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ABSTRACT

This paper describes an alternative to current information dissemination systems (letter journals), computerized information systems, and clearinghouse operations) that would establish a network of depositories at universities and research organizations. The essence of the approach is to provide convenient access to working papers and technical reports on a basis that could be self-supporting for the sponsoring institutions and remunerative for the authors. The paper describes the technical procedures of the plan and proposes a pilot project that would implement the plan on a small scale to a selected group of graduate schools of business. The proposal includes organizational considerations, dissemination networks, and financial analysis. It is hoped that the possibilities for the pilot implementation can be explored further. (CH)

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A PLAN FOR A PUBLICATION NETWORK FOR RAPID DISSEMINATION OF TECHNICAL INFORMATION

James MacLachlan

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1. Introduction

In this age of ever more rapidly changing technologies, technical information is of ephemeral value. It is perishable, its value decaying quickly with time. Because of this, new approaches have been devised that attempt to rush information to its audience before the utility is lost. These approaches can be subsumed under three rubrics:

Letter Journals: These publish new material quickly in brief form, giving originators an opportunity to advance their ideas and claim credit for them. The role of these journals is to disseminate information promptly, not to certify it; hence their contents are not refereed as they are in formal journals.[1] Partly because of the refereeing process, formal journals are often slow to publish; a time lag of two years is common. In contrast, letter journals normally publish within four months.

Computerized Information Systems: These systems provide rapid access to selected information in a computer data bank. An example is the MEDLINE system which provides immediate retrieval of medical information via time-sharing computer terminals.

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[1] Perhaps an additional category should be used to classify those "letter journals" that specialize in publication of lengthy abstracts which are in themselves substantial enough to satisfy many readers. The experience of the American Psychological Association in publishing 1800-word brief articles in the *Proceedings* of its annual convention shows that users are well satisfied with an abbreviated version. They find within the two 8-1/2 × 11 inch typeset pages most of the facts that they want to know. Equally important, authors often accept the 1800-word article as a (provisionally) final statement of their research; and fewer of them seek to publish a longer version elsewhere than was true before the *Proceedings* format was introduced.

Clearinghouse Operations: These systems utilize a central clearinghouse which acquires titles of interest to a special audience. The titles are available from the clearinghouse by mail. A well-known example is the Educational Resources Information Center (ERIC) which publishes over 10,000 new titles per year. To advertise these, ERIC publishes a monthly listing of new titles accompanied by brief abstracts. ERIC, like most clearinghouses, specializes in "fugitive" literature such as project reports, technical reports, and working papers.

To date, these systems have not been widely accepted. The computerized systems are very expensive. The clearinghouse systems, almost without exception, have seen little use and required heavy subsidies from the sponsoring organization. ERIC, for example, although it prices its documents reasonably high,[2] has required a federal subsidy in the vicinity of four million dollars annually. This represents 3/4ths of the ERIC budget. The under-utilization of clearinghouses appears to be due to three factors: lack of knowledge of their existence by potential users; cumbersome and inconvenient procedures required of the users; and the time delay, which is often a month or more while orders are being filled or in the mails.[3]

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[2] ERIC charges $3.29 for hard copy documents of up to 100 pages, $6.58 for documents between 100 and 200 pages, and $3.29 for each additional increment of 100 or fewer pages. Microfiche of any length document are available at 65 cents.

[3] William Paisley, Stanford University: "Improving a Field-Based 'Eric-Like' Information System," Journal of the American Society for Information Science, November-December 1971, Vol. 22, #6, pp. 399-408.

Seeking to overcome some of the disadvantages, Professor F. E. Balderston of Berkeley has proposed a new approach.[4] The design has the potential of providing very convenient access to working papers and technical reports on a basis that could be self-supporting for the sponsoring institutions and remunerative for the authors.

The plan would establish a network of depositories at universities and research organizations where working papers, technical reports, and other materials would be available quickly to the local user who would pay a small price per page. Where the depository should be located at each institution would depend on its own circumstances--whether as part of the library, or the college bookstore, or a separate non-profit organization, or (by contract) operated by a commercial bookstore or other organization.

The author or originating sponsor would pay for the initial publication run at the local depository's standard price per page for the number of copies necessary, plus the mailing costs to his mailing list and to the other depositories in the network.

Each depository receiving its few copies of the working paper would then be able to service local demand for it. It would meet the first four requests from stock, keeping one copy as a master, and would then reproduce, in a run whose size it would judge by the probable amount and timing of demand for the paper, copies to meet additional demand.

The author would also be required to provide, on a standard format, an identifying card for the working paper containing the following:

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[4] F. E. Balderston, "A Plan for Scientific Publications Network, Inc. (SPN)," unpublished draft, November 4, 1971, University of California, Berkeley.

1) Author, affiliation and address (including organized research unit, if any)

2) Title of paper

3) Abstract of paper (50 to 150 words)

4) Date of publication.

The depository, with the author's permission, would add to the file card a sequence number for the working paper.

Any institution or individual could pay a standard fee to subscribe to the identifying cards of all papers in the network, or cards of papers within specified disciplines. Such subscriptions would be by fee, monthly or annually, to the nearest local depository. Institutional libraries, in particular, would probably enlist as subscribers.

A working paper or report put into the network by an author or sponsored by his research unit or program would be his sole responsibility as to both content and manuscript preparation in the standard format. In this sense, the author would have more freedom, and the reader would have more risk, than is the case with formal journal publication.

Offset Printing and Xerox

Given the present state-of-the-art in reproduction technology, it would be advantageous in most systems to have the initial pressrun accomplished by offset printing, with the work being contracted out by the depositories to their campus printing department or a commercial printer.[5] The depositories would then mail an appropriate number of

[5]Two major developments have taken place in the Graphic Arts during the past decade: the perfection of electrostatic copy machines, and the development of short-run offset equipment that is economical and simple

copies to each other depository in the network. These depositories would service demand from this stock, except that they would retain one copy and make Xerox reproductions from it if the other copies are sold.

