DOCUMENT RESUME

ED 136 749 IR 004 438

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TITLE	Economic Issues in the Networking of Library Technical Support Services.
INSTITUTION	Western Interstate Library Coordinating Organization, Boulder, Colo.
SPONS AGENCY	Office of Education (DHEW), Washington, D.C.; Western Interstate Commission for Higher Education, Boulder, Colo.
PUB DATE	Oct 76
GRANT	G00-75-00741
NOTE	23p.
AVAILABLE FROM	WILCO, Western Interstate Commission for Higher Education, PO Drawer P, Boulder, Colorado 80302, $1.50
EDRS PRICE	MF-$0.83 HC-$1.67 Plus Postage.
DESCRIPTORS	*Costs; *Economic Factors; Financial Support; Government Role; Grants; *Information Networks; Library Administration; Library Automation; *Library Networks; *Library Technical Processes; Regional Libraries
IDENTIFIERS	Western Interstate Library Coordinating Org; WILCO

ABSTRACT

To acquaint library administrators with the economic issues of library networking, this guide of the Western Interstate Library Coordinating Organization (WILCO) outlines possible problems of a national technical services network. Market structures such as monopolies and oligopolies can exist among automated services, brokered services, and in the relationship of the Library of Congress (LC) with these services. Cost structures of the automated service industry should be examined for existing monopolies. Librarians should take steps to prevent the barriers to competition which encourage monopolies. The LC, being a library, information center, and cataloging data market, could continuously monitor the economic effects of network activities. Possible effects of a network include: (1) service and territorial monopolies; and (2) flexibility vs. standardization of data quality. Problems associated with sharing library technical services costs among libraries, government levels and private foundations are: (1) pricing arrangements; (2) research and development financing; and (3) intergovernment fiscal relations. Empirical research is needed on the nature of costs and market structures for automated service, brokerage services and cataloging data. (KP)

Economic Issues in the Networking of Library Technical Support Services

by

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October 1976

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ECONOMIC ISSUES IN THE NETWORKING OF LIBRARY TECHNICAL SUPPORT SERVICES

I. INTRODUCTION

A. Overview

The purpose of this document is to acquaint administrators of American libraries and library-related organizations with a few economic issues which will become increasingly important as the concept of a national technical-services network develops. This concept includes reference, interlibrary loan and so on in addition to technical services, and the discussion here can apply to a network of larger scope. The National Commission on Libraries and Information Science, the Library of Congress, managers of automated bibliographic centers and other service organizations, and the people who run libraries should find this paper a nontechnical and nonquantitative guide to some of the possible economic pitfalls and problems that will face the library community.

The economic issues to be discussed include:

(1) What kind of industry will supply libraries with automated technical services? Will it be a monopoly? What difference would it make if it were?

(2) Where will regional organizations like NELINET fit in?

(3) Where can the Library of Congress fit into the network? As a supplier? Competitor with other organizations?

(4) What is the economic significance of the fact that members of a network must cooperate?

(5) How should different automated and other networking services be paid for? Pricing in a market system? Government subsidy? Some combination of the two?

None of these questions can be answered here, but the issues they raise from the point of view of economic analysis, will be explained. Since this document is intended only as an outline of questions, research in the areas discussed will be suggested, as well as tentative policy objectives.

This report is a product of the cost and funding studies conducted by the Western Interstate Library Coordinating Organization (WILCO) under Grant No. G 00 7500741 from the U.S. Office of Education. The overall goals of the project are to determine representative costs of library services in areas of potential network support, evaluate the impact of network services upon librarian costs, and examine the economic issues and implications of networking. This document has been produced to fulfill the third goal; other WILCO documents address the other two goals.

B. Limitations on the Development of Library Economics

There has yet to be developed a complete economic theory of the library industry, which is regrettable from the points of view of both the economics and the library professions. From the Librarian's point of view,

it is regrettable because the lack of an economic theory specifically adapted to libraries inhibits the library administrator from the full use of what could be a valuable tool. From the economist's point of view, it is regrettable because libraries have to be among the most complicated and interesting phenomena of economic life: all of the complexities and subtleties of economic theory seem to converge and overwhelm attempts to come to grips with library problems. Moreover, the very aspects of economic theory which would seem most central to analysis of library-related problems are among the most underdeveloped: the economics of nonprofit and government agencies, subdivisions of large organizations, and cooperatives, as well as the economics of information and of social services. However well the standard economic models work elsewhere, they may not work at all for libraries, and new ones may need to be developed.

There are also unsolved problems in library network planning, for instance, in the nature of different types of hierarchical files: what types of information should be held regionally (e.g. holdings records), and what types nationally and locally? How can it best be arranged for a library in one region to have access to files of another region? How do you cope with the problem that a regional file may include entries from both a national data base and local ones?

In spite of the limitations of our abilities due to unanswered questions, we can still say some useful things. Standard economic theory has insights that can help us raise interesting and relevant questions, and some of the questions librarians may think are solely technical (such as those above on network planning) will turn out to have economic dimensions.

