

Cost – Benefit Analysis of Periodicals: A Review

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Abstract. Importance of periodicals as bearers of the most ancient and nascent micro thought is well established. However, libraries find it difficult to cope up with periodical subscriptions due to a recent spurt in periodical literature and the alarming rate of rise in their price. The rising costs of periodicals and the associated difficulties faced by the librarians in satisfactorily catering to the requirements of their clients can be adequately handled through the application of cost-benefit analysis. It is felt that a cost-benefit analysis can increase the awareness of librarians, administrators and others concerning costs and use patterns, but cannot be truly effective without the help of intuitive value judgment.

Keywords: Cost-Benefit Analysis, Periodical Subscription, User Studies, University Library

1. Introduction

Library services in the recent years are exceedingly becoming difficult due to spurt in the literature. The question of satisfactory performance of the services is acquiring greater concern of the librarian's day by day. The question becomes difficult due to lack of suitable techniques for measuring and evaluating the quality of a service or a function. Most of the existing evaluation techniques do not seem to be sufficiently sensitive to quantitative and qualitative factor of library service, and are therefore, not completely acceptable to librarians or non-librarians.

The basic problem is however, related to the very purpose of the library service, i.e. libraries are non-profit organizations similar to government hospitals which are concerned with providing benefits to the users. These benefits correspond to the satisfaction of the users. The incidence of reduced budgets, inflation and the increased expectation of the users during the 1970s necessitated a greater evaluation of many systems.

This paper intends to present a brief review of the literature pertaining to the evaluation of library service performance with special reference to periodical services.

The available literature has been organized under the following categories:

- i) Conceptual issues
- ii) Measurement issues
- iii) Methodological issues

Under the conceptual issues some of the important aspects such as the importance of periodicals, the impact of price rise in periodical subscription, rationalization of periodical subscription and resource sharing, a scatter of journals according to their productivity (Bradford's law) etc. which have direct or indirect relationship with the cost-benefit analysis of periodicals have been discussed.

In the second category of issues, different measuring techniques prescribed by various scholars have been discussed. The discussion differentiates between the three ways of measuring library performance, i.e. cost-accounting, cost-effectiveness analysis and cost-benefit analysis, while reviewing the relevant literature.

Review of literature concerned with the application of different methods to the evaluation of library performance, particular periodical service, has been undertaken in the third section entitled methodological issues. Works relating to use, calculation of unit cost, cost-effectiveness, cost-benefit analysis of periodical services have been separately dealt with.

An attempt is made in the concluding section to identify the gaps in the available literature and to specify areas for further research.

2. Conceptual Issues

Certain conceptual issues relating to periodicals and periodical services have attracted the attention of researchers. These issues can be seen as having direct or indirect relationship with the cost-benefit analysis of periodicals. The issues are rationalizations of periodical subscription, rising costs and Bradford's law.

2.1 Importance of periodicals

The importance of periodicals as bearers of the most ancient and nascent micro thought is well established. Perhaps, this is the reason why rigorous attention is scarce on the issue. Grogan devotes a small portion of his book to discuss the pre-eminence of periodicals in the literature of science and technology. Similarly R.L. Collision and E.J. Crane in their respective works, try to highlight the importance of periodicals over books and other printed materials³. Elsewhere one would only come across passing remarks on the significance of periodicals.

2.2 Rising costs

The alarming rate of rise in the price of printed materials has been the cause of concern among many. Librarians find it particularly difficult to cope up with periodical subscriptions as their prices are generally high.

One of the reasons for the rapid increase in prices of periodicals is that the publishing industry is still labor-oriented. Besides the increase in postal rates and material costs significantly contribute to the price hike of periodicals.

Innumerable literature has been gathered exploring the impact of rising costs of periodicals on the library services. Prominent among them are the works of Isaac and Satyanarayana, Kundu and Sinha and Omotoso, Saxena and Khare, Sharma and Singh.

