development programs at the Institute. Computer costs are minimized by purchasing services from a commercial service vendor.

The NASA-supported centers typically operate on a somewhat different basis from the NSF-supported centers. NASA's continuing commitment to the transfer of space technology to the private sector has resulted in ongoing funding of the centers beyond the development phase. The Knowledge Availability Systems Center (KASC) at the University of Pittsburgh has been supported by NASA since 1963 and while user fees provide substantial income, NASA's support has continued well into the operational phase. Similarly, the New England Research Application Center (NERAC), located at the University of Connecticut, derives approximately 50 percent of its operating budget from search income; NASA and the University of Connecticut provide the remainder. The North Carolina center receives 25% of its operating costs from user fees; the remainder is divided between NASA and the state of North Carolina.

The evidence suggests that the offline search centers will require a strong ongoing institutional commitment to maintain their operations. Georgia, Ohio State and UCLA have chosen to provide free service to local users, but there is little evidence that any of the centers other than IITRI have been able to develop a body of paying customers of sufficient magnitude to support a range of operating costs which include data base acquisition, computer related costs, and staff overhead costs. It is probable that most libraries will not and probably should not consider duplicating the offline or online processing activities now available to the national library community from the offline centers and online service vendors.

SERVICE DELIVERY COST FACTORS

Many academic libraries now deliver computer search services to their users, purchasing these services from outside suppliers. While it is difficult to determine what the real costs of both online and offline searches are to the original supplier, the fees charged to libraries are explicit. Pricing structures are complex but for online services are generally based on the amount of actual computer connect time and, for offline services, on the number of years of data base coverage which is searched. In general, retrospective searches are considerably less expensive in an online mode. Both online and offline rates vary for different data bases and for different systems or processing centers.

Library costs for these services will also include staff time. While the time required to analyze a user's requirements and prepare a search strategy and/or profile is similar for online and offline searches (approximately 30 minutes), online searches also require direct terminal use. This latter process typically requires twenty minutes, approximately equivalent to the period required to review the initial results of a similar offline search. The one significant cost for the provision of online services which is not applicable to offline services is equipment costs. Terminal costs vary substantially but models adequate for most libraries lease for approximately $125/month and sell for approximately $2700. In some institutions, however, multi-purpose terminals are applied to online searching activities, reducing the equipment cost which would be specifically allocated to those activities.

User Fees

A major question facing libraries introducing these services is whether to apply user fees to fully or partially recover the above costs. While tradition may argue against it, most libraries have found it necessary to recover at least some costs in this manner. In most cases the fees represent either actual terminal connect time charges or, for offline searches, processing center charges. Other approaches include the use of standard fees for all searches regardless of cost variations, or the charging of all related costs including the time of reference librarians or information specialists. In some instances there are special student rates and frequently charges are applied against academic department budgets or research grants. Some libraries have reported the production of searches for entire classes, with the charges divided among the members of the class.

FIGURE 68. A LIBRARY VIEW OF COST ALLOCATION AND RECOVERY

Gardner, Jeffrey J. et. al., "The Delivery of Computer-Based Bibliographic Search Services by Academic and Research Libraries," ARL Management Supplement, p. 1-6.

Noting that public libraries in such large cities as Atlanta, Boston, Chicago, Los Angeles, New York and some of the bedroom communities surrounding Washington, D. C. already subscribe to the service, Disclosure, Inc. surveyed 20 public libraries in cities of intermediate size, choosing Dallas and Cincinnati as recipients of free service for 9 months that ended in December of 1973.(55) Disclosure Inc. undertook to supply Dallas with index and microfiche service on 400 Texas companies and Cincinnati with information on 220 companies listed on the Cincinnati Stock Exchange. The libraries, in turn, undertook to use their contacts with local press and media to let people know of the availability of the services and to keep logs of the people who requested them.

By 1974 the libraries were pleased with the amount of use and decided they could justify the regular commercial fee for the service from 1974 on (close to $5 thousand a year in Dallas). The users proved to be heavily weighted toward professionals including attorneys, investment bankers, CPA's, rather than general investors or "public interest" groups. The SEC accordingly did not feel it warranted to assist further in funding the program.

Various libraries, both public and academic, have instituted user fees for services. In 1970, the Minneapolis Public Library started a paid research service in cooperation with the greater Minneapolis Chamber of Commerce. Originally called "Search and Deliver" and later baptized "INFORM", the service drew its customers from "the largest corporations, or rather conglomerates, who already had both libraries and research and development departments".(56)

Georgia Tech's Business Information Center, The Technology Applications Center at the University of New Mexico, the Regional Information Communication Exchange at the Fondren Library of Rice University and the Engineering Society's Library are further samples of the diverse institutions operating, to some degree, on a fee-for-service basis. That the practice is controversial is illustrated by one comment in the Library Journal to the effect that by whatever name such practices "foreshadow an ominous trend toward [the] elimination of tax-supported library service".(57) To which the entrepreneur would reply that there is a world of difference between free access to information and free information.(58) Though hardly unrelated, freedom of information, as in the sense of the First Amendment, and freedom in the sense of no-cost are distinct ideas.

The point, of course, is that -- whatever one's wishes about freedom of flow -- information is <u>not</u> free of cost! The question is who pays and how! The answer is unlikely to be found in a simplistic dichotomy of cost-plus fees for every service or subsidized zero-price for every service. The equities and economics of a much wider range of alternatives deserve careful consideration.

12. Federal Services and Interventions

Traditional federal libraries have been described in Section 4. But the federal role in libraries and information services is much wider than that survey suggests. It is therefore useful to present here some other significant examples of federal government activities that illustrate the depth and complexity of federal involvement in library and other information services.

The U. S. Government is itself a major publisher. The Government Printing Office maintains some 25,000 titles. In the fiscal year 1974 it issued over 1.9 billion copies of these titles, including 8.7 million copies of the Congressional Record and 11.3 million copies of the Federal Register. The volume of business in FY '74 was $366 million.(59)

The National Technical Information Service of the Department of Commerce describes itself as an organization that

> "ships 11,500 information products daily as one of the world's leading processors of specialty information. It supplies the public with approximately four million documents and microforms annually. The NTIS information collection exceeds 800,000. All are available for sale. It is a central source for the public sale of government sponsored R&D and other specialized analyses prepared by Federal agencies." (60)

NTIS also abstracts, indexes, and otherwise places under bibliographic control about 65,000 new items each year, making the bibliographic tape available for public use in searching. The ability of NTIS to supply a copy of each item indexed is unusual for such services. The magnitude of the NTIS collection reflects the activities of government research and development contractors whose unclassified reports are deposited with the agency. Less visible is the Defense Documentation Center, which performs a similar role for classified R&D literature, and whose unclassified materials are made public through NTIS.

Under direction to recover its costs through appropriate sales prices, NTIS finds itself in competition with private sector organizations and compared unfavorably with government agencies that do not charge for full cost recovery. According to an interview report in American Libraries, William Knox, the Director of NTIS, says

> "that the Superintendent of Documents has interpreted the depository libraries statute in such a way that GPO is distributing free to 700 libraries the annual Government Reports Index, this year a six-volume set NTIS sells for $300. That's a loss of income to Knox and keeps the volumes' price up. 'The result is that those who buy our publications are paying the cost of free distribution by GPO', Knox said." (61)

Indeed, Circular A-25 of the Bureau of the Budget (now Office of Management and Budget), issued September 23, 1959, states that "Where a service (or privilege) provides special benefits to an identifiable recipient above and beyond those which accrue to the public at large, a charge should be imposed to recover the full cost to the Federal Government of rendering that service."(62) It also notes that "Costs shall be determined or estimated from the best available records in the agency, and new cost accounting systems will not be established solely for this purpose", adding that "maximum fee for a special service will be governed by its total cost and not by the value of the service to the recipient."(63)

The effect on the National Library of Medicine's practices, at least in the past, may be inferred from an announcement, reported in mid-1973, that, at that time the National Library of Medicine had "recently instituted user charges in the MEDLINE system in order to effect a needed reduction in the number of users."(64)

The executive branch concern for cost recovery evident in Circular A-25 is balanced by congressional concern for assuring "the fulfillment of international exchange of publications, the observance of the depository library laws, and the availability of publications to American citizens at prices commensurate with the fact that those publications were created through the use of appropriated funds"(65) as expressed by the Chairman of Congress' Joint Committee on Printing in a letter dated October 1, 1974, accompanying newly issued Government Printing and Binding Regulations.