C. Definitions

For purposes of this paper, we give the following definitions. Some of them are taken from the document, Library Networking in the West: the Next Three Years, fifth draft, 22 September 1976, by the WILCO staff.

Automated bibliographic center (ABC). An organization offering computer-based support for technical and public service operations to a number of libraries. Examples include BALLOTS at Stanford University and and the computer operation portion of the Ohio College Library Center (OCLC) and the Washington Library Network (WLN). Commercial vendors of cataloging and on-line retrieval services can also be considered as ABC's. The Library of Congress (LC) may also act as an ABC in the near future in allowing access to its on-line files. Note that the same organization may have both ABC component and a service center component (e.g. WLN, OCLC).

These organizations have been called "utilities", but there are disadvantages to this term. Some people in the library profession object because of its connotations to librarians and others, and economists use the term in two ways not identical to its use here. Since all the organizations in this group provide automated services, and since ABC is an easily remembered acronym, we use it here. Other WILCO documents still use the term "utility", and we send this alternative term as a "trial balloon" with their blessing.

Automated services. The output of automated bibliographic centers. The market for automated services has ABC's as suppliers and service firms as demanders.

Brokered services. The output of service firms. The market for brokered services has service firms as suppliers and libraries as demanders.

Costs. Economists categorize costs under two broad headings: variable costs, which vary according to the quantity of output, and fixed costs, which do not. Fixed costs are those which during the time period under consideration are the same whether the firm produces anything or not. Examples would be rent for the building, perhaps payments on the equipment bought to produce the output, and any costs incurred in contracts extending throughout the period under consideration. Variable costs would include raw materials or other materials used in the production of each unit of output, such as seeds for a farmer, steel for an automobile manufacturer, or catalog cards for a librarian. To an economist, cost includes discounts, bonuses, and all other relevant considerations figured in.

It is not always easy to decide what costs are fixed and what are variable, even when the relevant period of time has been decided. How do we categorize research and development, new computers, buildings to house them, seed money for pilot projects, rental of telephone lines, or messages between two or more computers? They can be either, depending on how the categories are interpreted. The problem, however, is not trivial, because it is the variable costs which have the most direct effect on price, and the fixed costs pose a problem as to how they should be paid. Both these considerations are discussed in the section on who should pay for what.

Demand. Desire plus the ability to pay. Generally speaking, the higher the market price of a good or service, the smaller the quantity demanded.

Firm. An organization, which in our usage can be profit-making, non-profit, or government-operated.

A library which is part of a government or another organization, and the library component of an agency such as LC, will be considered here as an independent firm. The same is true for a service firm.

Grant. A one-way transfer of goods, services, or money by one person, firm, government, etc., to another.

Library technical support services. Activities performed by service firms to assist libraries in acquisition, cataloging, serial check-in, and book processing. For our purposes, we exclude administration (of the library as a whole), circulation, and interlibrary loan. Such services may be automated services or brokered services.

Market. An economic institution through which exchange takes place. In a modern economy using money, it usually consists of a demand side (people who want to buy a good or service and have the money to pay for it) and a supply side (people who are able to sell the good or service and will do so for money). Generally speaking, the higher the market price of a good or service, the more of it will be supplied and the less of it will be demanded, and there will be a price at which the quantity demanded and the quantity supplied will be equal. If the price were higher than that, the quantity supplied would exceed the quantity demanded, i.e. there would be a surplus, and the price would fall. If the price were lower than that, the opposite would occur (there would be a shortage) and the price would rise. (The market price properly includes discounts, bonuses, and all other considerations, not just the list price.)

We can think of the library technical support services industry as consisting of several markets. The market for automated services (Mkt. A in Fig. I-1) consists of ABC's as suppliers and service centers as demanders. The market for brokered service (Mkt. B in Fig. I-1) has service centers on the supply side and libraries on the demand side. There is also a market C, with LC supplying cataloging data to the ABC's. LC could deal directly with service centers and thus we could loosely say it enters Market A, since the service centers would now treat LC catalog data as a close substitute for the services of ABC's. The same is true if it deals directly with libraries; we would then say it enters Market B.

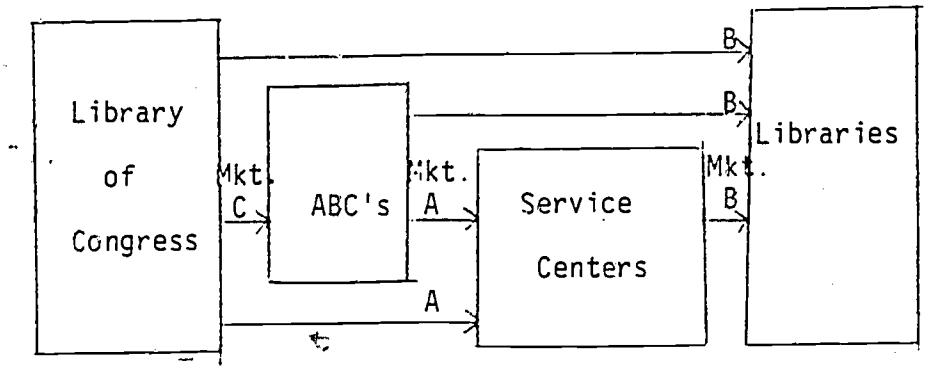

Fig. I-1.