Most of these studies concludingly suggest that, to overcome the problem of price rise, approaches such as resource sharing and cooperative acquisition of periodicals may be resorted to. In the words of Singh,

"Libraries located with close geographical proximity can share their subscription to journal to avoid unnecessary duplication and the money thus saved can be utilized to add more titles".

In this context Saxena and Khare¹² believe that establishment of document exchange centers at regional, national and international levels and the introduction of SDI services in all the scientific and technical libraries may lessen the burden. In fact, UGC had a proposal for the establishment and development of an Information Library Network, known as, INFLIBNET in the country by the end of Eighth Five Year Plan (1990-95) period. Although resource sharing inter library loan etc. are exceedingly being considered as the best solution, some fear that an increase of new titles in the future will make the situation more difficult.

An increase in the cost of providing library services during the past few decades has also necessitated the costing of library services, but costing of library services like any other non-profit making service oriented organization is a complex task. Nevertheless, cost-accounting methods are devised to help in planning and controlling future operations.

2.3 Rationalization of periodical subscriptions

Characterized by the financial crisis, the low purchase value of the rupee in comparison with foreign currencies and the escalation of subscription rates, the contemporary library and information centres find it difficult to build up their collections. No library can perhaps afford to work in isolation under the budget crunch. Rather inter-library cooperation is an imperative need in the present environment. In this context, rationalization of periodical subscriptions and organized resource sharing may offer a possible pragmatic solution. Heads of institutions and librarians of local institutions can jointly and cooperatively work out their needs and avoid duplication of periodical subscriptions. Methods can be adopted to permit exchange of photocopies of concerned pages, supply of photocopies of periodical articles, circulation of periodicals etc.

Besides, the users should be taken into confidence for the rationalization of periodical subscriptions. They should be convinced of the grave financial crisis and need for rationalization. In this direction NISSAT (National Information System for Science and Technology) undertook a study of twelve major libraries of Calcutta in 1990 and revealed a duplication of 203 periodical titles out of a total 499 periodicals subscribed to by these libraries involving an expenditure of 37, 02, 825 rupees. The same study estimated an overlap of rupees 6 million during 1993. Through careful rationalization of periodical subscriptions, a major portion of this expenditure can be avoided.

Although NISSAT was taking commendable steps towards popularizing rationalization of periodical subscriptions and resource sharing, only a few researchers have explored into the area. One such work is that of Rao and Chandra¹⁶ which describes the case of Hyderabad city wherein rationalization of periodical subscription and resource sharing has been possible through the initiative of the Department of Library and Information Science of Osmania University. It is suggested that such initiation should also be taken up in other cities in the face of contemporary financial crisis. Recently, Saroja and Padmini have examined the impact of rupee devaluation on libraries. They have taken into consideration the periodical subscription in the five universities and professional libraries of Tirupati over the past 10 years. One of the measures suggested to counter the adverse effects of rupee devaluation is, setting up of a Local Area Network (LAN) to promote cooperation among the five universities and professional libraries of Tirupati.

3. Measurement Issues

Measuring the profit of any social service such as, the library service, is extremely difficult. No standard measurement technique can be prescribed to for measuring library service. Nevertheless, a few studies have been conducted in the direction and the techniques evolved thereof have been stated.

The results of these studies furnish information about the economic health of the library and help the library management to:

- i) Plan and control the library operations,
- ii) Appraise performance of the library and take decisions as to its future function,
- iii) Decide about resources in terms of time and money to be invested in the services.

The purpose is accomplished basically in three ways:

- i) Cost-accounting,
- ii) Cost-effective analysis and
- iii) Cost-benefit analysis.

3.1 Cost-Accounting

Cost-accounting is basically a quantitative process involving the estimate of money spent on various functions whereas cost-effectiveness and cost-benefit analysis are qualitative process and therefore, much more difficult to assess. Almost all librarians and their governing bodies estimate the running costs of the library before deciding on the extent to which various requirements can be met.