Micro-fiche

The plan would lend itself equally well to micro-fiche reproduction and dissemination. The standard micro-fiche is a piece of film measuring about four by six inches and accommodating up to 98 pages at the standard 1:24 reduction ratio. These fiche are viewed in micro-fiche viewers which are available in a wide range of styles and prices (from $100 up), or pages from the fiche can be reproduced as hard copy. Some viewers can make photocopies of micro-fiche pages at the touch of a button, and for larger volume reproduction from micro-fiche, the Xerox Microprinter is available;[6] that machine delivers quality Xerox prints from micro-fiche or micro-film. Micro-fiche would be the cheapest form in which

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to operate. Xeroxed copies cost two cents per page when a 3600 is leased and used productively about four hours per day (calculated from Xerox 1972 State and Local Government Price List, pages 20, 21; costs of lease (including sorter and 40 bins), maintenance by Xerox, paper, toner, and developer are included in the calculation, and an allowance is made for labor and overhead). Short run offset printing costs in the vicinity of one cent per page for 8-1/2 × 11 inch sheets. Results from both processes are excellent when the original is typed on a carbon ribbon IBM typewriter.

[6]The Xerox Microprinter rents at a minimum rate of $160 per month. The cost per incremental copy from 3,501 copies per month and up is about 3.5 cents. The microprinter is available in two models, one of which makes positive copies from positive micro-films, the other makes positive copies from negative film. The first model can also be used as a standard Xerox copier. Speed of the micro-printer is seven copies per minute as compared with about 20 per minute for a 3600 Xerox. Quality of the work from the Micro-printer is good, but this system is slower and more costly than the 3600. Data from 1972 Xerox State and Local Government Price List, pp. 28, 29.

working papers could be reproduced and distributed, but surveys have shown that most users prefer to work from hard copy rather than micro-fiche.[7] A major problem is the poor quality of micro-fiche reading devices--they leave much to be desired in terms of constant focus across the transport, are often hot and noisy, their screens are not very bright, simultaneous viewing of two pages is impossible, and page-frame locations are not easy to address. It would be possible for depositories to offer their patrons the choice of micro-fiche at a reduced price, or hard copy.[8] However, given the present state-of-the-art, creating hard copy from micro-fiche is expensive and quality is a problem with most of the equipment on the market.[9]

As technology improves, micro-fiche will become a more attractive alternative to more conventional reproduction techniques, but at present we would expect most systems using this proposal to operate with offset printing and Xerox. They could, of course, convert to other technologies

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[7] Donald C. Holmes, "Determination of User Needs and Future Requirements for a Systems Approach to Microform Technology." Published by ERIC, October 1969.

[8] ERIC follows this policy, charging 65 cents for any single document in micro-fiche form, vs. $3.29 per 100 pages for hard copy. ERIC charges $3.29 for hard copy documents of up to 100 pages, and $3.29 for each additional increment of 100 or fewer pages. Thus, for example, a 125 or 160 page document would cost $6.58 in hard copy, but only 65 cents in micro-fiche. ERIC will also service monthly standing orders for all new documents at a charge of 8.9 cents per micro-fiche, and 510 institutions, mainly universities, now subscribe to ERIC on that basis.

[9] Desk top reader-printers that use photo sensitive paper produce prints that tend to curl, have a chemical feel to their surface, and may have poor permanancy. Xerox prints, however, are made on untreated bond paper and are of good quality--comparable to other types of Xerox prints. Xerox is now designing a new micro-fiche printer which will automatically scan the fiche to produce a desired number of hard copies in collated form.

at a later date. The appendix of this paper presents up-to-date information regarding micro-fiche technology and its costs, so that an administrator can consider the cost effectiveness of this alternative for his particular application.

Computerized Literature Searches

Another example of advanced technology which would be compatible with this proposed system is the use of computers to search a data base consisting of abstracts, titles, or "enriched titles" from the literature. To initiate a computerized search, the user specifies the key words that describe his interests, and the computer then searches its data base to produce a bibliography. Generally, these systems use a thesaurus of standardized words (the "authority list"), and the user selects appropriate descriptors from the thesaurus and enters them into the computer in the form of various conditional statements using Boolean logical operators (...AND, NOT, OR...). The computer scans each entry in the data base for key words, and those that contain key words in a specified form will be selected for listing in the bibliography. The conditional statements used to enter the key words into the computer are usually quite complex, and take the form "IF junior high AND science (AND student teaching OR visual aids) AND laboratory experiments." Such a statement would elicit a listing of literature on the use of student teaching and/or visual aids for developing laboratory experiments in junior high science classes. Usually, several such conditional statements are used and they may be chained.

Computerized searches could be used to develop a bibliography of appropriate working papers, if it were decided to develop such a data base as part of a publication network. It would be reasonable to

introduce a new publication network with its data base in the form of conventional library cards to be indexed and searched in the traditional manual way. Then, as the system grows, embracing more documents and serving a larger community of users, a computerized data base could be added to the system; and then users could reference documents either manually or by means of computerized search.

The type of computerized literature search described here is used to reference documents listed in the ERIC Master Data Base, a set of 14 computer tapes containing report resumés of journal articles; and thesaurus entries, descriptor postings, and identifier postings for report literature announced in "Research in Education" from 1966 to the present (about 60,000 reports). The tapes can be purchased by an institution for $1020, and are now available on a number of university campuses. Allan J. Humphrey of the Institute of Library Research at the University of California, Berkeley, is now conducting a survey of the active users of the ERIC computerized data base. Reporting on the preliminary results of his survey,[10] he found that where the ERIC Data Base is located on a college campus, 90 percent of the inquiries are generated by students in the department of education seeking thesis topics, 8 percent by faculty, and about 2 percent of the usage is accounted for by practitioners in the field. One reason for the low usage by practitioners appears to be their lack of awareness of ERIC. According to Paisley, "Even knowledge of ERIC's existence declines abruptly as we move from 'cosmopolite' researchers and professors to 'localite' administrators and teachers."[11] Additionally,

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[10] Colloquium presented by Allan J. Humphrey at the Institute of Library Research, Berkeley, on the topic "Survey of Active Users of the ERIC Data Base." February 21, 1973.