Service center. An organization acting as a broker of computer-based services from one or more ABC's in a particular region or the operator of other bibliographic services such as maintaining a union file of location information or a photocopying center. Examples are: AMIGOS Bibliographic Council, Bibliographical Center for Research (BCR), the California State Library's Union Catalog (CSLUC), the Pacific Northwest Bibliographic Center (PNBC), and the service distribution portion of the Washington Library Network (WLN).

Service firm. An organization which supplies libraries with library technical support services, automated or not. A service firm may be either an automated bibliographic center or a service center.

Supply. Ability to produce a good, at a cost. Generally speaking, the higher the market price for a good, the larger the quantity supplied.

Vertically-integrated firm. A firm which combines two or more activities that otherwise would be separate, sequential in a production process, and traded through markets. For example, and ABC that acts as its own service center is a vertically-integrated firm; for our purposes, we can say that it sells automated services to itself and then turns around and sells brokered services to libraries. Whether a firm chooses to become vertically integrated depends on a lot of economic, political, and other factors.

II. THE MARKET FOR AUTOMATED SERVICES

What are the possbile ways that the market for automated services can develop? Presently there are several firms supplying automated services, with some differentiation of the good supplied: for example, WLN has a controlled authority file capability with the on-line data base, unlike OCLC or BALLOTS. (BALLOTS does not deal entirely through service centers, and WLN not at all; OCLC deals directly with libraries in Ohio and California. However, all three could deal through centers. Here we think of them as selling automated services to themselves in Market A and then turning around and selling brokered services in Market B. The fact that all three are to that extent vertically integrated does not affect the analysis.) There are also differences in the technological compatibility of the services with each other, but we have assumed that these are surmountable, for purposes of our discussion here.

An important question, then, is whether there is some reason to believe that there will continue to be several suppliers in Market A, or only one monopoly supplier of automated services. We examine each of these possible market structures in turn.

A. A Monopoly on Automated Services?

A monopoly exists when one firm can dominate the supply side of the market and become the sole supplier of the good or service being traded in that market. According to most, though not all, economists, there are at least two undesirable qualities about monopoly. The first is that it will generally be tempted to produce too little output and charge too high a price. The second is that a monopoly will have little incentive to innovate.

Most monopolies tend to be rather short-lived, if left to themselves; as other firms notice the higher profits earned by the monopoly in its market, they will try to enter it. Other firms can usually be expected to succeed in entering the market and destroying the monopolist's privileged position (though not necessarily the monopolist firm itself).

1. Is there a natural monopoly in automated services?

There is one type of monopoly which may not be short-lived, and that is the "natural" monopoly. A natural monopoly exists when one firm can produce a given output more cheaply than if it were produced by two or more firms. Therefore, the larger firms can charge a lower price than the smaller ones, and eventually the largest firm will grow large enough to take over the entire market. Natural monopolies are thought to exist in such industries as railroads and the telephone industry: it may pay to have one set of tracks between two cities, but not two, and it would be more expensive to run several phone lines to each house to hook up to several phone companies in a single area rather than to have just one. (It is difficult to gather accurate and unambiguous cost data in many cases, however, so economists differ over whether one or another industry really is a natural monopoly.) This is one of the reasons why such industries are regulated or even operated directly by the government (e.g. the U.S. Postal Service, even after the reorganization, which still left it an arm of the government rather than a privately-owned firm).

A firm providing several services could be a natural monopoly in one and not in another. For example, an ABC could be a natural monopoly in computerized data-base maintenance, but find that servicing of computer terminals may be less costly or of higher quality if left to service centers.

2. What happens to other types of monopolies?

There are several other ways in which a monopoly can try to establish or preserve its privileged position besides being lucky enough to be a natural monopoly. If the government can be persuaded to prohibit other firms from entering the market, the monopoly can become officially sanctioned and backed up by the power of the state. European countries used to grant monopoly status to trading companies in the New World and elsewhere, and the patent and copyright laws of today are a limited form of the same thing.

Other tactics can include driving out competition through "predatory" price-cutting: lowering your price even to below cost until your rival is forced to close its doors, then raising your price to the monopoly level. (Some economists deny this is economically rational, since the predator will suffer losses too, but again most economists probably believe it is possible.) Or asking customers to sign a contract promising to deal with only one firm. Or forming an agreement among all firms to limit output and divide the profits, thus causing all firms to behave as if they were a single firm. These practices are illegal for profit-making firms in the U.S.

Would it be possible for a nonprofit firm to engage in such practices? This is partly a legal question and partly an economic one, which depends on the particular model used to describe the behavior of nonprofit firms. It may be that nonprofit firms can find creative ways of forming monopolies that are not open to profit-making firms. Foundation grants might be a possible way: if the firm can convince a foundation to offer grants for the purchase of automated services, say, then the grant has the effect of a cut in price as far as the purchaser of automated services is concerned, and the firm will still receive the same price for the service. There is nothing in this procedure to help the firm become a monopoly, unless the grant specifies that it is to be used only for the services of one particular firm. Then the grant can have the effect of giving that firm the ability to gain monopoly power.