Therefore, cost-accounting of library system has received ample attention from scholars. The popularity of cost estimation according to Roberts' has increased due to "*operational reasons*" i.e. its significance in the annual budgetary cycle, and its various financial nuances peculiar to an organizational set up. Cost accounting has a number of important uses for library management and a number of studies of its application in libraries have been conducted. Weight has developed the topic quite fully based on the findings of the studies of his time, i.e. till the middle of the last century.

Prominent works in the latter phase include that of Brown, Butcher et al, Clements, Price, Rather and Welch, who have estimated cost of library systems in different countries. In India, works of Bhatia and Subba Rao are worth-mentioning. Butcher et al have tried to convey the basic principles of cost accounting and have shown how this tool can be applied in the library with the help of "*hypothetical job costing model*". In their view, application of this cost-accounting model will have several benefits in the library such as; (a) standards of performance can more easily be established, (b) improved knowledge of cost can aid in administrative planning, (c) budget requests can be substantiated by the detailed analysis of cost, and (d) the most important aspect of any cost-measurement system can be identified. Welch³⁰ in her study of cost of library materials specifies that every area of library expenditure should be properly studied in view of the decreasing financial resource allocation to the libraries over the years. Clements presupposes costing as the hard core of any system that aims at measuring and monitoring progress towards stated objectives and contends that it is essential for libraries to become familiar with the problems of costing and with the handling of finance related information. This helps in controlling the day to day library operation, planning for the future and improving overall effectiveness of the library systems. He provides a twofold framework for library costing; (1) routine cost-accounting system for regular management information, and (2) special exercise costing to deal with particular questions such as, whether to mechanize a given procedure or how much it costs to process a new acquisition.

Different types of cost study of library and information service have been discussed by Roberts. The basic framework for calculation of costs, measurement of labour time input and specific issues and problems which arise in implementing a programme in a library or information unit are vividly discussed.

In India, the problem of shrinking library budget and rising price of books and serials have attracted the attention of cost analysis. Bhatia's work reveals that there is a need for greater cooperation between libraries to cope with the problem of finance. Subba Rao offers a solution to the problem of rising prices and shrinking budgets through a budget formula. It is based on "*country quotient/weightage*" method. Hayes and Baker argue cogently for the adoption of cost accounting by libraries. In their words, "*a cost-accounting system is continuing rather than intermittent: it is concerned with the total library and not with some detailed aspect of it; and it ties together costs with effectiveness rather than being concerned with simply one or the other. Cost-accounting is a management tool of primary value to the librarian in his/her day to day control of the library*".

3.2 Cost-Effectiveness and Cost-benefit Analysis

The value and profitability of information service can be qualified by using modern management techniques to generate numerical data. By and large, all approaches of assessing the value and profitability of information services are directed towards achieving improvement in the system. Until recently, major thrust has been on the measurement of cost-effectiveness.

Cost-effectiveness refers to the cost of achieving a particular level of effectiveness within an information service. Some types of unit cost measure will be needed. Examples of cost-effectiveness measures would include cost per document answered successfully, cost per relevant and so on. The cost-effectiveness of a service can be improved by holding costs constant unlike raising the levels of cost-effectiveness or by maintaining a particular level of effectiveness while reducing the cost.

However, since the early 1970s cost-benefit analysis in the library and information services have attracted greater attention.

A cost benefit evaluation relates the benefits (outcomes) of a service to the cost of providing it. Again, the cost benefit relationship can be improved by increasing benefits without increasing costs and by reducing costs without reducing benefits..... However, true cost-benefit studies are virtually unattainable in our field.

Some library areas in which cost benefit analysis can be tried are; (a) determining the cost and benefits of book use, (b) budget allocation for acquisition and cataloguing, (c) cost advantage of using printed catalogue card instead of preparing them, (d) economics of library and information networks, on-line search cost (e) weeding and retirement of documents and reference service.