[11] William Paisley, op. cit.

practitioners lack knowledge of the specialized procedure required to address the computer. The experience with ERIC Data Base has been that proper development of the conditional statements is vital, otherwise searches will yield too many (sometimes thousands) of bibliographic entries, or too few. Hence the assistance of a specially qualified librarian is almost a necessity for most users.[12]

In a few installations, the ERIC Data Base can be searched on line by command from remote terminals located in the university library. This offers excellent speed and convenience to the user, and such systems may become common in the future as costs of computing continue to drop.

2. Organizational Considerations in a Prototype Publication Network

Many different organizational configurations could be considered when designing a network. Presented here is an example of one configuration that appears to be efficient and implementable.

Level of Royalties

The author, or sponsoring research institute, is expected to pay the costs of the initial printing and distribution of the paper, and then will receive a royalty for each copy sold. Presumably, works by the better known authors will sell faster--hence they will be more handsomely rewarded in monetary terms. The lesser known authors, however, gain the advantage of exposure--and for them that may be more important than money. Thus, it appears that the system offers an appropriate motivator to both groups. It should be borne in mind that at many institutions the

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[12] Another example of an organization which offers computerized literature searching is University Microfilms' DATRIX Division. Their data base contains indexing information for the 200,000 doctoral dissertations published by University Microfilms. The firm supplies a keyword list to the customer, and the customer submits a descriptive summary of his research goal couched in those keywords.

publication of working papers is now subsidized. At such institutions, the proposal of a system whereby the author pays initial costs may not be enthusiastically received by certain authors. However, if their work is of meri. .d interest, they will be rewarded in time through royalties. The institution will immediately benefit by being relieved of costs and responsibilities that amount to a sizeable burden. Many of these are hidden costs.

Copyright

The depository would obtain a copyright for each paper entered into the system. This would offer some legal protection against wholesale, unauthorized reproduction of the papers, though violations would be difficult to detect and hard to prosecute. If the author wished to obtain the copyright in his own name, he could do so by paying the depository a fee (University Microfilms charges $15 for obtaining a copyright in the author's name).[13]

Quality Control

The primary goal of the network concept is to rapidly disseminate information, and no provision is made to monitor the quality and accuracy of the material published. However, since authors must pay the initial cost of publishing their papers, they will be motivated to submit only work which they believe represents a worthwhile contribution to knowledge (otherwise the paper could not be expected to sell enough copies to recover its costs). In addition, it will always be possible for other authors to publish critiques of papers in the system. If further quality control is needed, this might be accomplished by requiring that all contributors have credentials that would establish their expertise.

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[13]University Microfilms' DATRIX division publishes in the vicinity of 30,000 doctoral dissertations annually.

Advertising and Promotion

The time required for the network to gain acceptance can be accelerated by advertising and publicity. Examples would be advertising in professional journals and school publications, news releases to the press, and speakers at conferences. In addition, the depository might wish to distribute obsolete reports free of charge when the files are purged. This could help build visibility for the system. In the early years of the system, depositories should budget a reasonable sum for advertising and promotion. The exact amount would depend in part on the target audience, and how easily that audience can be informed of the depository's services.

Proposal for a Pilot Project

We are proposing, for a pilot project, a special purpose system directed to a specific group of users. It would also be possible to create a more general purpose network, and within that network there could be niches for special groups. These groups could subscribe to the cards listing documents of interest in their particular fields. The project proposed here could be later enlarged to service additional special groups. This is a user-oriented system with the design centering on meeting user needs in a manner that will be convenient and useful.

The balance of this paper will examine one promising potential implementation of this approach. Through the use of a computer program, we simulated a number of possible network configurations. The specific plan presented on the following pages was chosen because it has these advantages:

1. A low level of sales could maintain the network at a modestly profitable level.

2. The network will function satisfactorily with a limited number of participants. The figures presented assume an eight-depository network. Increasing the network size would improve results for both author and institutions; but for purposes of easy implementation, a small network is more viable and could serve as a model for applications of larger scope.
3. Prices to the users have been kept as reasonable as possible ($1.75 for the typical report) but are sufficient to make the system completely self-supporting at a modest level of sales.
4. A definite need appears to exist which can be met effectively and efficiently by the proposed network. Institutions are publishing and distributing technical reports in this field--but their efforts lack coordination and few potential readers know of the existence of this material.

3. Proposal for a Network to Disseminate Research Reports and Working Papers from Graduate Schools of Business

There are now at least 557 universities and colleges in the United States which offer graduate and/or undergraduate degrees in the field of business administration. These institutions awarded 89,607 undergraduate degrees in business during the school year 1971-72, plus 3,571 M.A.'s, 22,090 M.B.A.'s, 207 D.B.A.'s, and 620 Ph.D.'s. 142 of these institutions operate bureaus of business research. 81 institutions granted 100 or more graduate degrees in business during the 1971-72 academic year.[14]

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[14] Twenty-Third Biennial Survey of Universities Offering an Organized Curriculum in Commerce and Business Administration, November 1972. Delta Sigma Pi. Available from Delta Sigma Pi, 330 South Campus Avenue, Oxford, Ohio 45056.

Our proposal would begin by linking eight of these institutions through a network; thus, technical reports and working papers from eight campuses would be available at a depository on each of these campuses. It would be possible for the network to grow from that point; hopefully, more institutions would want to join and this would result in greater profitability for both authors and institutions. It is important to note that even on a very small scale, with eight institutions participating, the depositories can make a contribution to university overhead and "profit" and be modestly remunerative to the authors.

