This report explores the bodies of literature pertinent to the economics of information, a topic of growing interest to the information community and to economists. As used here, economics of information refers to the concepts and tools of economics as they apply to information activities. The report consists of (1) a short section on the economists' framework for analysis, (2) a table that divides the pertinent literature into 14 categories, briefly defines each category, and explains why it is important to information activities, (3) a brief commentary on the state of this literature and (4) a selected bibliography of over 300 items. An exhaustive list of all items could not be done in this initial effort, but, most recent literature, especially monographs, technical reports and literature surveys, is covered to the extent that a reader should get a good introduction to this literature. In addition, 25 items are identified as giving particularly informative overviews. These items represent the full range of material from theoretical studies to applied analyses, plus several surveys. (The first edition is available as ED 044 545.) (Author)
THE ECONOMICS OF INFORMATION

BIBLIOGRAPHY AND COMMENTARY ON THE LITERATURE

SECOND EDITION, 1972

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ABSTRACT

This report explores the bodies of literature pertinent to the economics of information, a topic of growing interest to the information community and to economists. As used here, economics of information refers to the concepts and tools of economics as they apply to information activities. The report consists of (1) a short section on the economists' framework for analysis, (2) a table that divides the pertinent literature into 14 categories, briefly defines each category, and explains why it is important to information activities, (3) a brief commentary on the state of this literature and (4) a selected bibliography of over 300 items. An exhaustive list of all items could not be done in this initial effort, but, most recent literature, especially monographs, technical reports and literature surveys, is covered to the extent that a reader should get a good introduction to this literature. In addition, 25 items are identified as giving particularly informative overviews. These items represent the full range of material from theoretical studies to applied analyses, plus several surveys.
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PREFACE TO THE SECOND EDITION. ONE YEAR LATER
(Specially prepared for INFORMATION-PART 2- Reports and Bibliographies)

Reissuing this publication provides an opportunity not only to update the bibliography but also to comment on the commentary.

BIBLIOGRAPHIC UPDATE

Since the date of original publication, nearly 500 items have been located which pertain to the economics of information. About 160 deemed most significant have been selected for inclusion in the 1971 supplementary listing attached to this preface. This supplement focuses on material published in 1971, but also includes a few items issued in early 1972, as well as some pre-1971 key items missed in the first edition.

As in the first edition, citations are included from both the information literature and the economics literature. However, the shift in time covered, the supplement generated using the same procedures employed in the first edition. The list of citations and references passed in the first edition was not done for three reasons. First, the citations organized in this fashion are very unevenly distributed among the categories, so the listing looks on a very "happy" appearance. Second, discussions with readers of the first edition indicate fewer divisions would improve the utility of the listing, and that arbitrarily dividing by the two source literature categories would inadequately serve most users. Third, the task of compilation is considerably simplified.

Citations are selected which provide either useful knowledge concerning economic analysis of information activity, or basic input data on information activity necessary for economic analysis.

From the economics literature, selection favors studies which apply economic analysis directly to information activity, or which examine the significance of information as an input to other activity. Also included are some reviews of techniques and approaches potentially useful in analyzing the economic aspects of information. In addition, a few items are included which provide good introductions to the concepts and tools of economic analysis to aid information professionals in understanding economics as applied to information.

From the information literature, selection favors studies which analyze information activity in order to assess current operating systems and outputs or to aid in planning and developing new systems and outputs, or which evaluate the effects of information on other activities. Also included are some descriptions of information systems, plus surveys and inventories of particular types of information activity which provide improved understanding for economic analysis. In addition, a few expositions on key issues affecting economic factors of information are included.

The twelve starred items are judged to have particularly interesting material or are regarded as works of special significance in this field. Undoubtedly some worthy items are missing from the listing as a function of compiler ignorance.

COMMENTS ON THE COMMENTARY

Discussions with both information professionals and economists suggest that the schema characterizing the overall framework of economic analysis (Figure 1) in the original edition provides a useful context for examining the literature on the economics of information. As noted in the first edition, this literature remains diffuse and spotty. However, recent efforts do raise a greater effort to relate prior effort to current work and to develop a broader context for their analyses. Increased rigor of analysis also is more common, and some beginning work in previously neglected areas -- particularly the demand side of economic analysis -- promises to fill in deficiencies in the literature.