The new trend of using cost-benefit analysis acquired momentum with the work of Mason. Around this time Lancaster differentiated between cost-effectiveness and cost-benefit and listed the basic requirements for each type of analysis. Cost-benefit analysis is quite different from cost-effectiveness study. Cost-benefit clearly refers to a relationship between the costs of some activity and benefits derived from it. Lancaster clarifies that a cost-benefit study is one that tries to justify the existence of the activity by demonstrating that benefits outweigh the costs. Ideally, the benefits should be expressed in the same unit of measurement of cost, i.e. in \$ (Dollar) £ (Pound) or some other currency. Unfortunately, it is exceptionally difficult, if not completely impossible to express the benefits of library service in monetary terms.

A large volume of literature has gathered in recent years, which stresses on the need for methods of measuring performance in information centres. A variety of approaches have also been proposed. Many of these have been reviewed by Landau, who has brought out the essential features of cost-reporting procedure. As is evident the vast majority of studies either treats the problem in a somewhat subjective way or relates it to specific library processes and systems.

In the following paragraphs an attempt is made to review the available literature under the above two categories.

A perusal of the available literature on the measurement of the quality of library services clearly brings out the difficulty of the task. Perhaps, this is the reason why no standard measurement technique has been evolved so far to measure library services. Most studies subjectively outline the characteristics and criteria by which effectiveness and benefits can be measured.

Gilchrist identifies twelve characteristics which could provide potential benefits. These are, (i) response time-savings in time to answer inquiries, (ii) increase in complexity of enquiries leading to further time saving, (iii) reliability or accuracy of data, (iv) up-to-datedness, (v) depth of data for products – including ease of comparison, (vii) presentation including ability to provide hard copy (viii) browsability, (ix) user convenience, (x) feed back to users, (xi) feed back to manufacturers, and (xii) reliability of the system.

Klement suggests the adoption of “*Entrepreneurial Model*” propagated by David C. McClelland to increase library effectiveness. The basic characteristics of this model are; (i) risk taking as a function of skill, not chance—that is, decisiveness; (ii) energetic and/or novel instrumental activity; insistence upon individual responsibility; (iii) a need for knowledge of the results of decision (money is regarded as a measure of results); (iv) anticipation of future possibilities and (v) organizational skills.

Wessel considers that there are four types of criteria which affect the measurement of effectiveness. These are, (i) policies and instructions which already exist; (ii) gathering mission statement of the parent organization which they serve; (iii) there exists a substantial body of library statistics which could form the basis of effectiveness criteria; (iv) utilization of certain management techniques.

Mott⁴⁵ on the other hand, states 3 basic criteria for effectiveness such as, organizing centres of power or routine service, qualitatively and efficiently. Secondly, organizing centres of power to change routines, i.e. adaptability whether symbolic or behavioural adaptation and subsequently, organizing centres of power to cope with temporarily unpredictable overloads of work, i.e. flexibility considering the stages of cost benefit analyzing. Magson points out 5

such stages. These stages are, (i) activity function (by time and cost), (ii) cost activity (present situation), (iii) cost activity in alternative situation, (iv) activity of cost benefit by difference of alternative situation and the present situation, (v) benefit function analysis by substitution of present situation data in the activity function by time and cost.

There are also various steps involved in the study of cost-benefit analysis. According to Lancaster these stages are, (i) definition of the objectives, (ii) identifying the various alternatives, (iii) determining the cost of various alternatives, (iv) establishing one or more model that relates to costs and lastly, establishing a criterion for ranking the alternatives. He also identifies 5 basic criteria for measuring benefits; (i) cost saving in using the system compared to another system, (ii) avoidance of loss of productivity (iii) improved decision making, (iv) avoidance of duplication, and (v) stimulation of inventions.