These new regulations expressly specify that "When a department uses appropriated funds to create information for publication, the printing and binding of that information is subject to the provisions of Sections 103 and 501 of Title 44, United States Code, and it shall not be made available to a private publisher for initial publication without the prior approval of the Joint Committee on Printing."(66)

A possible impact of this regulation is made plain by the following comments, written in 1966 by Curtis G. Benjamin, then Chairman of the Board of the McGraw-Hill Book Company: "In the past 40 years, literally hundreds of such works on which Federal funds have been spent in one way or another have been published and copyrighted privately by contractors or grantees." Benjamin argues against bars to private publication on the grounds that its critics "naively fail to distinguish between publishing and printing" adding that

> "The chief contribution of a commercial publishing house is the know-how of its staff ... experts who shape ideas and raw manuscript into sophisticated books, who advertise and sell them vigorously throughout the world ... not only [put] the published book in all available trade channels but also [see] that it is

> properly placed for notice and review in the literature of its subject. These are the reasons why commercial publication enhances the basic purpose of publishing - the widest possible dissemination of a new work among all interested persons in the world. And these are, of course, the reasons why so many authors of Government-financed scientific and technical works prefer commercial publication over GPO printing." (67)

The delicacy of some of the distinctions and interpretations that will be necessary in interpreting and applying this regulation is evident from a report of the House Committee on Government Operations accompanying a bill (adopted in November 1974 as PL 93-502) amending the Freedom of Information Act. Recognizing that "In accordance with Section 483a of title 31, U. S. Code, and Office of Management and Budget Circular A-25, user fees are applicable to requests for information and may be assessed for production of copies and time spent by agency employees in search of requested information", the report -- in explaining an amendment to the Freedom of Information Act that now requires each agency to maintain and to "promptly publish, ... and distribute (by sale or otherwise) copies of each index"(68) of publicly available information -- adds that "The Committee recognizes that some agency indexes are now published by commercial firms. Such publications would also be able to satisfy the requirement of this ... amendment."(69)

This incipient controversy marks yet another facet of the tortured history of the Copyright Act of 1909, and of the Revision Bill that Congress has worked on since the Legislative Appropriations Act of 1955 provided funds for research and study of copyright law revision by the Copyright Office of the Library of Congress. Other aspects of the copyright controversy have been considered by the Supreme Court in Williams and Wilkins vs. United States.

It is not within our scope to delve deeply into the thicket of the copyright issue. It is worth noting, however, that the problem is likely to continue to get more complex, not simpler.

By way of illustration, late in 1974 McGraw-Hill and NTIS announced a retail service whereby a terminal at the McGraw-Hill book store in Manhattan is linked via the Lockheed time sharing system to NTIS headquarters in Springfield, Virginia. According to the report in Publishers Weekly, "Customized searches are conducted in the store with the help of trained information specialists .... First titles are listed on the screen, and abstracts of selected titles can be shown for closer evaluation." Furthermore, "The store stocks many of the more popular NTIS reports for immediate sale, but those not in stock can be ordered immediately from NTIS over the on-line terminal. Delivery by mail takes up to four days."(70)

It is clear that whatever accommodations are reached on copyright will depend not only on the framing of law by the Congress and the interpretation of law by the Supreme Court, but also on a task that may be inherently much more difficult than hammering out agreements on principle, namely the problem of determining or estimating costs in the private sector or from the best available records in a government agency, as required by Circular A-25. As we shall see in Section 14, that's where the real nut is cracked.

13. Benefits and Burdens - Tax Support

The evidence marshalled in the preceding sections makes it clear how great is the variation in the quantity and quality of information accessible to different people whether through traditional library services or through fee-for-service information sources. Polarized arguments over "free" services versus "fee-for-service" only obscure the fact that neither approach, in and of itself, is guaranteed to match needs and available resources. The issue is when variation means there are wrongs to be righted and when it only reflects fair differences in purposes or needs.

In any case, the range of techniques available for controlling the operation of information markets is far wider than the polarized views suggest. How widely these are used and with what effectiveness is not well understood.

In some instances changes in institutional organizations and approaches to information delivery are thought to be effective. Schlessinger's study of New Haven claims that

> "the innovative approach decided upon in New Haven, to reach neighborhoods with special problems of racial, ethnic or geographic isolation, has resulted in an extension program of four branches and four experimental neighborhood centers requiring more than the traditional minimum standard for personnel. Specifically, the extension program absorbs about 30 full-time staff members or one-third of the staff and about 40% of the total salary budget (excluding maintenance personnel). ... the extension program accounts for about half of the individual library users, testifying to effectiveness in this area and reflecting, perhaps, the present limitations of the main building."(71)

On the other hand, the evaluation of LSCA services to special target groups conducted by System Development Corporation in 1972-73 found that only "About 10 percent of the projects visited and studied were notably successful". The authors are therefore prompted to ask:

> "'Is roughly one-tenth of the total number of LSCA projects directed towards special clienteles a quantity that will significantly affect a sufficient number of the target population to recover the cost of the program in terms of increased earnings or decreased government-funded social programs such as welfare and crime prevention and punishment?'"

They also note a number of program deficiencies, "such as lack of administrative control and insufficient data".(72)

The New York State Education Department's Division of Evaluation noted in 1967 that

> "One of the most vexing problems in developing a cooperative statewide library program is getting localities to make a reasonable support effort and, in some cases, preventing the 'freeloading' municipality from taking unfair advantage of neighboring communities, the system and the State. There is ample evidence that in New York State some communities and localities are enjoying system benefits without having made anything approaching a reasonable local effort to contribute what they could without undue taxpayer strain. Because the tax rate (which constitutes a reasonable effort) varies substantially from one locality to another, there is no standard minimum which can be established for the entire State. Thus, some kind of index of ability-to-pay is a prerequisite to working out an equitable solution to this problem." (73)

The State of Illinois reports that if all taxable property were taxed at the maximum rate permitted in the state without special referendum, per capita support would range from a minimum of $3.28 to a maximum of $25.82.(74) As of 1972, however, average per capita support for libraries amounted to $3.68 if taken for the state population as a whole and to $4.65 if taken only for the population in the taxing area of the library.(75)

As authorized by legislation that became effective in 1970, a "levy of .15% of the fair value of all the taxable property in the area as equalized or assessed is permitted without a referendum. The same amendment permits an increase in the levy rate by referendum to as much as 40%."(76) The actual levy rates for fiscal year 1970 are shown in Figure 69.

Tax Rate	Number	Percent
.00 - .029	22	4.5
.03 - .059	85	17.3
.06 - .089	106	21.5
.09 - .119	116	23.6
.12 - .159	143	29.1
.16 - over	20	4.1
Total	492	100

FIGURE 69. ILLINOIS LIBRARY TAX LEVY RATES, 1970

Illinois Libraries, "Meeting the Challenge: Illinois State Library's Long-Range Program for Library Development in Illinois, 1972-77," Table 2, p. 740.

Interestingly enough, referenda for increase in library taxation have been more successful than referenda for increases in the school tax rate, reflecting perhaps the difference in absolute size of these taxes.

A report issued in September 1974 by the Library Financing subcommittee of the House Revenue Committee of the State of Illinois expressed the belief of the Committee that

> "many more libraries should seek voter approval to increase the tax rate for the support of libraries before requests are reiterated for the General Assembly to increase the tax rate without referendum. .... In contrast to the 32.5 percent of the successful referenda for increase in school tax rate, the success rate for library referenda for the same purpose is 59 percent. This clearly indicates that the possibility for success for the library referenda was greatly underestimated by a number of witnesses at our hearings." (77)

Means other than direct fees-for-service or tax support are available and, indeed, are being used to support the provision and delivery of information services. These include free use of the electromagnetic spectrum by radio and TV services, and widespread subsidies and cross-subsidies to which we turn in the next section.

14. Benefits and Burdens - Subsidies and Cross-Subsidies

In 1967 the New York State Education Department's Division of Evaluation noted that "At this point none of the systems make a charge for interlibrary loan service, although some reimburse their central libraries and at least two reimburse all members. Few, if any systems make any attempt to classify requests by types of material, the time involved in filling the request, or in any other manner."(78)

As is evident from Figures 24-29, the burden of interlibrary loan falls inequitably on net lenders and net borrowers. It is therefore clearly understandable why the extension of interlibrary loan systems as a means for broadening access to information resources should meet resistance not only from publishers fearing lost revenues but, perhaps more important, from within the library system itself. The New York report clearly points out the consequences:

> "There is no uniform interlibrary loan policy from system to system. In some systems the policies that do exist are so restrictive as to seriously limit the usefulness of the service. For example, while 6 of the 19 Upstate systems indicate they have no restrictions on the type of interlibrary loan materials they will try to provide or the type of patron they will try to help, many other systems will not request interloan for children and students generally. Some will not request certain types of materials, such as periodicals. [At that time, the Division of Evaluation's consultant found it] 'impossible with the materials at hand to determine any accurate cost of interlibrary loan transaction. The figures we have range from as low as $1.01 to a high of close to $7.50 in very special research libraries. None of the figures in this wide range are based on the same factors and none of them include the total cycle cost of an interlibrary loan transaction'. [Calling on an 'educated guess', the consultant then estimates that] 'the cost would be between $7.50 and $10.00 per item, depending on whether the transaction has to follow a course all the way to the State Library and beyond, and whether it is classified as "filled" or "unfilled"'"(79)

By late 1974, cost trends plus inflation may well have increased these estimates to a $15-20 range.