The communications gap between the information community and the economics community appears to have narrowed during the past year. Occasional instances of cross-referencing between these two literatures can now be found. Among some recent meetings which discussed economics of information, representatives from both groups could be found on the program. For example, at the American Society for Information Science conference in October 1971, a panel with both economists and information professionals addressed precisely the topic, "Economics of Information." And from the economics community, a workshop sponsored by the National Bureau of Economic Research at the Urban Institute (Washington, D.C.) in June 1971, had a mixture of information professionals and economists attending. In time this trend should generate a broader range of common understanding between these two communities.

Perhaps the most significant trend noted this year is the substantially greater awareness by the information profession concerning the significance of economic factors to information management. Leading journals in the field appear to be interested in publishing materials which discuss economic aspects of information. Clearly the volume of literature on this topic has
increased substantially. Furthermore, at the national conferences of the American Library Association, the Special Libraries Association, and the American Society for Information Science, special workshops were held on topics directly pertinent to the economics of information: all these sessions received substantial attention and performed by Matten. As a report sponsored by the National Science Foundation and performed by Mathematica, Inc., A COST/BENEFIT APPROACH TO EVALUATION OF ALTERNATIVE PROVISION PROCEDURES, with W.G. Baumol as principal investigator.

The literature this year provides no direct answers to the questions raised in the original commentary, a not too surprising finding for this brief a time period. Less reassuring is the fact that virtually no material could be found which even explicitly raises these questions. Furthermore, the issue concerning the appropriate locus of capability for economic analysis of information appears to be even more critical, given the current tight budgets for information and the critical policy questions being raised by funders of information. The choice of locus will largely determine the agenda of analysis and the impact of results. Obviously, additional capacity would go far toward improving the response to tight budgets and policy questions.

No formal action has appeared concerning the two suggestions offered in the original commentary: however, signs of informal activity may be seen to implement the suggestions. Most abstracting and indexing services seek a bit more systematic in their treatment of material on the economics of information this year. Access to previously unpublished material on the topic appears to be increasing, first because such studies are more likely to be published, and second because some authors are depositing such studies in the EPIC system and the NTIS system. Also, the increased sensitivity to this topic by ANNUAL REVIEW authors results in identifying previously unpublished but significant items.

In conclusion, the past year has yielded substantial growth in the quality and quantity of literature on the economics of information, and the linkage between the economics community and the information community has enjoyed a modest increase.

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February 27, 1972

Footnote: The compiler gratefully acknowledges the assistance of the American Society for Information Science, Educational Resources Information Center/Clearinghouse on Library and Information Science staff in gathering material for this bibliography, and helpful discussions with John Wilson, Alice Billingsley, and Ted Branhorst, all chapter authors for the forthcoming ANNUAL REVIEW FOR INFORMATION SCIENCE AND TECHNOLOGY, Vol. 7.
PREFACE TO THE 1971 EDITION

This brief and long-awaited introduction to the literature of the economics of information is the first of a modest number of publications in the area to be sponsored by the Special Interest Group (SIG) on Cost, Budgeting & Economics of the American Society for Information Science (ASIS). The report is the result of a cooperative endeavor with the EPIC Clearinghouse on Library and Information Sciences (ERIC/CLIS), a contractual responsibility of ASIS.

Today -- 1971 -- there is no single other subject in the area of information which transcends costs in importance. Decision makers, budget analysts and perhaps soon, the public, are examining our operating costs with a penetrating and often skeptical eye. It is patent that while methodology to optimize the operation of information dispensing organizations must be constantly developed, it is equally clear that methodology and standards for finding, analyzing, reporting costs, both in their dollar and their benefit sense, must be produced.

There is tragedy in the fact that there exists ten times the literature on the economics of information listed here in unpublished, scintillatingly available in file cabinets over this country, rough analyses, immeasurable studies. These have not been published because they are either in rough form or are proprietary. As Acting Chairman of this SIG, I appeal to all users of this document to submit works of this nature -- cleaned up or rendered non-proprietory if necessary, to EPIC/CLIS for announcement and availability purposes. The information community needs all the help in this area it can get.