In order to learn what is being done at present by leading business schools to disseminate their research, we wrote to the deans of 18 schools. Nine responded to the questionnaire, and eight of those have made arrangements for their own printing and distribution of working papers and technical reports. The results are tabulated on the following page. When we use the term "report" in the tabulation, we refer to all working papers and project reports produced by all of the business school departments as well as closely associated bureaus and organized research units.

The 18 schools solicited represent only a fraction of those who might participate in the proposed network. Beginning on page 15, we list 81 institutions which granted 100 or more graduate degrees in business during the 1971-72 academic year.

4. Financial Analysis of Network of Eight Depositories for Publishing Reports at Graduate Schools of Business

This network will accommodate the type of reports now being distributed on a decentralized basis by universities such as those listed in the tabulation on page 14.

RESULTS FROM QUESTIONNAIRE REGARDING PRODUCTION AND DISSEMINATION OF REPORTS

Institution	Avg. Length of Report in Pages	Avg. # Copies Printed	New Report Titles Per Year	% Sent Off-Campus	Annual Recorded Costs	Annual Hidden Costs	Report Titles in Inventory	# Copies Distributed Per Year	Charge to Users	Printing Cost for Reports
University Of Michigan School of Business	25	50	25	7%	$ 660	$ 2,500	63 not advertised	1,250	0%	$ 55
Harvard Graduate School of Business	25	50	28	50%	$1,330	$ 800	Distributed by authors, not advertised.	1,400	0%	$290
Stanford Graduate School of Business	25	100	50	?	?	?	97 Research 12 Tech Reports	2,500	$1 to 8, Covers variable costs	?
UCLA Business School	30	125	10	?	$10,000	$ 2,000	25, not advertised	1,000	0%	$225
Columbia Graduate School of Business	21.4	100-200	105, but this includes business case studies	mostly used on campus	?	?	75, not advertised	?	0%	$75
University of Texas at Austin, Bureau of Business Research	50 pp.	125	75	20%	$ 4,500	?	75, an index is sent to mailing list at end of yr.	?	?	$ 50 $ 90
Purdue Univ. School of Industrial M.	35	350	60	95%	$ 7,500	$10,000	370 adv.by automatic & special mailings	9,000	0%	$ 100
U. of Ill. at Urbana - School of Business	25	150	40	25%	$1,100	?	?, small mailing list used to advertise	?	0%	$ 40

* The printing and binding cost for 200 copies of a 50 page report.

Graduate Schools of Business Which Conferred 100 or More Advanced Degrees During the Academic Year 1971-72[15]

School	MA	MBA	DBA	PhD
Adelphi U.		140		
Alabama, U. of	49	67		21
American U.	10	166		11
Arizona State U.	20	162	8	
Arizona, U. of	18	86		6
Arkansas, U. of	10	80		32
Babson		115		
Bernard Baruch		305		
Boston		101		
Boston U.	39	199		
California State U., Longbeach	39	164		
California, U. of, Berkeley	6	249		17
California, U. of, Los Angeles		380		30
Carnegie-Mellon U.[16]		60		11
Case Western Reserve U.	20	103		
Central Michigan U.		111		
Chicago, U. of		613		15
Cincinnati, U. of		107		5
Colorado, U. of, Boulder	23	259	30	
Columbia U.		650		15

[15]Delta Sigma Pi, op cit.

[16]Although Carnegie-Mellon did not confer 100 degrees, it has been included because it is famous for the quality of its research and the excellence of its graduates.

Major Graduate Schools of Business, continued

School	MA	MBA	DBA	PhD
Connecticut, U. of		166		
Cornell U.	17	123		5
C. W. Post	10	121		
Dallas, U. of	34	76		
Dartmouth		130		
Dayton, U. of		131		
Denver, U. of	22	78		
DePaul U.	23	182		
Detroit, U. of	10	146		
Drexel U.		180		
Duquesne U.	19	123		
Florida State U., Tallahassee		117	5	
Fordham U.		245		
Georgia State U., Atlanta	75	357	11	18
Georgia, U. of, Athens	17	90		3
Golden Gate		279		
Harvard U.		748	49	
Illinois, U. of	94	53		46
Indiana U.		320	30	
Iowa, U. of	21	82		6
Kansas, U. of, Lawrence	42	77		2
Loyola		370		
Massachusetts Inst. of Tech.	112			7
Memphis State U.	65	35		
Michigan State U., East Lansing	39	484	2	26

Major Graduate Schools of Business, continued

School	MA	MBA	DBA	PhD
Michigan, U. of, Ann Arbor	7	342		13
Minnesota, U. of, Minneapolis	53	77		9
Missouri, U. of	220	205	12	18
Nebraska, U. of, Lincoln	63	47		4
North Carolina, U. of		91		14
Northeastern U.	42	180		
Northern Illinois U., DeKalb	31	185		
Northwestern U.		439		20
Ohio State U., Columbus	10	203		34
Oregon, U. of, Eugene		100	7	7
Pace	32	86		
Pennsylvania State U., Univ. Park	12	118		13
Pennsylvania, U. of, Philadelphia	62	426		
Pittsburgh, U. of		215		1
Purdue U.	189			27
Rochester, U. of	34	123		4
Rutgers U.		205		
St. John's U., Jamaica, N.Y.		250		
St. Louis U.		120		10
Santa Clara, U. of		181		4
Scranton, U. of	198	45		
Seton Hall U.		125		
Southern California, U. of, L.A.	48	512	12	
Southern Methodist U.		135		
Stanford U.		278		12