On the basis of all these characteristics and criteria, Majumdar, while measuring the library effectiveness, analyses only five approaches and techniques in a cost-effectiveness analysis. These are; (i) description of alternatives, (ii) identification of pertinent measures of effectiveness, i.e. benefits,(iii) expression of both mission performance and cost as function of the characteristics of each alternative, (iv) estimation of appropriate value for equation parameters, and (v) computation analysis and the presentation of results.

Many measures have been employed in attempts to evaluate library performance. Obviously, not all of these measures are unique. They are, in fact, slight modification of one another. Even, Edward et al in their article "*Review of Criteria Used to Measure Library Effectiveness*", report the result of a survey of literature on measure of library effectiveness. This survey led to the formulation of six criterion concepts such as accessibility, costs, user satisfaction, response time, cost/benefit ratio and use.

The UNESCO "*Hand Book for Information System and Services*", mentions that "*benefits are usually more difficult to express and to measure*". It prescribes the following criteria which may possibly help in measuring benefits of different information services; (a) cost savings in using system as compared with the cost of finding the needed information elsewhere, (b) avoidance of loss of productivity that would result if information sources were not readily available, (c) improved decision-making or reduction in the level of personnel required to make decisions, (d) avoidances of duplication or waste of research that has either been done before or proved unfeasible by earlier investigators, and (e) stimulation of invention (serendipity factor).

4. Methodological Issues

Periodical subscriptions constitute the largest segment of budget of academic libraries. It also happens to be the most complex operation involving a series of decisions in respect of ordering routines, uncertain budgeting, annual price acceleration, varying terms and conditions and irregular supply coupled with growing demands of the users.

In the light of the above, numerous studies have been undertaken to make the periodical services much more fruitful. One important area of such studies is the aspect relating to the cost of periodicals. Scholars have analyzed the cost of periodicals and periodical services from various points of view. On the one hand, there are users' satisfaction or effectiveness studies and various kinds of budget and expenditure distribution studies. On the other hand, there are more rigorous and systematic types of cost study for library and information services including unit costing, cost-effectiveness and cost-benefit evaluation. Of the first set, users' satisfaction or effectiveness has received significant attention of researchers.

4.1 Effectiveness

A valuation of effectiveness is an evaluation of users' satisfaction. Such an evaluation should determine how well an information service or library as a whole satisfies the needs of its users. This type of evaluation is restricted to consideration of how well the service meets the expressed demands of users. Rout presents a quantitative model to measure users' satisfaction (Figure 1). With the help of this model he has measured the users' satisfaction over the

important services offered by the Central Library, Sambalpur University. A scale ranging between 0 to 2 (i.e. fully satisfied = 2, partially satisfied = 1, and not satisfied = 0) was used to quantify users' satisfaction and which were statistically analyzed to obtain the final level of satisfaction for individual services.