A similar issue is addressed in a more recent report to the Research Library's Group on proposals for cooperation among the Columbia, Harvard, Yale and New York Public Libraries. Attempting to anticipate costs and their equitable sharing among the participants, Rosenthal attempts to estimate anticipated volumes of interlibrary shipments in order to assess the relative merits of shipping through United Parcel Service or Greyhound, at estimated annual costs of $6,000 per year, as compared to the operation of a truck service of "on a daily basis, among the four libraries, which might reasonably be expected to amount between $25,000 to $30,000 per year."(80)

The subsidy and cross-subsidy practices of the Post Office are a useful example for detailed analysis. They affect libraries and publishers directly and since in this case, unlike many others, they are a matter of public record, they provide a particularly clear vehicle for exposition of certain general problems of cost accounting and pricing that seem likely to be of increasing importance in the world of library and information services.

Figure 70 shows volumes, revenues and attributable costs for the Postal Service's Special Fourth Class Matter and Library Materials categories. The evident excess of costs over revenues illustrates how postal operations subsidize information services. A report of the House of Representatives defines these categories as follows:

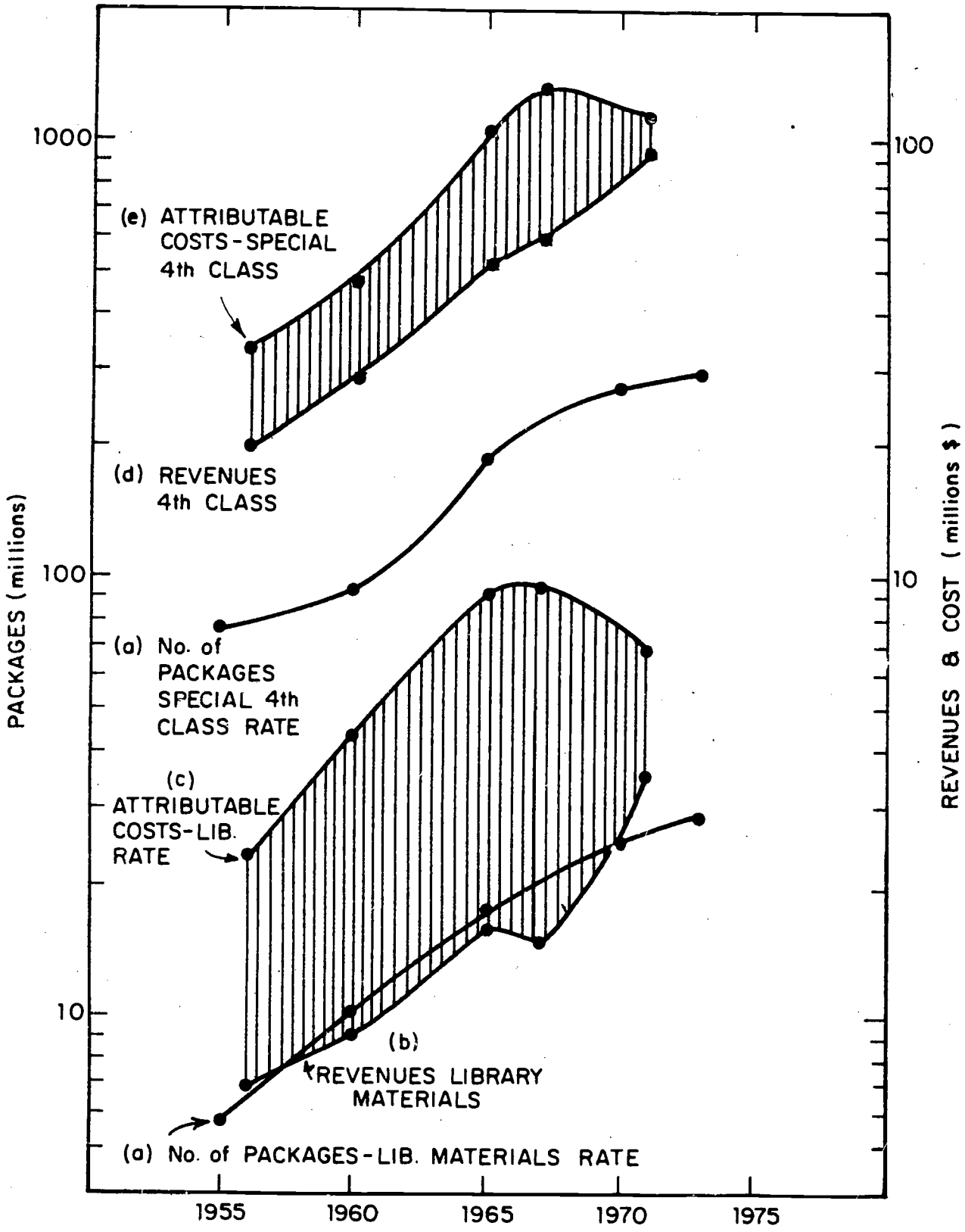


FIGURE 70. VOLUMES, COSTS AND REVENUES FOR LIBRARY MATERIALS -- U.S. POSTAL SERVICE

a. Number of Packages, Library Materials Rate.
Number of Packages, Special Fourth Class Rate.

R.R. Bowker Co., Bowker Annual, 1974, p. 198.

b. Revenues, Library Materials.

U.S. Postal Service, Revenues and Cost Analysis, Fiscal Year 1971, p. 2.
U.S. Post Office Dept., Cost Ascertainment Report, 1967, Table PP-R2, p. 48, 1965, Table 250, p. 72.

c. Attributable Costs, Library Materials.

U.S. Postal Service, 1971, p. 2.
U.S. Post Office Dept., 1967, Table PP-C2, p. 49, 1965, Table 251, p. 73.

d. Revenues, Special Fourth Class Rate.

U.S. Postal Service, 1971, p. 2.
U.S. Post Office Dept., 1967, Table PP-R2, p. 48, 1965, Table 250, p. 72.

e. Attributable Costs, Special Fourth Class Rate.

U.S. Postal Service, 1971, p. 2.
U.S. Post Office Dept., 1967, Table PP-C2, p. 49, 1965, Table 251, p. 73.

FIGURE 70 (Continued). VOLUMES, COSTS AND REVENUES FOR LIBRARY MATERIALS -- U.S. POSTAL SERVICE

> "The fourth class special rates cover books, 16 millimeter or narrower width films except when sent to or from commercial theaters, sound recordings, and certain other materials. A special rate is provided under this category whe.. such mail matter is mailed between public libraries, schools, colleges or universities, or certain nonprofit organizations." (81)

Revenues attributable to these classes of mail are directly determinable by adding up postage paid for mailings in these categories. Attributable costs, however, are an entirely different matter. As defined by the Postal Service attributable costs are:

> "Those costs, direct or indirect, which by empirical or deductive analysis can be demonstrated (1) to vary in response to changes in volume of a particular class, subclass, or category of service, or (2) even though fixed, to be the consequence of providing one specific class, subclass, or category of service. [Attributable costs are distinguished from institutional costs, which are] costs which are not directly responsive to changes in postal volume and which are not the consequence of providing a specific class, subclass, or category of service. Institutional costs are the total cost of the Postal Service less attributable costs." (82)

The importance of interpreting "empirical or deductive analysis" in the definition of attributable costs is clearly evident.

To the extent that total costs of the postal service exceed its total revenues, the difference is made up by appropriations requested of the Congress by the Postal Service for"public service and revenue foregone" costs. However, Figure 71 also shows how subsidies to particular classes of mail arise as cross-subsidies from revenues generated by other classes. Overall, postal revenues as shown in Figure 71 cover one hundred and fifty-one percent of attributable costs. The fifty-one percent difference may be taken as a rough measure of institutional costs not directly attributable to particular services. Deviations above or below the 1.5:1 ratio of revenues to cost may be therefore be

[In millions of dollars, except as indicated.

MAIL AND SERVICE	REVENUES AND REIMBURSEMENTS		Per capita revenues [1]	ATTRIBUTABLE COSTS [2]				
	Total	Percent of total		Total [2]	Revenue as percent of total	Direct labor	Transportation	Overhead
1970	6,476.8	(X)	31.75	4,143.4	156.2	3,071.6	572.2	398.9
1971, total	6,795.7	100.0	32.97	4,492.0	151.3	3,326.7	587.5	456.8
First-class mail [4]	3,505.9	51.6	17.01	2,105.3	166.5	1,803.5	52.0	248.5
Airmail [5]	196.1	2.9	.96	213.5	92.8	170.8	18.0	24.8
Priority mail [6]	302.9	4.5	1.46	103.0	294.1	37.5	59.7	5.8
Second-class mail [7]	156.6	2.3	.75	342.8	45.7	282.3	29.7	30.8
Publishers' mail	153.2	2.3	.74	335.4	45.7	276.0	29.4	29.9
Outside the county:								
Regular rate publications	128.3	1.9	.62	247.3	51.9	203.5	21.7	22.0
Other	12.9	0.2	.06	59.0	79.4	47.0	6.8	5.2
Within the county and fees	12.0	0.2	.05	29.1	29.9	25.5	0.9	2.7
Controlled circulation publications [8]	32.3	0.5	.15	14.8	218.2	10.4	3.1	1.2
Third-class mail [9]	844.2	12.4	4.09	584.0	144.6	475.4	36.6	72.0
Bulk rate	719.7	10.6	3.49	483.8	248.9	393.1	31.9	58.7
Single piece rate and fees	124.5	1.8	.60	100.2	114.0	82.3	4.7	13.3
Fourth-class mail [10]	819.3	12.1	3.97	545.8	150.1	326.0	171.6	48.2
Zone rate mail	715.8	10.5	3.47	422.4	169.5	243.9	142.0	36.5
Parcels	676.9	10.0	3.28	410.2	165.0	234.8	139.8	35.6
Catalogs and fees	38.9	0.6	.18	12.2	318.9	9.1	2.2	0.9
Special fourth class rate	99.7	1.5	.48	116.4	85.7	77.3	28.1	11.0
Library rate and fees	3.7	0.1	.01	7.0	52.9	4.8	1.5	0.6
Government mail [11]	206.2	3.0	1.00	115.1	179.1	78.3	27.1	9.8
International mail [12]	276.7	4.1	1.34	164.8	167.9	81.9	69.4	13.0
Special services	311.7	4.6	1.51	180.2	173.0	58.6	–	2.5
Other [13]	141.8	2.1	.68	122.6	109.1	2.0	120.4	0.2