Major Graduate Schools of Business, continued

School	MA	MBA	DBA	PhD
Suffolk U., Boston		154		
Syracuse U.	18	187		5
Temple U.		184		2
Texas, U. of, Austin	19	163		19
Tulane U., New Orleans		111		
Virginia, U. of, Charlottesville		119	1	
Washington, U. of, Seattle		312		
Wayne State U., Detroit		312		
Western Michigan U., Kalamazoo	7	161		
William and Mary, College of		102		
Wisconsin, U. of	52	179		10
Xavier U.	3	290		
Totals from these 82 institutions	1,925	15,792	167	502
Graduates from 475 other institutions	1,646	6,298	40	118
Grand total	3,571	22,090	207	620
Percentage of total that were graduates of the 82 leading institutions . . .	54%	71%	81%	81%

The following pages present Pro Forma Financial Statements for the author of a typical report, who would pay initially for the publication as per the plan, and then receive payments as his work is sold. The author would be expected to present an error-free, typewritten manuscript on 8-1/2 x 11 inch paper to the depository on his campus, and they will contract with a printer for the reproduction. The depository will also arrange for the printing of the catalog cards. For this example, we assume that the policy will be to distribute five printed copies of the report, along with 50 cards, to each of the eight depositories in the network.

It is difficult to forecast the sales level for these reports. The assumption made in these calculations is that a typical report will be sold 15 times at each depository, and this would represent sales of 120 reports. The break-even point for an author is 100 reports, and each report beyond that number yields him 37.5¢ at the proposed royalty of 1.5¢ per page. At the proposed charge of 7¢ per page to purchasers of reports, the typical 25-page report will cost $1.75. This is less than the $3.29 minimum charge for an ERIC report (see footnote 2 on page 2 for ERIC pricing policy).

Figures in the tabulation on page 14 lead us to suppose that the typical report will have about 25 pages, and that each participating institution will generate 40 new report titles per year. These assumptions are incorporated in the calculations.

A further assumption is that an average of 25 subscriptions for cards will be handled by each depository at a charge of 50 cents per month, for which subscribers will receive an average of 27 new cards per month. To amply cover demand for cards, our calculations suppose that each depository will be sent 50 catalog cards for each new report.

Printing Costs

We based our calculations on the conservative assumption that printing would be done off campus at full commercial rates. The eight universities for which we have data on page 14 are charged substantially less by their in-house printing facilities.

Sales

The most critical assumption in these calculations is the number of copies sold per report. Since this crucial variable is difficult to forecast, we have graphed the resultant profits or losses for a wide range of possible sales. The eight universities listed on page 15 had a total of 6,738 graduate business school students enrolled during the 1971-72 academic year. At the rate of sales assumed in the following calculations (4,800 reports per year per depository, i.e., eight depositories generating 40 titles each, each title sold 15 times per depository), that would represent less than one report per graduate student (4800/6738 = .71). Hence the assumed figure is only a fraction of potential demand. The market for these reports would consist of M.B.A. students, Ph.D. and D.B.A. students, professors, and businessmen. Perhaps the greatest demand might be generated by Ph.D. students. If each Ph.D. student were to buy eight reports per year, that would in itself represent a sales volume greater than the conservative forecast used here (4800/669 = 7.17).

We would expect that the principal purchasers of these research reports will be faculty members and doctoral students. These persons are faced with many reading materials and projects competing for their time and attention. Time to them becomes a scarce resource. How much time they could be expected to devote to searching through this material

is a question of importance that could not be answered precisely, even with skillful surveying. Data on consumer surveys from the information-science field (see the bibliography for references) indicates that persons tend to overstate the extent to which they will use a new service such as this when they are interviewed.

A sure way to determine whether this is workable is to implement the plan on a small scale such as we are suggesting here. The institutions involved are already shouldering expense (much of it hidden) for publishing and disseminating reports. This plan offers an opportunity to pass those costs on to the users of the reports, and give them in exchange much better access to the material through the on-campus depositories. It also offers authors the advantage of gaining wider exposure for their material; but they may balk at the $37.65 entrance fee, although they might more than recover this cost (which could in many cases be charged to organizations sponsoring their research). The small scale implementation proposed here carries little risk for the participating universities. No capital facilities would be required, with the exception of 12 four-drawer filing cabinets,[17] since initially they could contract out the printing and xeroxing at prevailing commercial rates, and we have made that assumption in the calculations on the following pages.

For the preceeding proposal to operate smoothly, it will require acceptance by three groups at the participating universities:

Authors: must be willing to submit their work and pay the cost of getting their work printed and distributed into the system, a charge of about $40 per report. The assumption in the pro-forma figures is that

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[17] This number of filing cabinets would be sufficient to allow the repository to hold five copies of every paper in stock for three years.

Pro Forma Financial Statement
To Author of a Typical Report (25 pages)

Expenses

Presswork Charge for 40 copies for network use (25¢ per plate, plus 1¢ per page for printing and collating, ie. 25 x 25¢ + 25x40x1¢) -------	$ 16.25
Charge for Printing 400 index cards ($7 for typesetting + 1.5¢ per card) ----------	13.00
Wrapping and Handling Charges (40¢ per package times 7) ----------	2.80
Postage Charges (at 80¢ for a 1-2 lb. parcel, the zone 5 parcel post rate) ----------	5.60
Total Charges (to be paid to depository when manuscript is submitted) ----------	$ 37.65

Revenues

Royalties Received (at 1.5¢ per page, assuming 15 copies sold per depository, ie. 8x15x25x1.5¢) ----------	$ 45.00
Profit to Author ----------	$ 7.35

Profit at other sales levels

100 copies ----------	breakeven
120 copies (as forecast above) --	$ 7.35
150 copies ----------	18.75
200 copies ----------	37.50
240 copies (30/ depository) -----	52.50
500 copies ----------	150.00

