MANAGEMENT OF LIBRARY NETWORKS

Policy Analysis, Implementation, and Control

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Preface

As economic pressures and the availability of computer technology have led librarians to consider resource sharing, many library networks have emerged. The result has been a formal structuring of large groups of libraries, sometimes in excess of 1000, into organized entities. Managers of such networks are challenged by many issues. These issues are not simply larger versions of those that individual libraries face. For example, the structural complexity of many library networks easily far surpasses that of most individual libraries. Further, library networks often involve many types of libraries, including public, academic, special, and so on. Therefore, resolution of network management issues may require consideration of a much wider variety of goals and constraints than normally of concern to an individual library. For these reasons and others, traditional experience and intuition may be insufficient for successfully resolving policy issues in library networks.

The purpose of this book is to present a methodology for the analysis of library networks and to illustrate how this methodology has been applied in several case studies of actual networks. Our goal is to convince the reader that an organized method of analysis can prove useful for aiding library network designers and managers. The approach we have adopted involves integrating a wide variety of management concepts with various mathematical modeling techniques to produce an integrated methodology that has been found to be useful in providing insight into the technical and sociopolitical issues confronting library and information network managers.

This book was written for three types of readers. If one is interested in the complete mathematical development of the

methodology espoused in this book, then all chapters are essential reading. However, if one is only interested in the mathematical flavor of the methodology without the details, then chapters five through seven can be omitted. Finally, if one is only interested in discussions of the management issues within library networks and the results of our case studies, then chapters three through eight can be omitted. In trying to address several audiences, we purposely avoided the single-mindedness that the reader might have expected. This was a necessary compromise that we feel will be completely justified if it allows a wide variety of readers to understand the methods we are proposing.

The research on which this book is based was carried out over a five-year period (1974–1979) and supported by grants from the Illinois State Library, a portion of the funding for which was provided by the Illinois Program for Title 1 of the Federal Library Services and Construction Act. Many individuals within the State Library have been particularly supportive of our work, including especially William DeJohn as well as Kathryn Gesterfield, James Beasley, and Alphonse Trezza.

Several students at the University of Illinois have participated in this project. Mitchell P. Slate and Jong H. Kang wrote graduate theses on particular aspects of this research. J. MacGregor Smith contributed to one of the case studies and also significantly extended the methodology to illustrate analysis of individual libraries as networks. Kenneth D. Enstrom and Susan J. Pellegrino based term projects on particular topics within this work. Maureen Wolke and Mark Nudelman assisted in data entry.

During the later phases of this project, Carolyn G. Robins has participated as a research assistant. In addition to interpreting and entering data associated with various aspects of this research, she provided much of the editorial expertise in preparing this book.

We gratefully acknowledge the contributions of all those noted above as well as the many librarians who have participated in this research over the last five years.

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June 1980

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Chapter One

Introduction

The main purpose of this chapter is to describe the setting in which library networks have emerged. We discuss the significant factors that have encouraged the development of library networks, with special emphasis on economic and technological factors. Our consideration of different types of services will be restricted to a few examples of prototype networks. The interrelationship of services among various types of networks is emphasized rather than the identification of all existing networks. The management of large-scale networks will be addressed from the perspective of both operational complexity and sociopolitical-economic complexity.

MOTIVATION FOR LIBRARY NETWORKS

In recent years we have experienced an increase in the number and types of library resource sharing networks. Directories of library networks are evidence of the current growth rate of these services [Butler, 1975; Delanoy and

Cuadra, 1975; Martin, 1978]. One of the contributing factors to the recent growth in networks is the combination of inflation and tightening of budgets experienced by library directors in the 1970s. In addition, the use of complex computer services that require highly specialized staff, coupled with rising costs, has contributed to a decrease in efforts aimed at developing individual library automation programs. As the number of library networks as well as the number of services offered by networks increases, individual library directors are likely to recognize the need to identify criteria that can be used to measure the costs and benefits offered by resource sharing networks.

Undoubtedly, the single library network to have influenced the operation of the largest number of libraries is Ohio College Library Center (OCLC), the services of which are primarily oriented around cataloging, book label, and card production. While resource sharing networks appear to offer attractive per unit cost advantages, one survey found that most library directors have not attempted to measure the economic trade-off between costs and benefits before and after joining the OCLC shared-cataloging network [Markuson, 1976b]. Thus while persuasion in joining resource sharing activities often alludes to economic advantages and while librarians often agree about the benefits realized through OCLC participation, this major survey of OCLC network members indicates no significant trends with respect to individual library cost savings due to joining a resource sharing network. Markuson [1976a] discusses the growth experienced at OCLC during a three-year period and raises this question: How much and how quickly can a network expand and still hope to offer the enticement of decreasing the rate in rise of per unit costs? While this book offers no simple answers regarding the "best" network, our

methodology will enhance the judgment of library decision makers in evaluating networking alternatives. Continued discussion of the economic issues related to network services appears in Chapter Two.