– Represents zero. X Not applicable. [1] Based on Bureau of the Census estimated population as of Jan. 1, including Armed Forces abroad. [2] Costs which can be demonstrated to vary with changes in volume of a particular class or category of service or, even though fixed, to result from providing one specific class or category of service. [3] Includes other direct and specific fixed costs not shown separately.
[4] Items mailed at 1st-class rates and weighing 12 ounces or less. Includes items wholly or partially in writing or typewriting, cards or bills and statements of account, items closed against postal inspection, etc. [5] Letters and cards weighing 8 ounces or less mailed at airmail rates. [6] Items otherwise qualified as 1st-class or airmail that exceed 12 ounces and 8 ounces, respectively. [7] Includes publishers' type mail paid at other than bulk rates. Publishers' mail includes printed publications periodically issued and mailed at a known post office to paid subscribers. These include regular rate newspapers and magazines, and classroom and nonprofit rate publications. Outside-the-county publications are those mailed to destinations outside the county of publication. [8] Publications of at least 24 pages and containing at least 25 percent nonadvertising content issued quarterly or more frequently for mainly free distribution. Includes certain trade publications and "shopper" guides. [9] Items less than 16 ounces in weight not mailed at either 1st- or 2d-class rates. [10] Items not mailed at 1st-, 2d-, or 3d-class rates, except government and international mail. May include parcel post, catalogs weighing 16 ounces or more, books, films, and records. [11] Penalty and franked mail. [12] Mail from U.S. to foreign countries paid at international mail rates. [13] Includes free mail for blind and handicapped, nonpostal services for other agencies and, for revenues and reimbursements, unassignable revenues.

Source: U.S. Postal Service, *Revenue and Cost Analysis*, annual.

FIGURE 71. CROSS-SUBSIDIES IN THE U.S. POSTAL SERVICE

U.S. Bureau of the Census, Statistical Abstract, 1973, Table 798, p. 492.

taken as, respectively, measures of net subsidizors or recipients of subsidies. Only second-class mail, consisting mainly of publishers' mail, is more heavily cross-subsidized than the library rate and the special fourth-class rate.

The politics of postal subsidies thus illustrate, along with those of direct user charges and direct taxation, the diverse arenas in which policy is set regarding who bears the burden of the cost of information services and who benefits from them.

The President's Commission on Postal Organization clearly recognized the problem in its June, 1968 report:

> "Whether the public interest dictates a subsidy for certain postal users is for Congress to decide.
> We doubt, however, that all existing subsidies stand close scrutiny if their underlying rationale were examined. Given vast Federal assistance to educational and non-profit institutions, directly or through tax exemptions, the use of the Post Office for further and relatively minor subsidies to these same organizations may, in many cases, no longer be appropriate.
>
> In many instances, too, it might be less costly to the Government, and more visible to the public, if subsidies were provided directly to the subsidized organizations. The Commission recognizes that valid political considerations may preclude such a method of funding, but recommends that Congress re-examine each postal subsidy to determine if the public interest warrants its retention." (83)

In the Postal Reorganization Act that became law on August 12, 1970, the Congress set a policy "that the Postal Service reach the point by 1984 that the users of mail pay all the costs of the Postal Service, except the 5 percent public service costs under section 2401 (b) (1) (G) of title 39, United States Code. To achieve this goal, each class of mail should bear the direct and indirect postal costs attributable to that class plus a share of the institutional costs (39 USC 3622 (b) (3)"(84)

Commercial mail matter including special fourth class matter was to achieve self sufficiency within five years, and matters sent under the special fourth class library rate within ten years. Government agencies, such as NTIS, were not given a period of grace.

However Public Law 93-328, passed by the Congress in June 1974, extended the phasing-out period for commercial mail from five to eight years and that for non-profit mail matter from ten to sixteen years. While the majorities were substantial (71 - 11 in the Senate, 227 - 129 in the House), they were by no means unanimous. The House Report noted that"Congress wisely relinquished the responsibility for setting postal rates under the Postal Reorganization Act of 1970. However, Congress in no way gave up its right to set the basic policies which are involved in ratemaking."(85) As is clear from Figure 72, the postal rate matter is of interest to publishers and libraries alike. In April 1974 while PL93-328 was still under debate, Susan Wagner commented in Publishers Weekly that "both Congress and the U. S. Postal Service appeared to be edging toward approval of measures to provide some relief from postal rate hikes which are hitting the small magazines, book publishers, book sellers, and libraries."(86) Here as is so often the case, politics make strange bedfellows or since, as we have indicated in Section 6, the interests of libraries and publishers are often consonant, bedfellows make strange politics.

The majority report, noting that "Congress historically provided lower rates for the classes of mail included in this bill in order to provide, at reasonable cost, the means for wide dissemination of educational, cultural, literary, and charitable materials"(87) cited, for example, testimony to the effect that:

> "One county library in Wisconsin (Manitowoc County Library) which circulates 1,000 books by mail per week, as an example, would save about $1.560 in the year 1976-77. Another public library, in Texas, (San Antonio Public Library) which reports a weekly book circulation by mail of 600 volumes, would save about $18 per week or $936 per year. The combined savings of these two libraries would permit the purchase of more than 208 hard-cover books or more than 625 additional paperbacks."

Citing James Madison to the effect that:

> "Knowledge will forever govern ignorance, and a people who mean to be their own governors must arm themselves with the power that knowledge gives. A popular government without popular information is but a prologue to tragedy," (88)

the majority report concludes that journals of news and opinions, non-profit publications, books and other educational materials "provide an essential service to all our citizens. They represent one of the strengths of our democracy and an essential foundation of the freedom we have always enjoyed." The report concludes that "We cannot cut off countless Americans for whom an increase in subscriptions might be a few cents more than they can afford."(89)

The minority, on the other hand, asserted that, in 1973, publishers "enjoyed an average return on equity of more than 12% compared with all other U. S. industries which averaged 11%"(90), displaying as supporting evidence a table prepared by the Library of Congress and shown here in Figure 72. The minority report saw big publishers as the big beneficiaries of the bill:

> "The Reader's Digest, Time, and The Wall Street Journal together will get twenty-five percent of the additional subsidy that is being given to so-called regular-rate publication. If the true intent of this bill were to help the small publishers, it very easily could have been written to apply only to publications with limited circulation or to those containing little or no advertising."(91)

Company	Profit 1973	Percent change from 1972	Percent return on net worth 1973	Profit 1st quarter 1974	Percent change from 1973
Washington Post, Inc.	13.3	33.0	16.7	1.6	12.7
Time Inc. (Time, Fortune, Sports Illustrated)	49.9	30.0	16.4	10.4	21.7
Norton-Simon (McCall's Redbook)	78.2	16.0	13.0	16.7	-17.2
Meredith Corp. (Better Homes and Gardens, Successful Farming)	5.9	93.0	9.8	2.5	67.9
Dow-Jones, Inc. (Wall Street Journal)	23.3	17.0	27.1	5.0	-.2
Esquire	2.7	25.7	11.5	2.6[a]	25.5[b]
Times Mirror Co.	54.9	31.0	17.0	(c)	(c)
New York Times Co	19.0	54.0	16.2	4.8	20.3

FIGURE 72. NET INCOME AFTER TAX FOR SELECTED U.S. NEWSPAPER, AND MAGAZINE COMPANIES,[d] AND 1973 AND 1ST QUARTER 1974
[DOLLAR AMOUNTS IN MILLIONS]

a. Esquire's accounting year is from April to March. These figures are profits for 9 mo. ending Dec. 31.

b. Percent change from first 9 mo. of 1973.

c. Not available

Note: original sources for table were Business Week Magazine, Mar. 9, 1974, Wall Street Journal Digest of Earnings, Standard and Poor's Corporation Records and Daily News.

d. U.S. Code: Congressional and Administrative News, 93rd Congress, 2nd Session, p. 1944.