Another way would be for the firm that wishes to establish a monopoly to attempt to have its customers sign a contract that restricts it to purchase from only one supplier. Something which would have the same effect would be to sell the customer a set of items all of which are compatible with each other but none of them, bought singly, compatible with items sold by another firm. For instance, an ABC could design (or have designed for it) terminals which could communicate with its own computer but not with the computers of any of its competitors. This in itself would not have the effect of creating a monopoly, but it would make it more difficult for a customer to switch ABC's. Or the ABC (or service center, for that matter), could threaten that if a library withdraws from a contract, it cannot get at its own records stored at the service firm. This could make the cost of cancelling a contract astronomical.

3. What should be done about a monopoly in automated services?

The two types of monopoly are traditionally dealt with in two different ways. The natural monopolies are subject to government regulation of the prices they charge, the quantity of output they produce, or both. The other monopolies are prevented or broken up by government antitrust action. Of course, everything does not always work as planned, but in general that is the conventional wisdom.

Concerning regulation of the price and quantity of a monopoly, two points should be made. First, it is quite an empirical problem to determine just what the market price and quantity should be. Since the monopolist will likely have not done it, the government regulatory agency may find itself doing it, and in any case one would hope it would be at least rechecking the monopolist's figures. Second, an issue has come up in the general public recently that has also bothered economists. That is the political one of who controls the regulatory agency that controls the monopolist (or other industry). In some cases, it is beginning to appear as though the regulatee might be regulating the regulator as much as the other way around. It is necessary for the regulatory agency to exchange information with the firm, but it destroys the purpose of the regulatory agency for it to become so close to the industry that it fails to regulate in the "public interest" (defined here to mean setting the proper price-output combination rather than the monopolistic one).

Can the production of automated services be considered a natural monopoly? Will one ABC be able to take over the entire industry by producing a larger output at a lower cost? If so, should the automated-services market be regulated as are the telephone and railroad industries? If so, what agency should do the regulating? An existing one or a new one? Should it be operated directly by the government? Only research into the relation between cost and output of ABC's can answer the first two questions, and only informed political choice can provide an acceptable answer to the others. The questions, however, should be explored now, before vested interests make the problem more difficult.

B. Automated Services as an Oligopoly

If one firm does not dominate the market and create a monopoly, several large firms may end up with the bulk of the job of supplying services in the automated-services market. This is called oligopoly. Unfortunately, whereas in economics there are definite theories about behavior in monopolistic and perfectly-competitive markets, there is no single theory about behavior in oligopolistic markets. However, certain general statements can be made.

In oligopoly, nonprice competition comes into its own: product differentiation, advertising, attempts to negotiate exclusive contracts with customer, offers of rebates, introduction of new products, etc. The variations are endless, which is one of the barriers to a simple theory of oligopoly. One interesting question is whether there can be sufficient product differentiation in the automated-services market such that several

firms, rather than just one, will be able to survive. Among ABC's there is some product differentiation. OCLC provides a different range of services than either WLN or BALLOTS, and WLN is the only one with the capability for a completely controlled authority list. There is also a great deal of research and development done by all three of these ABC's, which is not inconsistent with the existence of oligopoly.

The dangers of oligopoly are not only that it will continue to exist with the same problem as monopoly of price that is too high and output too low, but also that it can turn into something else. A small number of firms can find it much easier to get together and form a cartel than can a large number of perfectly-competitive firms. As a cartel, they can jointly set prices, output, and even divide up the market on a territorial basis. These actions would make the oligopoly into one big monopoly or several smaller territorial monopolies, with all the problems of such. Cartels and their implications for networking (and vice versa) are discussed later.

C. Which Type of Market?

The automated-services market is likely to be either an oligopoly, as it appears to be now, or a monopoly. There are good and bad points about either one, and it is not clear at this time which one is more likely to develop. Two things, however, are clear enough. The first is that steps should be taken now by the members of the library community to prevent artificial barriers to competition which would tend to encourage cartels or unnatural monopoly. The second is that there needs to be research into the cost structures of the automated-services industry in an effort to determine whether a natural monopoly exists or whether the optimal size of an ABC is only large enough for one firm to take a part of the market. Since technological change can drastically affect market structure, this research would need to be ongoing. It is in the interests of the libraries as ultimate users of automated services that these activities be begun.

III. THE MARKET FOR BROKERED SERVICES

The market for brokered services (Market B, as we called it) has the libraries themselves on the demand side and the service centers on the supply side. We are sidestepping the question here of what exactly comprise brokered services, but all we need to know is that they will make access to the ABC's cheaper through the broker than directly from the library to the ABC; and may offer products and services tailored to their clientele in addition to the ABC facilities.