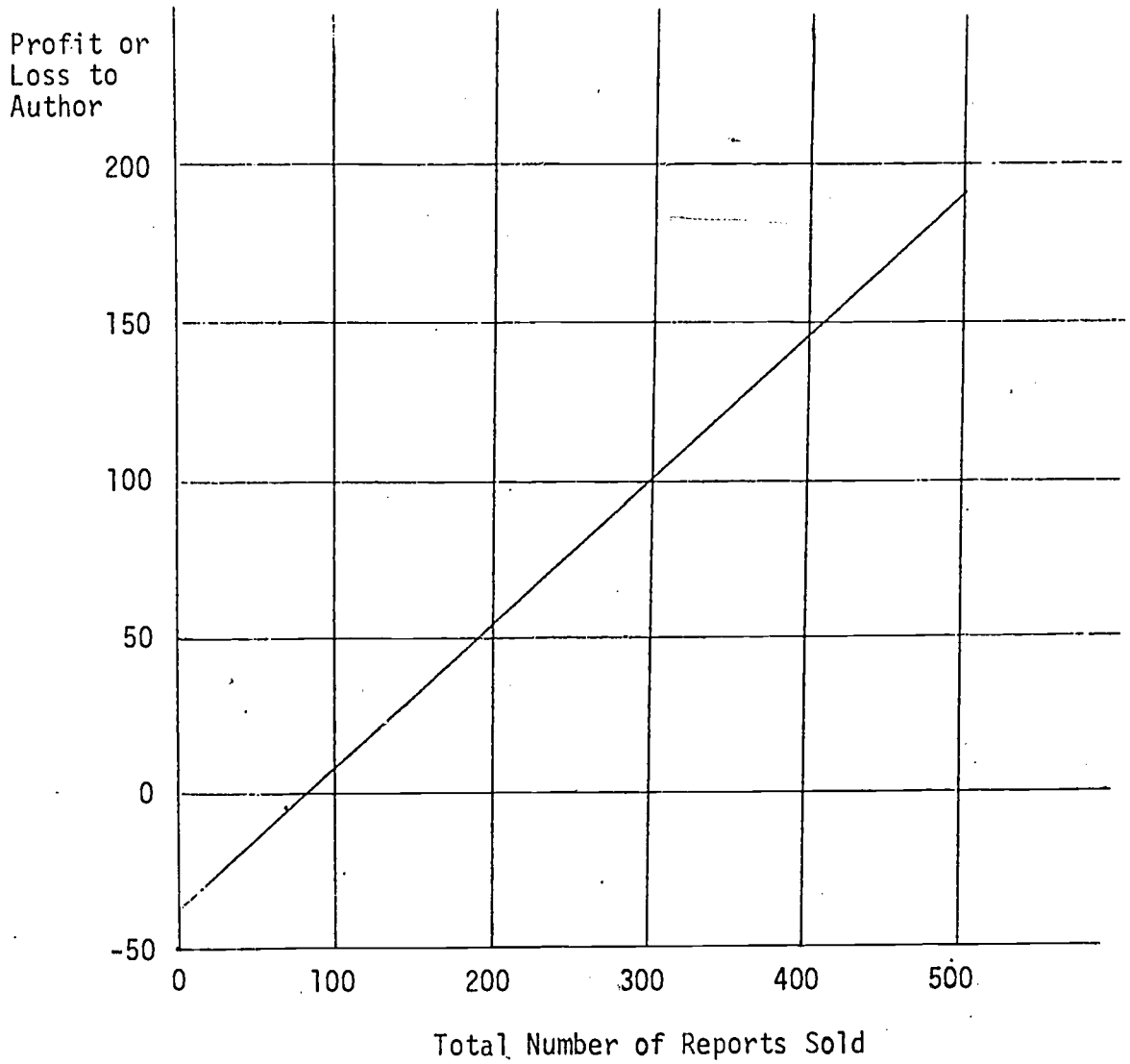
Pro Forma Financial Statement for One Year's Operation of a Typical Depository

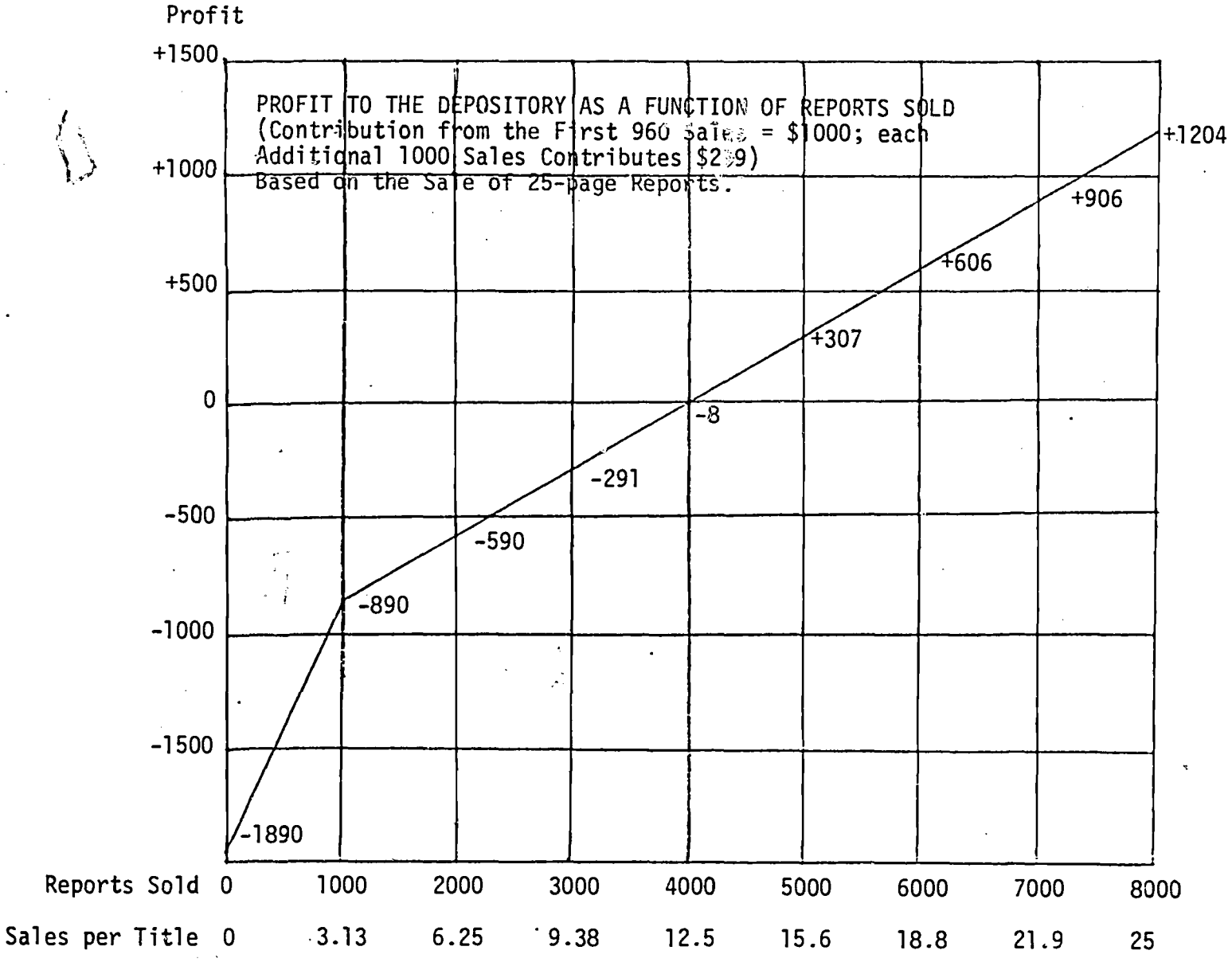
(Based on total sales of 4,800 reports, ie. 15 per title)