Finally, I ask all readers to get behind the drive to make this SIG effective. Librarians and information scientists with deep interest in the area of costs, budgeting and economics should be persuaded to join our concern effort.

Erik Bromberg, Director of Libraries
U.S. Department of the Interior
Washington, D.C. 20240
Acting Chairman, Special Interest Group on Costs, Budgeting & Economics,
American Society for Information Science
THE ECONOMICS OF INFORMATION:

BIBLIOGRAPHY AND COMMENTARY ON THE LITERATURE

PURPOSE

The purpose of this bibliographic exercise is to clarify the range of literature pertaining to the economics of information. The two major goals are to detail the core literature on the economics of information, and to survey the peripheral literature surrounding this core, or, perhaps more accurately, the material from which this core is emerging.

This purpose implies a particular focus. First, commentary is directed at the literature on the economics of information, not at substantive issues in the economics of information, which will be a topic for analysis in a later paper. Second, because of its exploratory nature, this bibliographic exercise takes a broad view of the economics of information and includes a wide range of material for readers with a variety of backgrounds and interests. While the bibliography aims to be comprehensive, surveying the pertinent literature for both the economics and the information communities, it is not exhaustive. Items older than three years are included only if significant work for which no more recent efforts substitutes. The bibliography concentrates on monographs and technical reports, particularly in the economics literature. Foreign language items are critiqued, although substantive work is contained in them.

As a result, the bibliography should provide a working reference checklist to the relevant literature on the economics of information.

PROCEDURE

In compiling this bibliography, two basic problems were encountered. Within the enormously broad field of "economics," which kinds of studies were likely to produce literature most pertinent to the economics of information? And when specific useful pieces of literature had been pinpointed, how could they best be classified to suit the purposes of prospective users?

The first step in generating this bibliography was to specify the factors involved in economic analysis of information activity. Figure 1 -- "The Economist's Framework for Analysis" -- is a schema which serves as the criterion for identifying the bodies of literature to be covered in the bibliography. Since this schema is the heart of this exercise, some brief discussion may be warranted to clarify the factors outlined in the schema and to develop the overall character of economic analysis.

Basically, economic analysis is the study of choice: the allocation of scarce resources among alternative uses, and the distribution of outputs among alternative users -- that is, the classic questions of what and how much to produce, who gets what products. Economic analysis finds answers to these questions by balancing supply against demand. Figure 1 reflects this equilibration, using some of the technical language and concepts economists employ when addressing these questions. In general, their analysis evaluates the conduct and performance of the decision-making units around which economic activity is organized, and the relationships among these decision-making units.

The supply side of the balance sheet reflects the production function -- the type and amount of resource inputs producers need for a given kind and quantity of output; in our economy, this production function is transformed into a statement of dollar costs required to produce a given output. The demand side of the balance sheet reflects a utility function -- the type and amount of outputs consumers prefer; the utility function can be viewed as a statement of the benefits consumers derive from these outputs.

The fulcrum of the balance is the mechanism for adjusting supply to demand. The "center box," includes two basic decision-making modes: (1) the market system mode, which matches supply to demand via price signals from market transactions, and informs producers of the relative demand for an output and tells consumers about the relative cost of the output; and (2) the non-market decision process mode, which matches supply to demand via some other authority which establishes production levels and determines which consumers receive the output. In most economies, an admixture of these two decision-making modes is used, with the actual mix depending, in part, on the political preferences of the society and the economic characteristics of the output involved.

The adjustment mechanism produces decisions of two general types: (1) decisions about the allocation of resources (lower left box), usually summarized in budgets for producers, and (2) decisions about the distribution of outputs to consumers (lower right box), typically contained in social policies concerning these outputs, or, more indirectly, through social policies which determine income distribution.
This exposition of the concepts used for economic analysis is over-simplified; it neglects the complex issues involved in applying these concepts to real-world activities and makes a number of assumptions as to the nature of man and society. Yet the schema does characterize the overall framework in which most economic analysis is done today.