One question which might arise is in the area of economic dynamics: Libraries which are part of state or local governments typically operate on annual or biennial budgets. Does this make the market less able to respond quickly to changes in technology or other conditions? Also, contracting by government-related libraries may take longer and operate under more rigid rules (e.g. award to lowest bidder) than by private firms: does this make it more difficult for a library to get out of a contract it no longer wants or to switch from one supplier to another or from one type of service equipment to another and therefore make libraries more reluctant to enter into them in the first place? Could it also make it harder for a library to act in unison with others? There is another reason, too, why nonprofit and government agencies may be slower to respond to changes in environment than profit firms: they cannot go bankrupt. So how can they be made flexible enough to change their functions or even go out of existence when they have outlived their usefulness in their present form? This is always done, of course, but it is sometimes thought to be more difficult for nonprofit organizations.

Again there are questions of market structure. Can the service centers remain monopolies, each the exclusive seller of brokered services in its own geographic area? Will there be other firms competing with service centers to provide some of the services they provide? (Local chapters of professional associations also hold meetings and issue newsletters, for example, and it is theoretically possible for LC to maintain a single holdings file in one giant computerized National Union Catalog -- or, more likely, for the ABC's to perform that function.) And the ABC's themselves could simply begin acting as their own brokers, as OCLC does in Ohio and California. In any case, it is possible to have a monopoly in either the market for automated services or the market for brokered services, or both. However, a monopoly in the former would affect the latter directly, not only because the output and price of automated services would affect the output and price of brokered services, but also because a monopoly in automated services might be able to have a say in the creation of new service centers and therefore might be able to engineer directly a monopoly in the brokerage market.

There needs to be research in the cost structures of service centers in the same way as for ABC's, and in the relation of service centers to the ABC's on the one hand and the libraries on the other. In addition, library administrators would do well to look for ways to increase their flexibility and ability to respond quickly to changes in market situations.

IV. WHERE DOES LC FIT IN?

The Library of Congress is a very special case. It is at once a library, its own service center and its own ABC. It is also the supplier in Market C, the market for cataloging data for the ABC's.

In Market A, LC could become an ABC for others by agreeing to supply cataloging data, a close substitute for automated services, directly to the service centers, bypassing the existing ABC's. (Indeed, when LC stated that it would supply "networks" with cataloging data, it did not specify what it meant by a "network", so it could have meant service centers as well as ABC's.) That would put LC as a supplier of a close susbtitute for the product in Market A, i.e., LC would be in effect competing with ABC's. But the other ABC's depend on LC for cataloging data. Could LC affect the viability of the other ABC's in the market for automated services by refusing to sell, or limiting its sale of, catalog data to the other ABC's? Would it simply become less costly for service centers to deal directly with LC? Or do the other ABC's offer sufficiently differentiated services that service centers would find it useful to deal with both LC and another ABC? There are services which OCLC, BALLOTS, and WLN offer that LC could not reasonably be expected to provide.

In Market B the Library of Congress could perhaps compete directly with the service centers as a supplier of its own brokerage services to the libraries, if it were able to deal directly with all libraries in the country. This rather unlikely possibility could happen if LC were to decide to maintain a national location file, as mentioned before, which would include location information about all libraries in the country, and if libraries were able to search that file directly in the manner of the SDC and Lockheed data bases. It could also happen if LC data (MARC, Automated Process Information File, and the authority files) were open to on-line searching by other libraries, through their own computers or terminals. (The Research Libraries Group is not an example of this. It is a vertically-integrated firm, part ABC and part broker, which deals with several academic libraries.) The reason this is unlikely is that LC does not seem to have the personnel and equipment to deal with libraries directly, but service centers are willing and able to provide the services instead.

LC no doubt is greatly concerned with its role in a national network, and can be expected to take seriously the economic consequences of its actions as well as those of others in the network. One would suspect, then, that LC will wish to make its services as widely available as possible, and that it would insure that it does not unduly favor one firm or type of firm over another. This does not mean that LC should try to do everything for everybody, but that whatever it does for the network will be done for all participants on an equal basis. Because this goal is more difficult to follow than it might appear at first glance, LC should make it a point to monitor its activities in the network and their economic effects on a continuing basis.

V. THE EFFECTS OF NETWORKING PER SE

In addition to the economic problems connected with the mere existence of libraries, service centers, ABC's, etc., there are questions relating to how all these organizations might work together in an integrated network.

One question is: what are the consequences of cooperative arrangements among ABC's to share data? It is expected that there will be developed systems of telecommunication such that the ABC's will be able to transfer data from one computer to the other, even as they maintain their own internal procedures. Would this be enough to allow existing ABC's to form a cartel? A cartel is a group of suppliers who agree to band together to operate as if they were a single monopoly, producing at the monopoly output and price. They then act to divide the monopoly profits among them according to some agreed formula. Cartels do not have to be small or even consciously arranged; some economists claim that the American Medical Association is an example of a cartel. They are, however, unstable unless the government can be induced to enforce the cartel agreement, according to many economists. There are incentives to stay in the cartel, but there are also incentives on the part of each firm to cheat on the cartel. The cheating firm then gets the best of both worlds: a share of the profits of the cartel, and the income from selling a little bit extra to a buyer at a lower price than the cartel agreed to. This of course has to be done secretly, not only because the rest of the cartel would act to enforce their agreement if they found out, but also because the other buyers would then try to hold out for the lower price. However, if the government can "regulate" the industry in such a way as to limit the number of suppliers to those who can meet the "standards" set high enough to insure the monopoly output and price, or if the government can set the price at the monopoly price, or both, then the power of the law is added to enforce the cartel agreement. The problems in this regard resemble those of a regulated monopoly; indeed, a regulated cartel is the same thing, in effect.