In addition to economic factors that have motivated the emergence of library networks, there also exist factors related to new technology. Application of computer technology and micrographics to library services have, for example, encouraged shared cataloging services and large-scale distribution of microfilmed book catalogs. Turnkey circulation control systems are available commercially from CL Systems, Inc. (CLSI) and Gaylord, for example. BRODART has recently offered IROS, an acquisitions system that can communicate with CLSI [IROS, 1977]. The interconnection of these automated circulation systems offers location and availability information among libraries and thus expands the total volumes potentially available for all library patrons.

Librarians are also beginning to reassess criteria for measuring library services. The emphasis on storing the largest number of volumes is becoming a value associated with a previous era. Economic factors, together with a more accessible technology for library services, have encouraged librarians to focus their efforts more directly on the patron rather than the holdings of the library per se.

There are also professional reasons for the emergence and growth of library networks. Librarians, like other professionals, are judged by peer review. This review process requires some outward manifestation of professional achievement that may or may not reflect substantial contribution to one's field, but are nevertheless the criteria commonly agreed on [Thompson, 1967]. Among the many possible yardsticks used to measure the professional "worth" of librarians, one might include experience with the latest developments in computer applica-

tions and network management. Thus one reason for the emergence of library networks may be the library profession's endorsement of such activities. While we certainly do not want to overemphasize such sociopolitical phenomena, they nevertheless should be recognized as an active force in the library networking domain.

TYPES OF LIBRARY NETWORK SERVICES

In defining library networks, particularly in chapters two and four, we emphasize the functional characteristics of resource sharing networks rather than focus on the different types of services offered by particular networks. In the context of this book, our discussion of resource sharing networks is limited to consideration of networks of libraries and information centers. However, we do want to note that the concept of resource sharing networks is not restricted to the library field. Thus library networks, like transportation networks, for example, refer to a particular type of resource sharing network.

For background we briefly define library networks from a functional perspective and describe the range of services currently available. Definitions of library networks and cooperative activities usually emphasize different levels of cooperation among libraries [Markuson, 1976a]. Butler suggests that a library network must include the use of some form of telecommunications [Butler, 1975]. The National Commission on Libraries and Information Science (NCLIS) offers this definition of a library network, which covers a broad range of services, organization types, and modes of communication:

"Two or more libraries and/or other organizations engaged in a common pattern of information exchange, through communications, for some functional purpose. A

network usually consists of a formal arrangement whereby materials, information, and services provided by a variety of libraries and/or other organizations are made available to all potential users. (Libraries may be in different jurisdictions but agree to serve one another on the same basis as each serves its own constituents. Computers and telecommunications may be among the tools used for facilitating communication among them.)" [NCLIS, 1975, pp. 82–83].

The functional definition of networks emphasized in this book focuses on the "pattern of information exchange" just mentioned. We describe resource sharing networks in terms of requesting libraries, resource libraries, and routes of communication linking particular libraries.* The Library of Congress has adopted a similar dichotomy of functions existing in a library network, namely, the bibliographic utility and service centers [Avram and Marayuma, 1977]. The main distinction between these two functions is based on the product orientation of the bibliographic utility and the broker or distributor orientation of the service center. Service centers function as the access points that provide products and services obtained directly or derived from the bibliographic utilities. In addition to accessing the bibliographic utilities, service centers may also provide input data to the storage and retrieval facilities of the bibliographic utilities. Thus some requesting libraries can function as resource libraries in the same network. In Chapter Two we discuss network structures in more detail, focusing on alternative structures, and in Chapter Four we provide a formal description of networks.

*Throughout this book we generically refer to "requesting libraries" as those libraries seeking services from other libraries. We refer to "resource libraries" as those providing services to requesting libraries. It is possible that the same library may function as both a requesting library and a resource library.

Within the broad area of information retrieval, the different types of service available through resource sharing networks reveal the important impact of applications of computer technology. The range of services provided by many resource sharing networks includes storage and retrieval of data such as factual, physical, and bibliographic data; document ordering and delivery services; general computer services (e.g., ARPANET); and support of group communication and decision making (e.g., the Electronic Information Exchange System, EIES [Turoff and Hiltz, 1977]).

The most widely used library networks can be described by four types of service:

1. Shared cataloging.
2. On-line reference.
3. Shared circulation.
4. Interlibrary loan.

Shared cataloging networks are perhaps the most fully appreciated of computer applications to library services. One of the anticipated advantages offered to OCLC members is that library directors will be in a position to improve and expand public services because of a decreasing percentage of the budget required to support technical services [Axford, 1977]. BALLOTS, the West Coast competitor of OCLC, is primarily a shared cataloging network with slightly different features [Project BALLOTS, 1975]. The Washington Library Network (WLN), geographically restricted to the state of Washington, is a growing network of multiple library services, including shared cataloging and interlibrary loan [Reed, 1975]. The Research Libraries Information Network (RLIN) represents a relatively recent network merging the Research Libraries Group (RLG) and BALLOTS, which was chosen for the technical