The minority concludes that the bill is "special-interest legislation in its worst form. It is a blatant, unjustified, unwarranted, and totally unconscionable raid on the Federal Treasury."(92)

Underlying these divisions are political factors that Samuel H. Beer describes as a decline of party voting in the Congress in favor of increasingly pronounced alignments of those who favor categorical programs against those who favor unrestricted general revenue sharing with state and local governments(93). He notes that party voting (roll calls in which a majority of Democrats voting oppose a majority of the Republicans voting) has declined from 46% in 1962 to 38% in 1972 while party unity (percent of party voting with the party majority) decreased from 70% to 58%. In the same period, categorical grants to state and local governments increased from $8 billion to $36 billion while, on the other side, the budget of the mayors' lobby, the U. S. Conference of Mayors, rose from $108,000 to $620,000. He found that votes by chairmen of committees with categorical responsibilities (e.g., Agriculture) and professional constituencies tended to align themselves opposite to the votes of chairmen of committees with intra-governmental constituencies (e.g., Armed Forces).

Here again the issue is less a public/private sector division than yet another manifestation of the general problem of flow-through of indirect benefits to their ultimate beneficiaries via intermediaries -- public or private -- along the way.

Although particularly aptly illustrated by the Post Office, questions about cost accounting, subsidies and cross-subsidies, the relationship of price to cost as through mark up of costs or through pricing

according to estimates of "value" to customers, are not limited to the Post Office.(94) Not only are they hotly debated issues in other information industries, most notably telecommunication service, but they are increasingly likely to appear in computer-based information services as illustrated by the pricing data shown in Figures 65 - 68. The matter of functional accounting raised in Section 7 is therefore all the more important.

Indeed, to the extent that libraries of all kinds adopt or fend off direct pricing to users, the justification to themselves, to their management, or to the public of the rationale for either practice seems increasingly likely to require more careful attention to the allocation of attributable costs by categories of service and to the methods of "empirical or deductive analysis" by which such costs might be ascertained.

To the extent that information service delivery increasingly relies on telecommunications, thinking along these lines will be altogether unavoidable.

15. Telecommunications Policy and Information Services

Figure 45 shows that the penetration of cable television systems is still far from the nearly total penetration by broadcast television illustrated in Figure 25.. Figure 73 shows that nonetheless there is evidence of library interest in the cable distribution medium.

Of more immediate consequence is the fact that the whole library and information service world has a significant stake in how certain major issues of telecommunications policy, now the subject of active controversy before the Federal Communications Commission or the Congress, are likely to be resolved. Figure 74 shows how some of the services described in Sections 8 - 11 depend on the Tymnet computer/communications network operated by Tymshare, Inc. (Figure 75).

Where the boundary should be drawn between telecommunications and data processing, the former regulated under the Communications Act of 1934 by the Federal Communications Commission, the latter unregulated, is a controversial and far from resolved issue.(95) How these questions and others of telecommunication policy are resolved will have significant effects on the institutional arrangements, the costs and the prices of performance and delivery of information services that increasingly depend on computers and telecommunications.

In a Notice of Inquiry and Proposed Rule-Making released in July 1974 (Docket Number 20097), the Federal Communications Commission takes notice

> "of a number of matters which raise, in one form or another the basic question of whether, and under what conditions, subscribers of the various service offerings of communications common carriers should be allowed to resell such services to others or to participate with others in the sharing or joint use of such services, and,

	U.S. Libs.	*U.S. Schls.*[a]	*Can. Libs.*
Programming Means			
Cablecasting live from libraries	4	3	0
Producing tapes for cablecasting	5	3	2
Using nonlibrary produced tapes for cablecasting	8	2	10
Not specified	4	5	3
Types of Library Programming			
Spot announcements	3	0	0
Children's story hours	11	0	3
Programs about library services	5	0	10
Educational programs for special groups	3	2	2
Educational programs on specific topics	4	3	3
Local news programs	0	2	1
Community events	1	0	1
Meetings or conferences	2	0	0
Talk shows or interviews	2	1	1
Audience participation	1	0	0
Video reference service	2	0	0
Not specified	5	1	1
No. of agencies reporting	22	7	14

*This table is based on the author's survey of *Video/Cable Activities in Libraries* which was compiled from responses to a questionnaire mailed to the Drexel Institute participants in February of 1973. See references 7, 18, and 19.

[a]The NCTA survey did not indicate if school or school library was involved.

FIGURE 73. LIBRARY ACTIVITIES USING CABLE TELEVISION*

R.R. Bowker Co., The Bowker Annual of Library and Book Trade Information, 1974, Table 2, p. 109.

Method	Cost to NLM ($ per month)	Cost to users ($ per month)	Total costs ($ per month)
Direct-distance dialing	2,100	73,000	75,000
Federal telecommunications system*	35,000		35,000
INWATS (inward wide area telephone service)	77,600		77,600
Leased multiplexor network (six cities)	13,500	42,000	55,500
Leased multiplexor (West Coast)	33,800	8,500	42,000
TYMSHARE network	13,200	38,400	51,600
Western Union Datacom	12,700	50,000	62,700

* Use of the federal telecommunications system is not permissible under regulations of the General Services Administration.

(a) NATIONAL LIBRARY OF MEDICINE
NETWORKING ALTERNATIVES

McCarn, Davis B. and Leiter, Joseph, "On-Line in Medicine and Beyond," Science, Table 3, p. 321.

FIGURE 74. NETWORK USES AND ALTERNATIVES

The National Library of Medicine, operating the MEDLINE data base on its own 370/155 computer in Bethesda, Md.

The State University of New York at Albany, providing back-up to the MEDLINE computer. It also offers the SUNY-BIOMED medical retrieval data base.

Lockheed, offering ERIC, NTIS, and other data bases on its 360/40 computer.

Informatics, offering TOXICON and other data bases on a 360/365 operated by Comnet.

Systems Development Corporation, Santa Monica, Cal., offering MEDLINE, CHEMCON, ERIC, using a 370/165.

Science Information Associates (Battelle Laboratories), offering CHEMCON and NTIS on its CDC 6400.

Data Resources, Inc., Lexington, Massachusetts, offering an econometrics data base on its Burroughs 6700.

National Bureau of Economic Research, Cambridge, Mass., offering data base services on its 360/67 computer.

In addition, there are quasi-data base applications on the network involving computers at **Mass. General Hospital, Ohio State University,** and the **University of Illinois.** Some of the above applications, particularly those involving the National Library of Medicine, involve contracts from the government to the data base operator to provide services to a captive audience rather than marketing of the data base directly by the utility operator.

(b) Tymnet Data Base Publishing Customers

Giuliano, Vincent E. and Kvaal, Robert J., Outlook for Data Base Publishing, Table 4, p. 23.

FIGURE 74 (Continued). NETWORK USES AND ALTERNATIVES

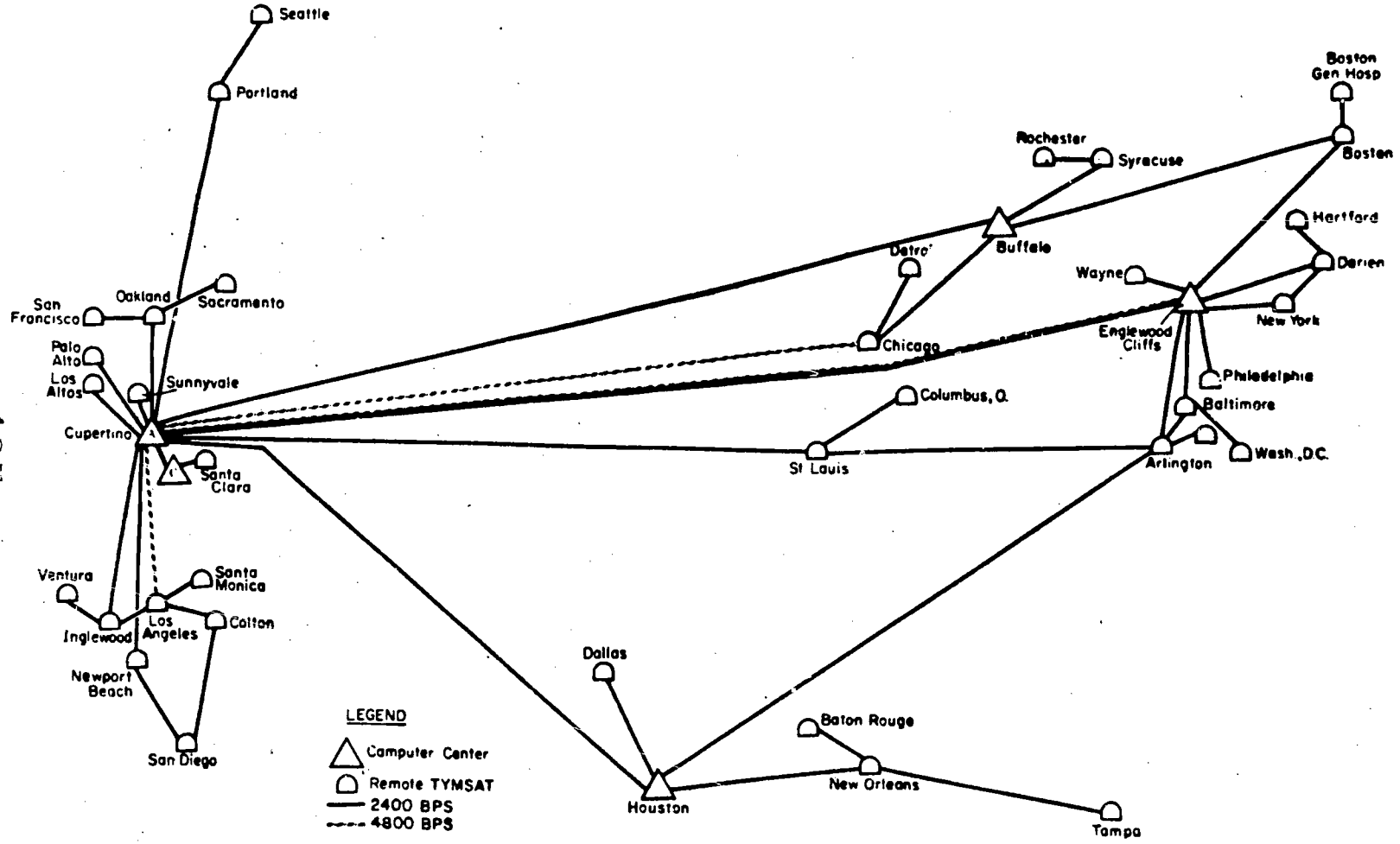


FIGURE 75. **TYMNET MAP**

Schwartz, Mischa et. al., "Terminal-Oriented Computer-Communication Networks," Proceedings of the IEEE, Figure 1., p. 1410.