Although economists devote most of their effort to the factors listed in the five inner boxes just described, economic analysis itself is contained within a larger social and environmental framework. Thus, economists join with researchers in other disciplines in studying this larger framework -- with engineers in analyzing the technological determinants of production function activity (the outer left box) and with sociologists, psychologists, and political scientists in examining the social aspects of economic activity such as incentives, value structures, organizational and group behavior, the socialization process, etc. (the outer right box).

Certain other conventional distinctions imbedded in economic literature were used in this literature search:

1. The level of activity studied, ranging from micro-economic theory (which examines the behavior of individuals and organizations) to macro-economic theory (which examines the behavior of an entire economy and its major sectors in terms of aggregate measures). The analysis of particular industries, such as the information industry, is located in between these two extremes.

2. The type of activity studied, grossly dichotomized into the study of public sector activity (the production and distribution of public goods, public finance, welfare economics, etc.) and private sector activity (the production and distribution of private goods, theory of the firm, equilibrium conditions of individual markets, etc.).

3. The character of the models used, generally split into two major categories, the first being comparative static models which analyze economic activity in terms of a sequence of equilibrium points (akin to a series of snapshots over time),
and the second being dynamic models which analyze economic activity in terms of a continuous line tracing the movement of particular economic indicators (akin to a motion picture).

The second major step in generating this bibliography was to review the recent literature from both the economics and the information communities in order to identify the major bodies of literature which report on the economics of information. In general, these two communities produce quite different types of literature pertinent to this topic. The economics literature consists primarily of items which develop the concepts and tools and contains for analysis only a few studies directly focused on the economics of information. The information literature consists primarily of items describing structural factors (decision-making units and their relationships) in information activity and provides some data on substantive aspects, although usually in a hortative mode.

Based on the schema shown in Figure 1, the four classifications listed above, and the review of literature, the resultant material was categorized as shown in Table 1. Categories 1, 2, and 3 are concerned with literature in the economics community; items 4 to 9 are concerned with that in the information community. A description of the material covered and its pertinence to the economics of information is given for each category.

### TABLE 1. CATEGORIES OF LITERATURE PERTINENT TO THE ECONOMICS OF INFORMATION

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Pertinence</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ECONOMICS OVERVIEW/THEORY</td>
<td>Describes the major concepts and tools of economic analysis and the problems addressed by economists.</td>
<td>Provides a general means for analyzing economic aspects of information activity.</td>
</tr>
<tr>
<td>2. ECONOMICS INDUSTRY ANALYSIS/PRODUCTION FUNCTION/MANPOWER</td>
<td>Analyzes the market relationship between producers and consumers of some good or service in terms of industry structure, conduct, and performance. Considers major input factors such as labor, equipment, etc., used in producing the industry output.</td>
<td>Pertinence. Using information as the resource of commodity, provides a means for analyzing the effectiveness of alternative organization patterns in the information industry and the impact of various policy choices upon the operations of the industry. Analyzes the relationship between information supply and demand factors plus the adjustment mechanisms in terms of effects on resource allocation and output distribution.</td>
</tr>
<tr>
<td>3. ECONOMICS: PUBLIC SECTOR/PUBLIC GOODS/WEALTH/BENEFIT-COST/PPBS/ NON-MARKET DECISION MAKING ECONOMIC ORGANIZATION</td>
<td>Analyzes the non-market aspects of industry and government activity particularly as they relate to public goods production and consumption. Considers alternative organizational configurations for performing economic activity.</td>
<td>Pertinence. Assuming such information activity entails non-market decision making and public good factors, provides a means of analyzing such factors as they affect information activity. Includes both macro and microanalysis of alternatives in generating input resources to sustain information activity, allocating such resources to various information functions, and distributing the outputs of such functions to various consumer groups.</td>
</tr>
<tr>
<td>4. ECONOMICS: OPERATIONS ANALYSIS/O.R./CAPITAL BUDGET THEORY/ MANAGEMENT ECONOMICS/SYSTEMS ANALYSIS/MARKETING/COST ESTIMATION</td>
<td>Describes the procedures for identifying components of economic activity, and develops the observational measures for analyzing such activity in terms of supply cost factors and demand benefit factors.</td>
<td>Pertinence. Provides the specific means for identifying and measuring economic aspects of information activity. Focuses primarily on microanalysis in developing and managing the operations of an information system.</td>
</tr>
<tr>
<td>5. ECONOMICS AND ALLIED SCIENCES: SECTOR STUDIES CLOSELY RELATED TO INFORMATION ACTIVITY</td>
<td>Applies economic analysis to sectors of activity similar to or directly related to information activity.</td>
<td>Pertinence. Provides useful examples of the employment of economic analysis in areas similar to information activities. Also provides significant data on major information producer and consumer groups.</td>
</tr>
</tbody>
</table>
6. ECONOMICS AND ALLIED SCIENCES: INNOVATION/ENTREPRENEUR/INCENTIVES