Revenues:	
Sale of Reports (assumes 15 copies sold per report, at average price of $1.75 each, ie 8x40x15x$1.75)	$ 8,400
Revenue from sale of catalog cards (assumes 25 subscriptions at 50¢ per month)	150
Reimbursement for printing and mailing by authors	1,506
Total Revenue	$ 10,056
Expenses:	
Printing of Reports (40 x $16.25)	$ 650
Printing of Catalog Cards (40 x $13)	520
Mailing and Wrapping Expenses	396
Royalties paid to authors (at 1.5¢ per page; ie. 37.5¢ per report times 4,800 reports sold)	1,800
Cost of Accounting and Funds Transfers for Payment of Royalties (at 50¢ per title, ie. 40x8x50¢)	160
Clerical Wages, selling (at 33.3¢ per report sold, ie. 4,800 times 33.3¢)	1,600
Clerical Wages, Filing, etc. (at $1 per title, ie. 40x8x$1)	320
Xerox Costs (at 3¢ per page. 960 copies, 60%, sold as received; remaining 3840 copies Xeroxed. 3¢ rate allows for some waste and overruns. For Xerox prices, see footnote 5, page 3. 3840x25x3¢ = $2,880)	2,880
Overhead Costs (rental of 15x20 foot room at $5 per square foot; printing and Xerox figures already include allowance for overhead)	1,500
Total Expenses	$ 9,826
PROFIT	$ 230

AUTHOR'S PROFIT VS. LEVEL OF SALES

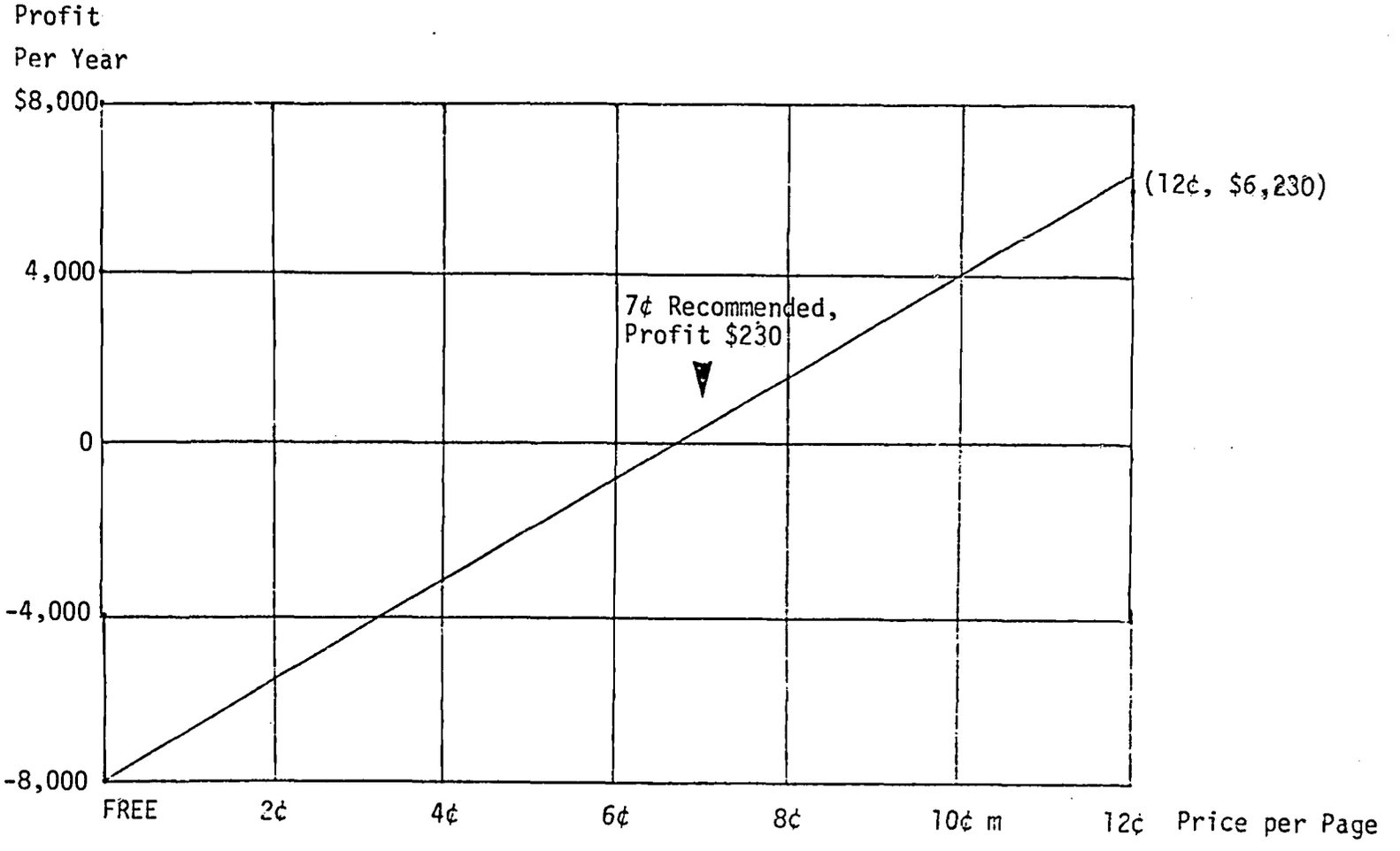
For a 25-Page Report, Eight Depository Network