Many of the organizations in the markets for library technical support services are themselves government agencies or nonprofit firms, and the Library of Congress may have a hand in setting the standards, for the data itself if not the transmission. Would that be enough to raise the danger of a legally-enforced cartel? Maybe and maybe not. LC, as the dominant supplier of cataloging data to the ABC's, and as a government agency in a position to set standards, could be in a position to enforce a cartel. If establishment of a standard language is enough to keep out potential competitors to the ABC's, and LC does not agree to supply "anyone" in the position of a potential competitor, as we said before, then the library community may find itself with an LC-backed cartel.

Just because suppliers trade with each other either goods or information does not in itself mean that there is a cartel. On the contrary, many firms trade with each other even though they are in competition, and arrangements could certainly be made among ABC's to trade data on a basis that avoids the dangers of cartels.

Another question relating to networking per se is the consequences of the possible hierarching of certain kinds of data on a regional basis. It has been suggested that certain types of information could be more profitably kept on a regionally hierarchical basis, with much-used location information kept at the regional level, other information of less-frequent use at the level of larger regions, and little-used information at the national level. In this case there could be a situation with territorial monopolies: each service center or ABC would be a monopoly in its own region, and say, LC a monopoly for information held at the national level. On the other hand this could occur only if the cost of maintaining a file in the central location plus the cost of telecommunication exceeded the cost of maintaining a number of possibly smaller files in many locations. If, for example, any ABC could store the holdings records for the entire country's libraries, and any new additions to the data base of one ABC were sold to the others, then they could all compete to provide the same holdings information to any library in the country. This, however, is a matter for research to determine empirically.

A further question concerns standardization. There may be some libraries willing and able to pay higher prices for higher-quality data (for instance, data in a data base with a controlled authority list), and some who would be willing and able to pay only lower prices for lower-quality data. Is the network flexible enough to accommodate both, or will standards be set so high as to exclude some of the latter group?

Librarians should encourage the free flow of information from one ABC to another while watching out for possible cartels. They should also act to insure that a network allows them to keep their options open: if it is cheaper to deal with an ABC close by for most services, they should also be able to call on another ABC farther away if the latter provides some unique service that the library can use. Service centers should not be prevented by law, contract, or tacit agreement from dealing with more than one ABC if they find it is in the interests of the libraries they service, and the same is true for libraries in relation to the service centers and ABC's. Librarians should also act to influence the ABC's to trade data while keeping a watchful eye out for possible cartels.

VI. WHO SHOULD PAY FOR WHAT?

We may now have reached the point in our discussion where we can say something about approaches to the problem of how the costs of providing library technical support services can be shared among the libraries, different levels of government, and the private foundations and corporations.

A. Equity and Efficiency

How should costs be shared? The question has to do with equity, in this case the ability to provide something we could call "equal access to information" by all libraries regardless of where they are in the country, and efficiency, that is, the ability to provide incentives to producers to provide the proper amount of their services in response to supply and demand.

The choice traditionally preferred by economists is a combination of grants and pricing. The government is called upon to redistribute income among demanders in such a way as to provide "equal access". This takes care of equity. The government is also called upon (under certain conditions) to underwrite the fixed costs of the program, because there is no economically reasonable way to apportion fixed costs among libraries. The market is then relied upon to set the price according to supply and demand. This takes care of efficiency.

For political or other reasons it may not be possible to implement this arrangement, so other types of systems can be devised. One alternative is price discrimination to cover all costs in a way that distributes the burden according to the wealth ("ability to pay") of the librararies.

Price discrimination occurs in such areas as telephone service (business rates vs. household rates) and movie theaters (discounts for students and senior citizens). However, it is usually thought that price discrimination can occur only under certain conditions. First, it often has to be done by a monopoly or a cartel; otherwise competition among suppliers would force the price to be the same for all customers, as the demanders who were charged higher prices shopped around for better bargains. The phone company is a regulated monopoly, of course, and the theater is usually a monopoly in a small area for that movie. Second, the demanders must have different responses to differences in prices; otherwise they would all end up being charged the same price by a discriminating monopolist or a non-discriminating monopolist. Third, they must be unable to resell the good they buy; otherwise the demanders charged the lower price could buy extras and resell them to the other demanders at a price higher than they paid but lower than the monopolist was trying to charge the other demanders. It is debatable whether either the market for automated services or the market for brokered services meets all of these conditions. On the other hand, it is at least theoretically possible that price discrimination by a regulated monopoly could achieve the same results as the grants-and-markets arrangement preferred by economists.

B. Problems

Within the area of grants and markets, there are several problems, not necessarily peculiar to the library industry, that nevertheless deserve special attention.