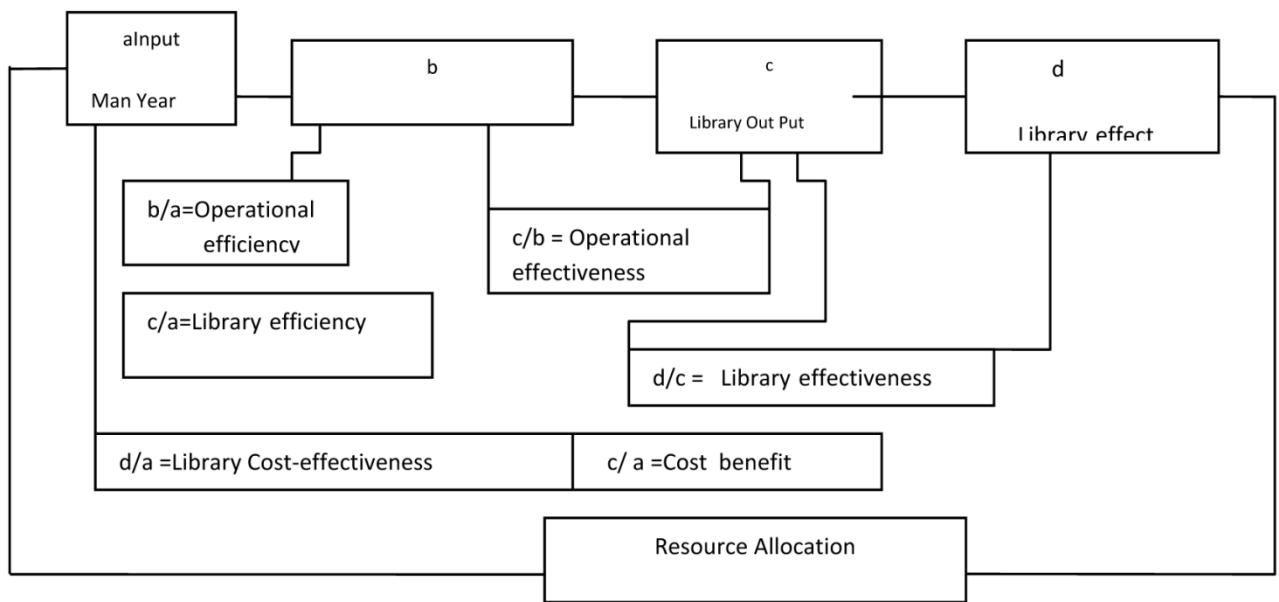


Figure 1. Library Operational Efficiency Measurement Model (Source: Rout, 1982, 5).

A few studies have specifically evaluated the use of periodicals. Satyanarayana studies the utility of periodicals in Andhra University Library by conducting two months long survey of the users. Lack of easy accessibility (as the periodical section of the library is located on the fourth floor without lift facility) is ascribed to be the prime cause behind poor utilization of periodicals. A similar, but more exhaustive work is done by Ramaiah to study the use of periodical literature in chemistry at the Central Science Library of University of Delhi (DUCSL) wherein, various suggestions are made to improve the service.

Among cost-accounting, cost-effectiveness and cost benefit analysis, the latter two as stated earlier, are the most difficult to measure particularly in case of social sciences. Evidently, cost-benefit analysis is undertaken by a limited number of scholars concerned with library and information science services. However, one comes across numerous works relating to unit-cost and cost-effectiveness evaluation of library services.

Unit cost:

An exhaustive work on unit cost calculation is presented by Dougherty and Heinritz. It is suggested that unit cost is the basis of cost accounting. It allows an organization to compare its performance with the performance of others engaged in similar work and to compare its performance for one period with another period. Unit costs also provide a certain power of prediction. It is obtained by dividing the total cost of producing a given number of units by the number of units produced, i.e.

Unit cost = $\frac{\text{Cost of producing an N unit of work}}{N}$

The above mentioned significance of unit cost of assessing performance of any department or organization and its formula is reiterated in the UNESCO handbook. To control resources carefully and effectively within the library it is essential to know the amount of cost incurred upon each of its activities and services. It means, the cost of each unit of activity/services, known as the unit cost, needs to be determined and standardized. Thus, in an attempt to determine the unit cost of the periodical section of Marathwada University Library and compare it with that of periodical section

of Burdwan University Library, Deo has calculated the individual cost of building, stationary, salary of the personnel, furniture, postal charges, electrical charges and cost of periodicals. It is assumed that determination of unit cost of different services of different libraries can help in controlling the cost by recognizing the activities, avoiding duplication of work and adoption of new techniques of work etcetera. Some even rate unit cost as a superior measure than that of ranking journals on the basis of citations. In contrast, however, Robert suggests that "*it is unwise and misleading to use unit costs as the exclusive indicator of performance*".