Description. Studies phenomena related to economic activity which refines key assumptions made in economic analysis, particularly factors underlying the presumed goals of economic activity and changes in economic organization.

Pertinence. Such studies often identify information as a critical variable in innovation and performance incentives. Potentially, such studies can clarify the process of innovation and performance incentives in information activity.

7. ECONOMICS AND ALLIED SCIENCES: POLICY ANALYSIS/PLANNING

Description. Studies the policy-making process and system, particularly in government.

Pertinence. Such studies often identify information as a critical variable in the policy-making process. Such studies can also clarify the process formulation concerning information activity.

8. ECONOMICS AND ALLIED SCIENCES: FORECASTING AND PERFORMANCE Indicators/KNOWLEDGE UTILIZATION/TECHNOLOGY ASSESSMENT

Description. Studies the determination and prediction of social and economic trends and the role of knowledge in such activity.

Pertinence. Such studies view information and information activity as essential components in trend analysis and in the organization of effort to produce forecasts.

9. ECONOMICS AND ALLIED SCIENCES: SOCIOLOGY OF KNOWLEDGE/SOCIOLOGICAL ANALYSIS/HISTORY/ORGANIZATION THEORY/SOCIAL PSYCHOLOGY

Description. Studies knowledge and information behavior as an aspect of society, particularly as a factor in organizational activity.

Pertinence. Such studies take information and knowledge as their primary topic, though usually at a very general level. Provides a broad view of information activity to serve as a context for performing economic analysis of information activity.

10. INFORMATION: OVERVIEW/DOCUMENTATION/ADMINISTRATION/INFORMATION SCIENCE AND LIBRARY RESEARCH/ NATIONL SYSTEM-INDUSTRY-POLICY STUDIES/COPYRIGHT

Description. Describes the major components performing information activity, their interrelationship, and their general practices and policies.

Pertinence. Details the general framework structuring information activity, thus identifying major decision-making units and their relationship. Provides some data concerning the adjustment mechanisms relating supply and demand plus allocating resources and distributing outputs.

11. INFORMATION: SURVEYS/USER STUDIES

Description. Analyzes the communities and groups which consume or generate information.

Pertinence. Provides some data concerning information demand factors and benefits.

12. INFORMATION: SYSTEM EVALUATION/ANALYSIS/GENERAL MANAGEMENT STUDIES

Description. Describes the operating characteristics of information activities usually in terms of some performance measures.

Pertinence. Provides some data concerning supply factors and costs in information production functions.

13. INFORMATION: SYSTEM OPERATIONS/OPERATIONAL ANALYSIS

Description. Explores the employment of modern information processing technology to information activity.

Pertinence. Provides a dynamic aspect to information production functions through shifts in technology and resource factors plus changes in incentives and organizational performance factors.

14. INFORMATION: SYSTEM OPERATIONS/OPERATIONAL ANALYSIS

Description. Details the current operations and policies of information activities.

Pertinence. Provides some data concerning resource allocation and output distribution by information activities.

The final step in generating the bibliography was to select from these bodies of literature the citations which are useful in studying the economics of information. A citation was selected for inclusion in the bibliography if it was pertinent to the economics of information, was broad in scope (i.e., it linked together factors outlined in Figure 1), and had been published recently (most items are dated no earlier than 1966).