1. Data records

An interesting arrangement has been suggested by at least one of the ABC's. A library which enters a new bibliographic record into the data base in order to have it for its own use, as well as that of other libraries who wish to use it, gets a rebate if the record is "resold" or used by another library. This device is intended as a stimulus to libraries to input records of high quality. In other words, a library can pay for automated services in money or in kind. There is nothing unusual in this arrangement -- barter has existed longer than trade with money -- however, if an ABC using this procedure becomes a monopolist in the selling of automated services, it would thereby possibly become a monopsony in the purchase of computer input, and can therefore be in a position if it wished of purchasing too little of it at too low a price. Whereas a monopolist is a single seller, who sells too little at too high a price, a monopsonist is a single buyer who buys too little at too low a price. Some of the dangers of monopoly can also occur with monopsony.

Automated bibliographic centers also are beginning to consider trading data with each other. Of course, it may be quite a headache to determine the value of a single entry into a data base. It may simply be better to stick to some standardized pricing arrangement (such as treating all records as equal in value) than to try to be too exacting about it. More on the administration of pricing below.

2. Seed money, research and development....

Who is to pay for the pilot projects, special studies, and research and development related to networking of library technical support services? This question is asked in general by economists in relation to all such activities. The answers vary quite a bit more than in many other areas of economic analysis. It might be argued that all these activities are really the production of information, and therefore should be publicly funded; indeed, the federal government is a large provider of research and development money to the private sector, if not of the actual research itself in some cases. On the other hand, some economists argue that private industry does very well as far as innovation is concerned. As a matter of fact, monopolies are sometimes said to be quite good at producing new technologies, perhaps better than other types of market organization, because of their ability to accumulate large amounts of money. So it may be that this question is answered for library technical support services in the same way as for the rest of the economy: research and development is financed by all kinds of sources in all sectors. At this stage of the development of economics, there is not much more that can be said, except that, since most libraries or government bureaus, and most service centers and ABC's are either government bureaus or closely related to government bureaus (e.g., governed to some degree by agents of them), then most of the research and development should probably be paid for by the government. Since the

research and development would benefit the entire country, it should logically be the federal government that plays the major role.

3. Costs of administration of pricing policy

Sometimes firms are not able to charge prices for some goods according to the most elegant economic models because the cost of determining what that price should be turns out to be greater than the firm thinks it will gain by fine-tuning its pricing. Butter and napkins at a restaurant are served free even though they cost the restaurant money to provide them, and even though the more customers there are the more butter and napkins must be put out. Other times firms may price according to broad categories rather than try to set a different price for each individual case. The post office charges the same amount for a letter to Portland, Maine, as to Portland, Oregon, even though it costs them more to send it one place than to the other almost no matter where you mail it from. Likewise they charge by the ounce or fraction of an ounce rather than trying to break the weight of a package down any further than that. On the other hand, some things can be metered fairly closely: the telephone company knows how many calls you made this month, what numbers you called, and how long you talked. One ABC has decided to start charging for searching transactions, for example, rather than absorbing those costs in a single price structure. So pricing is not as easy as it looks sometimes to an academic economist, so the latter's elegant models may have to be modified before they can be of practical use to the library community.

4. Intergovernmental fiscal relations

To say that the government should finance one or another activity is not to say which government. There are many different layers of government and it makes a difference which one is asked to pick up the tab. This is quite a complex problem, and only two remarks will be made here. First, to the extent that the benefits of a particular activity are confined to one jurisdiction, it would seem reasonable for the government of that jurisdiction to pay for it and not a smaller or larger one. Union lists are now often kept by states or groups of states, and catalog information is generated by LC. Second, the idea of equity can apply every bit as much to the relation among governmental units as to the relation between a government and its citizens (or libraries, as we've discussed). That is, the federal government or a state government may make grants to local governments in an effort to equalize access to information from one local jurisdiction to another.

5. Implications for libraries

The library community should look seriously at the problems of pricing and grants in terms of their goals of efficiency and equity. A criterion of equity should be agreed upon, and the market allowed to establish efficiency, within the limits set by government policy designed to prevent improper monopolies or cartels. Research and development for the network as a whole should be a national responsibility, and for each ABC or service center should be the responsibility of that particular firm. The former can be funded directly from public funds and the latter through the market. The ABC's and service centers can be relied upon to price their products according to the best practices they can, with an eye toward the administrative costs involved in different pricing policies.

VII. CONCLUSION

Can we have a national network of libraries, service centers, automated bibliographic centers, and government agencies without getting monopolistic firms or restrictive government regulations and interventions along with it? Do we want to? The questions have certainly not been answered here, but hopefully they have been asked in a systematic way.

It would seem that high priority in research could be paid to two things. First, economists need to devote more effort to develop models that describe the economics of nonprofit organizations and government bureaus, and the economics of information and knowledge. In the meantime, all we can do is use the standard models that were developed for profit-making firms, and hope they have some bearing on the problems of other organizations. Second, there needs to be empirical research, using whatever models are available now where necessary, into the nature of the costs facing each of the different organizations in the network, and thus into the structure of the markets for automated services, brokered services, and cataloging data. Economists, librarians and others in a cooperative effort can turn a problem that economist Kenneth Boulding once half-seriously called "impossible" into one susceptible to careful analysis.