> if so, whether and to what extent the Commission should regulate any such resale or shared use. Resolution of this question requires the Commission to define on a broad basis the role of the middleman in the provision of communication services to the using public. While the middleman has assumed an important role in nearly all aspects of commerce throughout the nation's history, in the field of communications it has been the tradition, generally, that the carriers owning and operating transmission facilities supply a complete communications service directly to the ultimate user. Only relatively recently has this tradition, exemplified in the tariffs of the established carriers, been questioned." (96)

Tymnet is an important illustration of this issue. In September 1973 the Federal Communications Commission declared Packet Communications, Inc. to be a common carrier under Section 214 of the Communications Act of 1934, although Packet Communications, Inc. leases all its transmission facilities from established common carriers.(97)

In its Notice of Inquiry on Docket Number 20097, the FCC states that:

> "Another arrangement currently in operation provides the data communications user a service much the same as that proposed by PCI and others (although it is provided over low speed voicegrade lines). Tymshare, Inc. a major data communications and processing enterprise operates a national and international data communications network called Tymnet. As of April 1973, Tymnet connected 54 cities with 37 large scale computers utilizing over 40,000 miles of leased telephone lines. Under a joint use arrangement other companies have been allowed to access their own computers via Tymnet. In such instances Tymnet's computers are used to route data but do no processing. The user pays the common carrier for its share of the transmission line usage and then pays Tymshare on the basis of terminal connect time, number of connections made and the volume of information transmitted. The Tymnet-type sharing operation is significant in that as the joint user is not provided with his own discrete channels the number of possible users is limited only by the aggregate use made of the available capacity by all users." (98)

The terms or which services described in Figure 74 become available to users in the future thus depend on decisions made by the FCC and the courts in the telecommunications field, as well as on the internal politics of the information services community.

Commercial organizations like Tymnet are not the only ones affected by decisions made in the telecommunications realm. Another illustration is the New England Regional Computing Program, Inc., a non-profit corporation established in 1967 by approximately 40 New England institutions of higher learning. NERComP, operating under a grant from the National Science Foundation, describes itself as having

> "established a hard-wired telephone network in 1970 to begin a process of opening up the resources of New England's major university computing centers to schools throughout the region. This network, which NERComP now seeks to expand and improve, is the only educationally-oriented regional network involving multiple suppliers which is not contained within a single state or run by a quasi-state agency." (99)

The New England Board of Higher Education (NEBHE) is one such quasi-state agency authorized "by the New England Higher Education Compact, a formal inter-state agreement between the six states ratified by the United States Congress."(100) NELINET, one of the library resource-sharing organizations described in Section 8, is a creature of the New England Board of Higher Education and participates in the OCLC catalogue-sharing network. It is an illustration of the Byzantine institutional and regulatory patterns that are evolving that NELINET, as a governmental organization, is entitled to the preferential rates offered by telephone companies to the United States government's General Services Administration, while OCLC as a private non-profit organization is not. NELINET thus faces a Hobson's choice of participating in the benefits of the OCLC consortium without the advantages of preferential telephone rates or vice versa.

Still more complex, and illustrative of the problems created by the FCC's practice of dealing with common carriers, television broadcasting,

specialized radio services, cable television, etc., through independent bureaus and indeed through distinct authorities granted under distinct sections (or in the case of cable television, no section) of the Communications Act of 1934, is the situation faced by Interact, a cooperative institution based at the Dartmouth Medical School in Hanover, New Hampshire. The ten participating institutions include colleges and universities, hospitals, the Department of Correction of the State of Vermont, and the National Library of Medicine. Interact operates a two-way closed circuit television system linking together these institutions to provide continuing education, deliver specialty health services, and promote sharing of resources in rural New England. Dartmouth is the licensee for a private microwave communications system dedicated primarily to the provision of this television service and associated voice and data services.

Supported in part by a contract with the Lister Hill National Center for Biomedical Communications of the National Library of Medicine, Interact provides a switching system which can link together any two, three, or more stations instantaneously for full two-way interaction at all times through color television signals and high quality audio signals capable of handling heart and breath sounds and with additional capacity for routing medical telemetries, such as electro-cardiograms, and computer data. A sample of activities is given by the calendar for the week of October 7, 1974 shown in Figure 76.

As initially conceived, the network served only the ten participants bound together by contractual cost-sharing agreements signed as a compact and submitted to the Federal Communications Commission.

The week of: OCTOBER 7, 1974

MONDAY, OCTOBER 7

** 8:00 - 9:00 a.m. — EMERGENCY ROOM STAFF CONFERENCE - Case Presentation and Management of Cases in the Emergency Room. UVM (226 A MFU) - CVMC - CGH (Staff Room) - RMH (Conference Room)

* 9:00 - 11:00 a.m. — SPEECH THERAPY - Mrs. Sue Ferland, Speech Pathologist from Burlington, provides speech therapy for children from the Claremont School District. UVM - CGH

* 11:00 - 1:00 p.m. — SUPERVISORY WORKSHOP FOR COMMUNITY HEALTH NURSES - Miss Patricia Randall, Director of the Health Department Nursing Division, Portland, Maine conducts a workshop for Supervisors of Community Health Nursing Agencies in N.H. & Vt. Sponsored by the Visiting Nurses Assoc., Burlington. Workshop entitled: "Principles & Process of Supervision." UVM - MHMH (Farr)

* 2:00 - 4:00 p.m. — SUPERVISORY WORKSHOP FOR COMMUNITY HEALTH NURSES - See above.

** 4:00 - 5:00 p.m. — RENAL RESEARCH SEMINAR - Prof. Jean Crabbe, Prof. of Physiology, Univ. of Louvain and Visiting Gilman Prof. presents: "Aldosterone: Sites of Action; Study of Action". MHMH (Chilcott) - UVM (226 A MFU)

TUESDAY, OCTOBER 8

** 8:00 - 9:00 a.m. — NCME TAPE SHOWING - A three part videotape produced by the Network for Continuing Medical Education: Office Treatment of Skin Cancer"; "Corticosteroids: Rx for Three Connective Tissue Diseases"; "Early Prosthetic Fitting for Congenital Defects of the Extremities." MHMH (Studio A) - CVMC (Doctors' Lounge) - CGH (Staff Room) - RMH (Conference Room)

* 9:00 - 10:00 a.m. — STATION MANAGERS SEMINAR - INTERACT Station Managers discuss and plan for future programs as well as evaluate ongoing programs. MHMH - CGH - CVMC - UVM - RMH

RMH – Rockingham Memorial Hospital, Bellows Falls, Vermont
VOTECH – Vocational Technical College, Claremont, New Hampshire
WINDSOR – State Correctional Facility, Windsor, Vermont
MHMH – Mary Hitchcock Memorial Hospital, Hanover, New Hampshire
UVM – Medical Center of Vermont, Burlington, Vermont
CVMC – Central Vermont Medical Center, Berlin, Vermont
CGH – Claremont General Hospital, Claremont, New Hampshire

* Closed Conference – Open to involved professionals only
** Open Conference – Open to any interested professional staff and allied health personnel.