Profit
+1500
+1000
+500
0
-500
-1000
-1500
PROFIT TO THE DEPOSITORY AS A FUNCTION OF REPORTS SOLD
(Contribution from the First 960 Sales = $1000; each
Additional 1000 Sales Contributes $299)
Based on the Sale of 25-page Reports.
-1890
-890
-590
-291
-8
+307
+606
+906
+1204
Reports Sold 0 1000 2000 3000 4000 5000 6000 7000 8000
Sales per Title 0 3.13 6.25 9.38 12.5 15.6 18.8 21.9 25

PROFIT TO THE DEPOSITORY AS A FUNCTION OF PRICE CHARGED PER PAGE

Based on Total Sales of 4,800 Reports, i.e., 15 per Title



the faculty at each institution will submit 40 manuscripts in typewritten form suitable for offset reproduction. This would represent a total of 320 new titles per year in an eight-university network. Authors participating in this system would gain increased visibility for their works, and their papers would be available on a convenient basis at eight universities. If an author's paper sells over 100 copies, he will receive royalty payments that exceed his cost of placing the paper into the system (calculations are on pages 22 and 24).

Readers: A relatively modest level of purchases by readers will maintain the proposed system at a self-supporting level. The level assumed in these calculations amounts to less than one sale per graduate student per year at major universities such as those listed on page 14.

University Administrations: The implementation of this program would result in minor expense, since staffing requirements are not large and no capital equipment of consequence would be required unless heavier than projected volume developed. The proposal offers universities an opportunity to get out from under the costs involved in publishing working papers and technical reports, and at the same time gain greater visibility for the works of their faculty and make the latest thinking from other campuses more conveniently available to faculty and students on their own campuses.

It is hoped that the possibilities for a pilot implementation of a publication network, involving a selected group of graduate schools of business, can be explored further. Such exploration would need to include consultations with administrators and directors of research organizations at a number of business schools, pilot surveys of potential author- and reader-interest in such a network at several of them, and

determination of the basis of agreement on which the institutions concerned could participate in such a network for a trial period.

APPENDIX

Micro-Fiche Technology

A micro-fiche (from the French word, fiche, meaning card) is a rectangular sheet of film, usually 4 x 6 inches, which contains images (pages of print or pictures) photographically reduced in size. The images on a conventional fiche are reduced between 20 and 48 times. As of this writing, it appears that the industry will standardize on a reduction ratio of 24 times which will yield 98 pages per fiche. This is the format now being used by government agencies such as the Defense Documentation Center (DDC). The standard 24 times reduction meets the needs of most users, providing a space saving of 97% of storage space required for original hard copy documents.

Besides being more compact, microfiche is cheaper to produce than hard copy. In quantity, duplicate fiche can be produced at about 8¢ each, and the equipment required is not expensive and does not require a darkroom. If volume is not sufficient to warrant a step-and-repeat camera, the most reasonable alternative will normally be to send out the documents to a firm such as NCR (National Cash Register) which will produce master micro-fiche. Their charge is $7 plus 70¢ for a title heading for a 98 page micro-fiche. They will also make duplicate micro-fiche at a charge ranging from 11¢ to 25¢ each, depending on the volume. Up to 300 copies can be made from a master micro-fiche. NCR is probably the largest firm in this business, manufacturing in excess of 5 million micro-fiche annually.

Devices to make hard copies from micro-fiche are available from Xerox, NCR, and 3M and can be leased or purchased outright. The cheaper copiers tend to give poor quality prints, but they are convenient for

occasional use since they are equipped with viewing screens and can be used as both readers and copiers. High quality copiers, such as the Xerox device, are expensive and justifiable only on locations where a heavy volume of prints is needed.

In spite of their cheapness and compactness, micro-fiche have not been enthusiastically accepted by the reading public. The reason is, mainly, the inconvenience of using micro-fiche readers and their poor quality. The usage of micro-fiche got a big boost when the Defense Documentation Center (DDC), on July 1, 1968, instead of providing a free document service to the defense community, began to charge $3 for all hard copies of reports received into their system after August 1965--while continuing to supply micro-fiche free of charge, and sometimes with faster delivery. The defense community was forced to equip itself with the necessary micro-fiche readers and printers.

Further information on micro-form technology can be obtained from:

NCR Microform Systems
1000 Cox Plaza
Dayton, Ohio 45439
Phone: (513) 449-5135

Mohawk Industrial Labs
System 4000
1 Ward Street
Vernon, N.Y. 13476

Minnesota Mining & Mfg. Co.
Microfilm Products Division
St. Paul, Minn. 55101

Xerox Corporation
Rochester, New York 14644

Eastman Kodak Company
343 State Street
Rochester, N.Y. 14650

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