4.2 Cost-effectiveness

Cost-effectiveness deals with the relationship between levels of performance (effectiveness) and the costs involved in achieving this level. Under costs, both the costs that relatively fixed (equipment purchase or rental, developmental costs etc.), costs involved in acquisition and indexing, and the costs that are relatively variable are considered. The performance of the effectiveness of an information service can be measured in a number of different ways and different information services have different performance criteria. Scholars have attempted cost-effectiveness study of periodicals mostly based on Bradford's law.

The traditional Bradford Method of ranking journals is based on the single unit of the number of relevant papers in the journal. No attempt is made to make the ranking more objective by relating the relevant items to the cost of acquiring the journal. It contains two major components:

- a) The suggestion that journals in a special subject field should be ranked in terms of their "productivity" or how many relevant items they produce in a year;
- b) A technique for modeling the total productivity of a set of journals on the basis of (a).

Virtually all subsequent work has concentrated on the development of the modeling technique (b). Indeed a whole new field of investigation has developed around the kind of ranked distributions, such as the Bradford and Zipf distributions, needed for this modeling process. But little attention has been devoted to the method (a) by which the objects of interest are ranked. Houghton and Prosser investigate the use of the Bradford model as an aid to decisions on which journals a library should take but conclude that other factors relating to the cost of journals should be taken into account. Line proposes ranking of journals in order of references per unit cost. Robertson and Hensman have suggested improvement upon the Bradford's original proposals in order to arrive at a more realistic picture. In this paper they discuss a number of alternative methods of ranking the journals contributing to a special subject field and how these methods relate to cost effectiveness and cost-benefit measures.

Robertson and Hensmans' modified formulation has been applied by Raghvan and Salini to journals subscribed to by the Central Food Technological Research Institute (CFTRI) library, Mysore. The foremost thing in their work was to assess the relevance of papers appearing in the journals subscribed to the CFTRI library. The period selected for the purpose of the study was the year 1975. For each journal the total number of relevant items (relevance judged by a panel of specialists regularly scanning every journal received in the library) published in 1975 was computed. This figure was divided by the subscription cost of that journal to yield a measure of relevant items per unit cost. The subscription cost and relevant papers were cumulated and graphically presented. This study is a further improvement and rationalization of Brooker's method and traditional Bradford's approach.

4.3 Cost-Benefit Analysis

Cost-benefits refer to the relationship between the benefit of a particular product or service and costs of providing it. Generally speaking, benefits are more difficult to measure than performance (effectiveness) except that, in a commercial sense, benefits equate to return on investment

With information services various levels of benefits are evident. For example, a society or institution may, quite properly measure the benefits of its information services in terms of income from sale of publications or services and balance this income against production costs, i.e. calculate return on investment. It weighs costs against income

benefits. On the other hand, a government agency may be partially subsidizing this information service and may adopt a broader view of its benefits in terms of the less tangible factors. Moreover, within the environment of information service, relationship between cost and effectiveness may be somewhat difficult to distinguish from the relationship between costs and benefits. For example, we reduce the average number of terms assigned in indexing, and thereby reduce the average indexing time per item. So the immediate benefit of this action is to reduce input costs. On the other hand, such an action is likely to have a very definite influence on the effectiveness of the system (the average precision of the system may increase and this in itself may be regarded as a form of benefit while the average recall will almost certainly decrease). In other words, this action has had an immediate observable benefit (in terms of cost saving at input), it will have a long range influence on the effectiveness of the system and it may have an even longer influence on the benefits of the services and products for the end user.

The most effective and beneficial system is likely to be one that sets out to satisfy the great majority of the demands placed upon it, but not all of them. We can design a system capable of satisfying 90 percent of the users' requirements efficiently and economically but to satisfy the remaining 10 percent would require a disproportionate increase in cost and effort.