For further information, contact your T.V. Coordinator

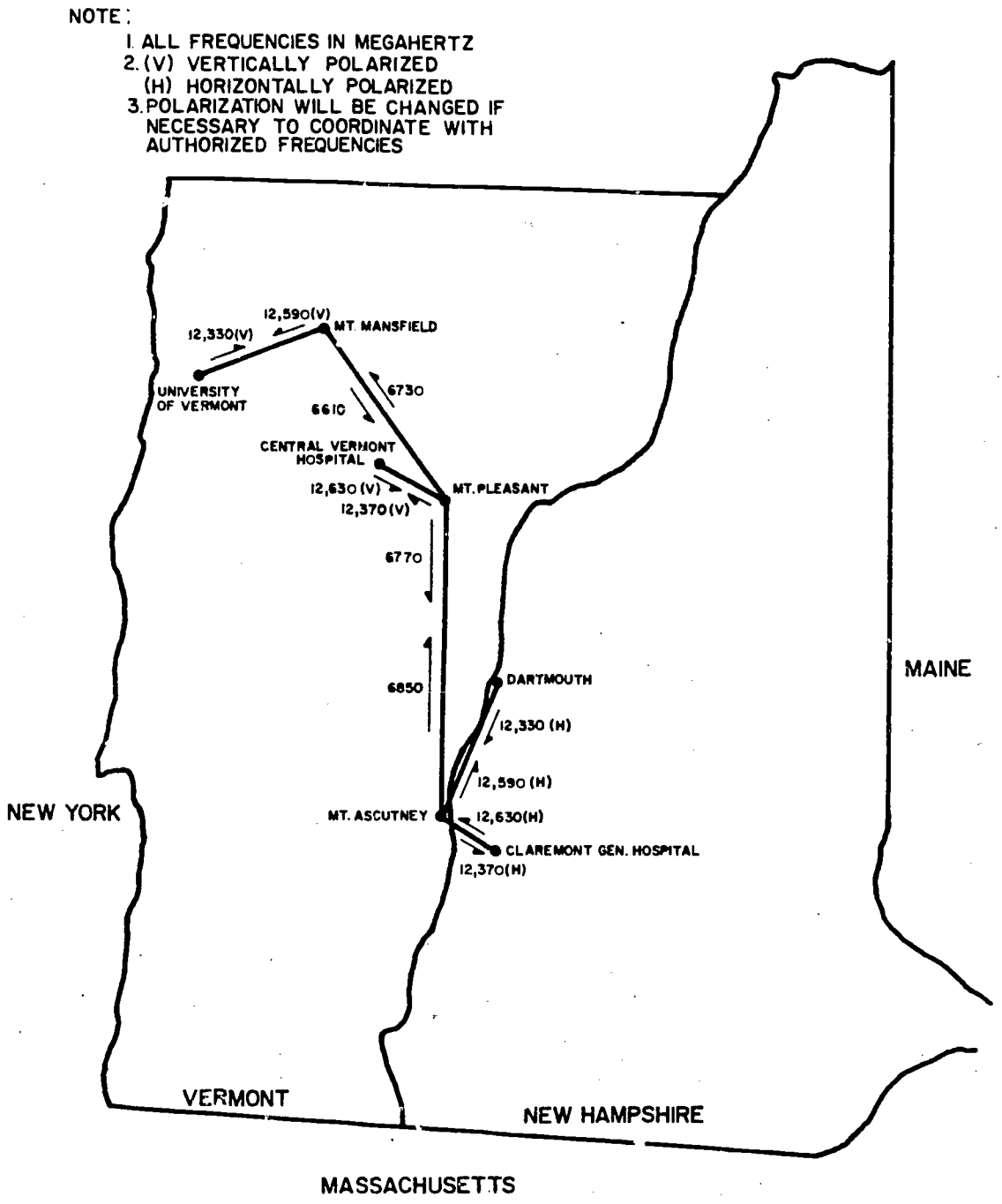
MHMH	– Carol Orgain	646-3566	RMH	– Joan Larkin, R.N.	463-3903
UVM	– Jacques Marquis	656-2173	VOTECH	– Robert Garland	542-7744
CGH	– John Donaldson	542-7771	WINDSOR	– Katherine January	674-2124
CVMC	– Warren Kyprie	229-9121			

Supported by:
LISTER HILL NATIONAL CENTER FOR BIOMEDICAL COMMUNICATIONS, National Library of Medicine, and TRI-STATE REGIONAL MEDICAL PROGRAM

(a) **INTERACT: SAMPLE ACTIVITIES**

Personal Communication, Harold Pyke, Director, Medical Interactive Communications Network, Dartmouth Medical School, Hanover, N.H.

FIGURE 76. A MEDICAL INTERACTIVE COMMUNICATIONS NETWORK



(b) FREQUENCY PLAN-VERMONT NEW HAMPSHIRE MEDICAL INTERACTIVE TELEVISION NETWORK

Personal Communication, Harold Pyke, Director, Medical Interactive Communications Network, Dartmouth Medical School, Hanover, N.H.

FIGURE 76 (Continued). A MEDICAL INTERACTIVE COMMUNICATIONS NETWORK

Significant questions, however, arise as a consequence of the prospective transition of the organization from subsidized to self-supporting status under a contract from the National Library of Medicine for determining whether and how this self-sufficiency might be achieved.

As the circle of users is expanded from the initial group to occasional users from among professional societies, governmental agencies, or other educational groups, the rate-setting issues described in the preceding section comes more sharply to the fore. The further question of whether businesses might be eligible for participation under the rules governing the licenses under which the organization operates its microwave links is much more thorny.

Thus governmental policy to encourage the weaning of experimental operations toward self-sufficiency and governmental policy regarding spectral allocation and operations as they differentiate between educational organizations and for-profit business organizations show evidence of incompatibility. The flavor of the details may be gathered from Figure 77.

Figure 78 illustrates the interactions of "empirical or deductive analysis" of attributable costs, regulatory constraints, subsidies and cross-subsidies, and economies of scale in the operation of shared resources. Though far from ever fully resolved to everyone's satisfaction, these questions are common enough in other realms and increasingly likely to be of explicit concern in the world of library and other information services.

FREDERICK M. ROWE
PERCY H. RUSSELL
DONALD C. BEELAR
R. RUSSELL EAGAN
CHARLES R. CUTLER
ALOYSIUS B. McCABE
JOHN P. MANWELL
JAMES M. JOHNSTONE
ERWIN G. KRASNOW
STEPHEN A. BROWN
ROBERT A. BEIZER
BERT W. REIN
JOHN L. BARTLETT
RICHARD C. LOWERY

PAUL M. HYMAN
JAMES H. WALLACE, JR.
NOLAN E. CLARK
ROBERT D. STRAHOTA
THOMAS B. CARR
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EDWARD W. WARREN
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(312) 726-2929

November 14, 1973

Harold Pyke, Director
Medical Interactive
Communications Network
Dartmouth Medical School
Hanover, New Hampshire 03755

Dear Hal:

Per our telephone conversation on Friday, this letter will summarize how you may proceed to establish a consortium to share the costs of the New Hampshire/Vermont Medical Interactive Communications Network. The FCC's Rules on private microwave sharing are, in general, designed to prevent the use of private systems to make a profit which could result in the illegal rendition of common carrier services for hire. The FCC's Rules restrict who may share and also set up safeguards to monitor the sharing of costs.

Eligibility to Share

Microwave systems such as yours, which are licensed in the Business Radio Service may be shared by anyone who is eligible in that radio service for the frequencies being shared. The eligibility for the Business Radio Service is quite broad including, inter alia, "[a]ny person engaged in commercial activity . . ., [e]ducational or philanthropic institutions, . . . [and] [h]ospitals, clinics and medical associations." There is, however, an additional restriction in the case of the Medical Interactive Network: the 6 GHz frequencies for backbone of the system are only available for "intercity closed circuit educational television."

The basic eligibility to share the system thus extends the present users of the system which are educational institutions and hospitals.

FIGURE 77. A SAMPLER OF RESOURCE-SHARING ISSUES

Moreover, all present users use the system to some degree for educational programs. As you know, to qualify as a CCETV system, more than 50% of the use must be educational; however, the staff will not disqualify any of the present users simply because its individual educational use is less than 50%, as long as system use remains above 50% educational.

The organizations which will use the system on an ad hoc basis such as the mental health association and pharmaceutical association may qualify for the Business Radio Service either as being engaged in commercial activity, as educational or philanthropic organizations, or as recognized medical associations, but probably will not all be able to qualify their use as relating to education. Thus, their use may require a waiver of the Rules. The staff has indicated that this should present no problem, especially where the use is confined to the transmission of television and/or data between the premises of the eligible users and where there is no general offering of communications services to the public. The staff would not, however, entertain a blanket waiver and authorization, even to serve a narrowly defined segment of public. An application must be submitted for each entity to share the system describing the entity and its use of the system.

Finally, the federal government and agencies thereof are not eligible for FCC-licensed frequencies. The federal government has its own pool of frequencies administered by the Office of Telecommunications Policy (OTP) and the Interagency Radio Advisory Committee (IRAC). Nonetheless, the staff seemed persuaded that participation in the total system by federal government hospitals such as the Air Force hospital and VA hospitals would serve the public interest, and therefore, would grant the necessary waivers, upon request, as long as no new FCC-licensed radio facilities were required to serve the federal government. Drops to the federal installations must use OTP/IRAC frequencies or land line facilities unless an extremely persuasive case can be made in terms of economy and efficiency to use FCC frequencies.

Finally, the consortium itself will not be eligible to use the system or to be the licensee of the system. Dartmouth will have to retain the licenses, exercise control over the stations, and be responsible to the FCC for the system. The consortium will be merely a vehicle for establishing a common understanding among the participants as to the use of the system and the cost sharing. As such, no specific legal form is required, but my suggestions as to its form are discussed below under "Structure of the Consortium."