Librarians, as the ultimate users of library technical support services and the ones who turn them into the final product for the benefit of the public, can influence the activities of service centers and ABC's by switching from one to another if they are dissatisfied with service, bargaining with an ABC or service center to change the mix of services offered, and working with the government to encourage research and development, redistribution of funds for equal access, and regulation of the service firms if and when that appears necessary.

VIII. APPENDIX

A. Assumptions

The following description is taken from Library Networking in the West: the Next Three Years, fourth draft, 11 August 1976, by the WILCO staff. It summarizes the relevant aspects of the state of the library networking world that we assume to exist in the near future, and upon which our discussion is based.

"The activities undertaken by the various organizations involved in... library cooperation should lead to increased integration of the bibliographic data, computer [services], communication systems, regional distribution and service organizations, and library resources... . The computers of [ABC's]... will be in the course of being linked to allow on-line access to files and the transmission of needed records from one to another [and to and from LC]. [Libraries] will tend to select a particular [ABC] for the bulk of their bibliographic service[s]... . An economical telecommunications network meeting the communications needs for libraries will be in development. Access to the [ABC's] will be supported by state or multistate service centers...each of which will serve states and libraries in a pattern consistent with efficient and effective service, training, maintenance, etc. [Libraries] will probably contract with the service center for processing support from one particular [ABC]... . There may be a movement towards maintaining...bibliographic records in a national file to reduce the burden of storing and processing redundant records at each [ABC]. There will be a movement toward coordination (nationwide) of bibliographic record creation and coverage of unique and non-print resources... . Holdings records may be maintained at local...state...regional...or central...locations [depending on their purpose]." (pp.2-3)

"The number of minicomputers installed in libraries may double by 1979... . LC files may be accessible for on-line searching [by 1978-80]... . Libraries participating in on-line cataloging systems will be expected to assume the responsibility of inputting bibliographic records in full MARC format to the best of their ability. Some [ABC's] will have quality control procedures to assure record quality... . The [ABC's] will continue to find it desirable to encourage users to access the utilities via service centers... . Some service centers by 1978 will be planning for, or have, minicomputer systems for data concentration and message switching... . We assume that in addition to on-line files there will be value in having bibliographic and holdings information available in other forms, such as microfiche, and that terminals in libraries will tend to be multifunctional... . Telecommunication services commercially available will change greatly as new companies, services and rates appear... . A national library network will evolve as a result of [ABC], service center, state and regional planning, in conjunction with LC and NCLIS." (p. 16)

B. ACKNOWLEDGMENTS

These individuals have read earlier drafts of this paper and offered helpful suggestions, many of which were incorporated into this version. They share no responsibility with the author for any errors that remain.

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C. BIBLIOGRAPHIC NOTE

There does not seem to be a great deal written on the economics of libraries, let along library networks; that is one of the points of this paper. The following are samples of works in economics which may be of interest; it is by no means a complete nor even representative bibliography in the field.

For those totally unfamiliar with economics, a short introduction to microeconomics (the half of economics that most concerns libraries) is Robert Dorfman, Prices and Markets, (Englewood Cliffs, Prentice-Hall, 1971, paperback). The standard introductory text for college students for decades has been Nobel laureate Paul Samuelson's Economics (10th ed. New York, McGraw-Hill, 1976, 917 p.).

The economist whose name most quickly comes to mind when the subject of the economics of libraries is mentioned is William J. Baumol. He is known in the profession for his text Economic Theory and Operations Analysis (3rd ed. Englewood Cliffs, Prentice-Hall, 1972, 626 p.), which can be read after Dorfman or parts of Samuelson. His work in the library-related field includes Economics of Academic Libraries (Baumol and Matityahu Marcus, Prepared for the Council on Library Resources by Mathematica, Inc., American Council on Education, 1973,) and on the Economics of Library Operation (Final Report Submitted to National Advisory Committee on Libraries, June 30, 1967, Princeton, N.J., Mathematica ERIC document ED 022 525). His latest paper for the 1976 ASIS convention deals with production of scientific journals.

Kenneth Boulding takes a sweeping view of the economics of nonprofit activities, part of his concern with what is called "grants economics." His The Economy of Love and Fear; a Preface to Grants Economics (Belmont, California, Wadsworth Pub. Co., 1973) is a good overview, and his prose makes delightful reading.

One of the few other works overlapping in subject with this paper is Robert M. Hayes, The National Library Network, Its Economic Rationale and Funding (National Program for Libraries and Information Services Related Paper Number Nine. Washington, DC, NCLIS, December, 1974, 49 p. ERIC document ED 114 098). Written at the same level of technicality as this one, with a few formulae added and explained, its bolder and more decisive approach perhaps is a reflection of the author's long experience in the field. The present author's technical disagreements with standard economic models differ from those of Mr. Hayes, but the article is a valuable contribution worth looking at.