The major abstracting and indexing tools which cover both economics and information literature were consulted for relevant citations. In addition, the 1968-1970 issues of leading journals in the information field were scanned for pertinent citations.
Roughly 300 citations, which fit the stated criteria were located and are listed in the Bibliography under one of the 14 categories described in Table 1. For the convenience of readers who want a condensed introduction to the economics of information, the most informative citations are identified by an asterisk (*).

**COMMENTARY ON THE STATE OF THE LITERATURE**

Although this study was aimed primarily at assembling a useful list of citations on the 'economics of information', it also revealed some interesting characteristics of the current literature and raised some questions.

The most obvious characteristic of the literature is its extreme diffuseness. As a corollary to that, more material exists than is immediately evident. Although both the economics and the information communities produce material relevant to the topic, little interaction occurs and virtually no cross-referencing is evident between the literatures of these two communities. Two related factors probably account for this diffuseness. The first of these is the 'emerging' stage of development of this topic, since the economics of information has only recently been treated as a discrete topic for study by either economists or information specialists. The second factor is the 'part-of' character of most items treating this topic, in which work pertinent to the economics of information has usually been produced with some other topic or purpose in mind, often without the publication of results as an objective of the work.

This diffuseness also extends to the terminology employed in discussing the economics of information within the literature, including the key terms 'economics' and 'information.' Within the information community, little consensus is evident concerning the use of 'economics': typically, the tendency is to equate economics with any literature in which a dollar sign appears. Conversely, the literature of the economics community uses the term 'information' to cover a variety of phenomena, ranging from a narrow view of information as purely price and market data to a very broad interpretation of information as covering practically any communication. Consequently, subject headings relating to the economics of information are used with little consistency or accuracy by abstracting and indexing services, so that the material is widely scattered and often buried in the publications of these services.

Another characteristic of the literature is that it is quite spotty and often fuzzy in content. A general framework in which to place particular studies is lacking. Most work on information activity focuses almost exclusively on the supply side of economic analysis and neglects the demand side. The result is lopsided analysis — much on costs with little on benefits. Typically, such work is descriptive rather than analytic. Even at the descriptive level, the context provided for studies is often insufficient to give any meaning to numerical data on costs, etc. Furthermore, the cost structures employed by such studies have been dominated by the need to establish accountability for preventing misappropriation of funds rather than by the need to improve managerial performance in information activities.

Much of the work by information specialists on the economics of information has dealt with either the evaluation of information systems or the administration of information activity, especially in terms of accounting costs. However, more specific and intense interest about the economics of information has developed recently, apparently stimulated by two issues now facing the information community. One is the impact of technological change and the general uncertainty as to when automation is economically warranted in information activity; an issue also facing managers of many other types of activities. The other issue is the increasing funding squeeze on public sector activity and the increasing demands by sponsors for more cost and quantified justification of information activities; an issue facing most areas of public service today.

In general, economists have done only a modest amount of work focusing directly on information in the sense that this term is used concerning libraries and the publication process. Probably the most relevant work by economists has been as a consequence of commissions stemming from major studies of information activity such as those of the National Academy of Sciences, National Academy of Engineering Committee on Scientific and Technical Communication, and the president's National Advisory Commission on Libraries.

Can any useful lessons be learned from this examination of the literature on the economics of information? One key feature which was revealed is that systematic analysis, as developed by economists, has rarely been used in studying information activities, probably because of the substantial communications gap between economics and information specialists. This communications gap is evident in the lack of flow between the literatures produced by these two communities. In addition, a fundamental lack of consensus concerning what is really important in the discussions of economics of information by both sides is evident; the impression is that the information community is generally lacking in an understanding of economics, while the economists fail to understand information problems.

But in the relatively few studies where these two groups have worked closely together, fruitful payoffs have resulted. Therefore, more thought and effort aimed,
toward remedying this communications gap seem warranted. It may be further speculated that, to some extent, the field of economics in 1970 resembles that of psychology in 1960 with respect to the potential for advancing the study of information activity. Consider the impact psychologists made during the past decade in their study of information activity, particularly that of user behavior and its policy implications for information program development. Thus, the experience of developing a relationship between the information community and psychology may offer insights useful in pursuing the relationship which exists between economics and the information community today.