FIGURE 77 (Continued). A SAMPLER OF RESOURCE-SHARING ISSUES

Appointment of Costs

To share a private microwave system, the Rules require the licensees to give the FCC 30 days notice of the proposed cooperative use giving the names of the participants (along with a showing of eligibility) and the contract or understanding among the participants. The FCC then has 30 days to raise any questions or objections to the proposal. If any questions are raised, the system may not be shared until they are cleared up.

Up to the present, the Medical Interactive System has been shared without charge to the participants as a result of the generosity of Lester Hill National Center for Bio-medical Communications. This operation has simplified dealings with the FCC because no formal written contract is required for sharing without charge and no consideration need be given to the apportionment of costs. In addition, when costs are shared, the Rules require the filing of annual reports on FCC Form 402A showing the operational and capital costs and their apportionment if charges are made. As you know, we have been required only to file a statement that no charges were made. Enclosed for your information is a copy of FCC Form 402A.

The Rules permit costs to be shared only "on a nonprofit, cost sharing basis pursuant to a written contract between the parties involved which provides that the licensee shall have control of the licensed facilities and that the contributions to capital and operating expenses are accepted only on a cost sharing nonprofit basis, prorated equitably, among all participants using the facility." The licensee of the system is required to maintain records showing costs and contributions.

As I understand your proposal, the full costs associated with the system would be borne by the present users and perhaps the federal government agencies if and when they participate, but other small users would be charged a nominal fee based upon hours of use. There should be no serious problem in the classification and disparate treatment of "full" cost participants and "nominal" cost participants -- one obvious distinction being the availability of a microwave drop on the premises of the "full" cost participants but not of the "nominal" cost participants. The principal concern of the FCC staff was that the "nominal" charges would be more than an equitable proration of the total costs. This concern can be met in part by making the proposed rate of $25 per hour a "topping"

FIGURE 77 (Continued). A SAMPLER OF RESOURCE-SHARING ISSUES

rate; that is, the charge to nominal participants would be $25 per hour, but no more per hour than the total operational and capital expenses actually incurred in any year divided by the total number of hours of actual operation.

This concern that the proposed nominal charge of $25 per hour be truly nominal charge also prompted the staff to inquire into the bases for attributing costs to the system operation. Cost attributable to the system operation would include salaries and normal burdens for system management personnel, system operating personnel such as technicians and cameramen, lease of facilities, power and space from Vermont ETV, space and power at each of the participating institutions (either in money or in-kind), janitorial support, secretarial support, and office expenses relating to the operation of the system. Program expenses, which should be kept separate from the information required by the FCC, include those costs associated with the production of the material transmitted. Program expenses include the costs of props and materials used in the programs, salaries of the "actors," "authors," and personnel dedicated to planning the innovative use of the system. Possibly, some of the management and administrative salary and travel expenses should be apportioned to program costs. A close link should be taken at your expenses to see how directly they relate to the microwave system operation. I suspect most "program" related activities are donated in-kind by the participants. If practicable, it would be administratively desirable to have only a single pool of costs to share.

After the "nominal" contributions are subtracted from the total operational costs, the remaining costs should be "prorated equitably" among the full cost participants. Any basis upon which the members of the consortium agree to divide the costs should be acceptable to the FCC as "equitable" unless, perhaps, the licensee ends up sharing little or no costs. The FCC prefers sharing of costs in proportion to 'use," such as total hours. However, I suggest you work out a tentative formula, and I will see if the FCC has any problems with it. Finally, in adopting a cost sharing formula do not forget to provide for future capital contributions if necessary for expansion of the system replacement of existing equipment.

Structure of Consortium

As I mentioned before, Dartmouth will remain the licensee and remain responsible to the FCC for the system operation. The

FIGURE 77 (Continued). A SAMPLER OF RESOURCE-SHARING ISSUES

consortium may, however, have a board of directors or advisory committee to advise on, and to review, the use of the system and to explore new and innovative uses. The members of the consortium could be the present users with the federal government agencies represented either as full members or, perhaps, associate members.

The consortium could be established by a single contract setting out:

1. The purpose of the consortium.
2. The types of programs acceptable on the network.
3. The cost sharing formula including provision for nominal users.
4. The method for establishing an advisory board.
5. The ultimate control over the facilities remaining with Dartmouth.
6. Methods for settling or avoiding conflicts in use of the system.
7. An understanding that Dartmouth can add nominal users or associate members by separate contract.

The nominal users probably should not be members of the consortium, but handled by a separate contract between Dartmouth and each nominal user. If you desire, I will draft a standard contract with blanks for th name of the nominal user, a description of its activities, and a description of its proposed use.

Procedure

Once you have a tentative cost formula, we should draft the necessary contracts. If the contracts are acceptable to all concerned,

FIGURE 77 (Continued). A SAMPLER OF RESOURCE-SHARING ISSUES

I will review them with the FCC staff, make adjustments if necessary (with your concurrence, of course), get the contracts signed, and formally file the contracts and required notice with the FCC.

If you have any questions along the way, please let me know.

Very truly yours,

John Bartlett

JB/rb

Enclosure

FIGURE 77 (Continued). A SAMPLER OF RESOURCE-SHARING ISSUES

Personal Communication, Harold Pyke, Director, Medical Interactive Network, Dartmouth Medical School, Hanover, N.H.

Interact Interactive Television Network

DARTMOUTH MEDICAL SCHOOL. HANOVER, NEW HAMPSHIRE 03755 TEL. 603/646-3566

M E M O R A N D U M

TO: Drs. Seibert and Welsh, Messrs. Blough, House, Johnson, Donaldson and Ely

FROM: Harold F. Pyke HP.

RE: Position Paper on Cost Sharing Budget April 2, 1974

After numerous meetings, memoranda, etc. I'd like to try to summarize our current position regarding a 1974-1975 budget and method of cost sharing expenses in various categories. All of this is, of course, preliminary to approval by an INTERACT organization and appropriate authority.

1. Direct costs for operating INTERACT fall into two general categories: Technical Operations and Program Development. Administrative and marketing costs are of mutual benefit to both direct cost categories and can be treated as an indirect cost burden on each.

a. Technical Operations are those related directly to the operation and maintenance of the microwave links between participating institutions.

b. Program Development is all other direct services provided by INTERACT including development and production of educational programs, provision of technical assistance other than para. 1 a., and communications consulting services.

c. Both direct cost categories must be kept separate, one from the other. Technical Operations costs must be apportioned equitably among participants in a manner approved by the FCC.

2. Preliminary Budget, 1974-1975

Direct Costs:	Amount	%
Technical Operations	$46,300	38.2
Program Development	74,900	61.8
Total Direct Costs	$121,200	100.0

FIGURE 78. ISSUES IN COST ALLOCATION

Indirect Costs:	Amount	%
Administration	$54,800	45.2 of T.D.C.
Total Cost	$176,000	
Reserve for Equipment Replacement	20,000	
Total Cost and Reserve	$196,000	

3. Allocation of Technical Operations Costs

Basis: 4 fixed stations: 1 share each
3 mobile stations: 1/3 share each

Apportionment (computed):

Rockingham Memorial Hospital	$5,800
Vocational Technical College	5,800
Corrections Department	5,800
Subtotal, Mobile Stations	$17,400
Claremont General Hospital	17,400
Central Vermont Medical Center	17,400
University of Vermont, Medical Center Hospital of Vermont, UVM Medical School	17,400
Dartmouth College, Dartmouth-Hitchcock Medical Center	17,400
Subtotal, Fixed Stations	$69,600
Total Technical Operations and Administrative Overhead, Computed	$87,000

NOTE: This is a computed rate. In 1974-1975 income from the Lister Hill contract should effectively reduce the rate by approximately 66%.

4. Allocation of Program Development Costs:

These expenses are variable and depend on the extent to which specific capabilities are utilized by participating institutions. Among the four fixed stations (who now utilize these services exclusively), the computed allocation is approximately $27,200 each. Billed rate for 1974-1975 would be less 66% or approximately $9,250 each.

5. Summary 1974-1975

Mobile Stations	Computed Rate	Billing Rate
Technical Operations (fixed)	$5,800	$2,850
Program Development (variable)	-	-
Total Each of Three	$5,800	$2,850

Figure 78 (Continued). ISSUES IN COST ALLOCATION

Fixed Stations	Computed Rate	Billing Rate
Technical Operations (fixed)	$17,400	$8,600
Program Development (variable)	27,200	9,250
Total Each of Four	$44,600	$17,850
Grand Total, All Stations Combined	$195,800	$79.950

6. There are a number of hidden costs of the INTERACT operation which have not been computed here. These include use of space, faculty and staff time and effort, and maintenance of equipment other than that purchased for INTERACT operations. I would expect each institution to contribute "in kind" support as it has in the past.

If there are errors in my computations (as in earlier correspondence), please let me know. I hope this paper will clarify our current position on this subject.

Next: an analysis of charges ad hoc (non-participating institutions, individuals, etc.) users.

Personal Communication, Harold Pyke, Director, Medical Interactive Communications Network, Dartmouth Medical School, Hanover, N.H.

FIGURE 78 (Continued). ISSUES IN COST ALLOCATION

Personal Communication, Harold Pyke, Director, Medical Interactive Communications Network, Dartmouth Medical School, Hanover, N.H.

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