Improving this relationship poses some major questions to the information profession, for instance: What steps can be taken to improve the exchange of information between these two communities? How can more integrative research and studies of the economics of information be encouraged? And how can greater capacity for economic analysis of information activity be developed?

Perhaps the most fundamental question concerning the economics of information is: Where should the capability for economic analysis be located? A number of alternatives are possible -- the operating staffs of information organizations, agencies sponsoring information research and development, professional associations, information schools training professionals for the information community, or economics or information research organizations. The most likely solution is a mix of the former with capability at several levels. But what mix would be the most effective?

Finally, two suggestions are offered here which are designed to ease the burden of keeping up with the literature. First, improve the organization of material on this topic by abstracting and indexing tools serving this area. Currently, the indexing and classification structures used by such abstracting and indexing services are very weak in their treatment of the subject. In part, this weakness stems from defects in the primary documentation on economics of information. But, in addition, most abstracting and indexing services have not worked out an effective and coherent index language and classification structure for this material. Steps should be taken to remedy these defects, either by the abstracting and indexing services alone or by these services with the aid of interested professional groups.

Second, improve access to unpublished studies and data concerning the economics of information. Apparently a significant number of unpublished studies do exist in this area. Obfuscations or oblique references to these studies make it difficult for them to be discovered. However, some organization or professional group should collect and make accessible the results of such studies, but with adequate guarantees for protection of the confidentiality of the source of activity studied. Therefore, some organization or professional group should collect and make accessible the results of such studies, but with adequate guarantees for protection of the confidentiality of the study sources. This could be done by adopting rules for protecting the anonymity of the data sources for these studies, perhaps by adoption of the rules used by the Bureau of the Census in handling business financial data. Furthermore, the alleged existence of these unpublished studies may be symptomatic of defects in the current primary publication process for handling this literature; perhaps material on the economics of information requires some change in the usual documentation practices via primary journals.

In conclusion, the literature concerning the economics of information often stimulates many questions, but does not provide many helpful answers. Perhaps the most significant aspect revealed in this literature search is the weak linkage between the economics community and the information community, suggesting that a major communications gap exists here.
NOTE: The titles of the categories numbered 1 through 14 are fully described and their pertinence to the economics of information is shown in Table 1. Items marked by an asterisk (*) are particularly informative.

The citations are arranged under various subheadings within the broad categories as an attempt to group related material. This approach is intended to provide economists with an introduction to the field of information science and to enable information scientists to learn more about economics.

These citations which carry PB or AD numbers may be obtained from the National Technical Information Service, Springfield, Virginia 22151; and those with ED numbers from the ERIC Document Reproduction Service, P. O. Drawer 0, Bethesda, Maryland 20014. Ph.D. dissertations are available from University Microfilms, 300 North Zeeb Road, Ann Arbor, Michigan 48106.

1. ECONOMICS: OVERVIEW/THEORY

General


Information


(See especially article by K. E. Boulding, "The economics of knowledge and the knowledge of economics," pp. 1-13.)


(See especially article by J. Marschak, "Economics of inquiring, communicating, deciding," pp. 1-18.)


2. ECONOMICS: INDUSTRY ANALYSIS/PRODUCTION FUNCTION/MANPOWER

General


Information


of Maryland, School of Library and Information Services, 1969. PB 192 125.

Durck, G. "Knowledge: the biggest, growth industry of them all." FORTUNE, November 1964, pp. 128-132, 269, 270.


3. ECONOMICS: PUBLIC SECTOR/PUBLIC GOODS/WELFARE/BENEFIT-COST/PBS/ NON-MARKET DECISION MAKING/ ECONOMIC ORGANIZATION

General


Hovey, H.A. The Planning-Programming-Budgeting approach to government decision-making. New York, N.Y., Frederick A. Praeger, Publisher, 1968.


Information

Defense Documentation Center. Bibliography on cost/benefits of technical information services and technology transfer. 1968. AD 672 500.


Phase 1: Literature search and state of the art, 1967.

Phase 2: Data gathering and evaluation, 1968. AD 676 188.

Phase 3: Recommended criteria and methods for their utilization, 1969. AD 682 758.

4. ECONOMICS: OPERATIONS ANALYSIS/O.R./CAPITAL BUDGET THEORY/MANAGEMENT ECONOMICS/SYSTEM ANALYSIS/MARKETING/COST ESTIMATION

General


Black, G. The application of systems analysis to government operations. New York, N.Y., Frederick A. Pomeroy, Publisher, 1968.


Information


Korfhage, R.R. and T.G. Delutis. A basis for time and cost evaluation on information systems. School of Industrial Engineering, Purdue University, 1969. PB 188 946.


Phase 1: Literature search and state of the art, 1967.

Phase 2: Data gathering and evaluation, 1968. AD 676 188.

Phase 3: Recommended criteria and methods for their utilization, 1969. AD 682 758.

5. ECONOMICS AND ALLIED SCIENCES SECTOR STUDIES CLOSELY RELATED TO INFORMATION ACTIVITY

General


Information


6. ECONOMICS AND ALLIED SCIENCES: INNOVATION/THE ENTREPRENEUR, INCENTIVES

General

AMERICAN ECONOMIC REVIEW, May 1969. Papers and proceedings of the 81st annual meeting of the American Economic Association, 1968. (Special sections on "Theory of Innovation" and "Research and development and other determinants of investment.")


7. ECONOMICS AND ALLIED SCIENCES: POLICY ANALYSIS/PLANNING

General


Information


8. ECONOMICS AND ALLIED SCIENCES
FORECASTING AND PERFORMANCE INDICATORS/KNOWLEDGE UTILIZATION/TECHNOLOGY ASSESSMENT

General


Information


9. ECONOMICS AND ALLIED SCIENCES: SOCIOLOGY OF KNOWLEDGE/SOCIOLOGICAL ANALYSIS/HISTORY/ORGANIZATION THEORY/SOCIAL PSYCHOLOGY

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March, J.G., ed. Handbook of organizations. Chicago, Ill., Rand McNally, 1965. (See especially article by Marschak,


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10. INFORMATION: OVERVIEW/DOCUMENTATION/ADMINISTRATION/INFORMATION SCIENCE AND LIBRARY RESEARCH/NATIONAL SYSTEM--INDUSTRY--POLICY STUDIES/COPYRIGHT

General


(See especially following sections on:

Vol. 1 -- "National information issues and trends" -- J. Sherrod
Vol. 2 -- "National information issues and trends" -- D.P. Hammer
Vol. 3 -- "Information networks" -- J. Becker and W.C. Olsen
Vol. 4 -- "Library and information center management" -- P. Wasserman and E. Daniel

Vol. 5 -- "Library and information center management" -- B. Holm)


(See especially Preston, M.H., "Cost-benefit analysis: procedures and applications" pp. 85-100, and Thompson, G.K., "Cost estimates for bibliographical searching in a social science information system," pp. 101-112.)


Murdock, J.W. and D.M. Liston, Jr. "A general model for information transfer:


Vol. 1 -- Information acquisition, sensing, and input: a selective literature review.
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Vol. 3 -- Overall system design considerations: a selective literature review.


National Systems--Industry--Policy Studies


Sophar, G.J. et al. "The determination of legal facts and economic guideposts with respect to the dissemination of scientific and educational information as it is affected by copyright." Washington, D.C., Committee to Investigate Copyright Problems, 1967. PB 178 463.


11. INFORMATION SURVEYS/USER STUDIES

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13. INFORMATION: SYSTEM DEVELOPMENT/ PLANNING/AUTOMATION

Production, Publishing, Documentation, Classification, etc.


(See especially section on 'Publication and distribution of information'--J.H. Kuney, Vol. 1, and J.D. Doebler, Vol. 5.)

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14. INFORMATION. SYSTEM OPERATIONS/OPERATIONAL ANALYSIS

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Dougherty, R.M. "Manpower utilization in technical services." LIBRARY RESOURCES


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ECONOMETRICA, July 1971. See especially following papers:
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Sec. 41 - Welfare economics and externalities, pp. 140-142.
Sec. 46 - Teams and other organizations II, p. 156.
Sec. 62 - Microeconomics of information I, p. 195.
Sec. 12 - Information in decision and organization theory, pp. 339-340.


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