Any experiment to measure the cost-benefit of a library or library service is likely to be costly. But it is clear that various levels of approximation are available. Cooper's discussion on retrieval system is an example. Each item which is acquired for a collection could (in theory at least) be judged by its utility to the users, rather than simply by its relevance. This process might be somewhat complex. Nevertheless, a number of user studies of journals have been conducted. Chen has studied using patterns of physics journals in MIT science library and has observed that 62.7 percent of the journals were used only once during a 3½ month period. She also found that 90 percent of the use had been covered by only 49 core journals out of 220 journals subscribed to in the library. Longlois Schulz in a journal usage survey at the Applied Physics Laboratory Library of the Johns Hopkins University found that 7.5 percent additional shelf space could be added by deleting 9.6 percent of journals which were not being used by the researchers. Cambell in a survey at the Wolverhampton Polytechnic Library found that 106 journals out of 358 were consulted not more than once during a five month survey period. It was also observed that 80 core journals provided 75 percent of the total use. Houghton and Prosser have employed such statistics to their study.

Ramaiah has made an attempt to identify the ore periodicals in Chemistry and its allied subjects at the DUCSL, Delhi. Although such studies do not undertake a cost-benefit analysis of subscribed journals, they provide a reasonable approximation to it.

Unfortunately, applied examples of cost-benefit analysis to periodical services or for that matter any library service is highly limited. Magson's work can be cited wherein; he has taken up a "*specimen analysis*" of library functions and activities. Robertson and Hensman have used data relating to the set of journal articles published in 1969 and selected by the Biodeterioration Information Centre as being relevant to biodeterioration. The prime objective of their study was to use the various ranking methods (Bradford's method) to answer the following questions:

- a) How can we acquire 90 percent of the items at minimum cost?
- b) How can we save 10 percent of the cost of acquiring all the items with minimum loss of items?

Even here, the authors themselves admit to have described the various levels of approximation to cost-benefit decisions on the basis of which a library should take journals. They have examined various levels up to cost-effectiveness rather to a true cost-benefit measurement.

Mahapatra deals with the application of industrial cost techniques following the work of Raffel and Shisko who applied it in a university library in the USA. This is a sort of cost-benefit analysis that looks at policy making situations. The study becomes more illustrative than applied. Biswas and Sen have attempted to measure cost and benefits separately in their study in terms of use frequency of the journals by different users and savings achieved

through different methods of subscription respectively. They also conclude that the cost of a journal is not directly related to its use. A similar study has also been undertaken by Ojha and Das.

Dealing with the concept of cost-benefit analysis in libraries both theoretically as well as empirically, Sridhar believes that it is difficult to apply the technique to libraries. However, “*cost per use*” of a journal appears to him as a useful ratio for assessing journals subscribed to by a library. His empirical study of cost-benefit analysis of journals indicates that such a study does not answer all questions, but provides an additional dimension over and above what appears in a simple user study to an understanding of journal usage. He rather concludes that many non-economic factors dominate the decision to subscribe to a journal and a cost-benefit analysis can increase the awareness of librarians, administrators and others concerning costs and use patterns, but cannot be truly effective without the help of intuitive value judgment.

5. Conclusion

The ideas gathered from the foregoing discussion may be summarized as under:

The three measurement techniques of library performance, viz. Cost-accounting, cost-effectiveness and cost-benefit, have not been attended by scholars at an equal footing. Of the three, cost-benefit analysis of library and information services has remained by and large a neglected field of investigation. The most probable and immediate explanation that can be ascribed to the situation is the difficulty of conducting cost-benefit analysis with accurate quantification. A great number of scholars are unanimous in their view regarding the difficulty.

As is evident, works relating to cost-benefit analysis of periodicals is rare, and of other library services are negligible. However, some of the available literatures provides significant guidelines (e.g. Robertson and S. Hansman, 1975) for future research. Unfortunately application of these guidelines has been quite poor.

Considering the multitude of tangible and intangible features of library and information services, it is not very surprising that a single clear cut frame is yet to be evolved to measure their benefits. May be in the coming years, particularly with the help of sophisticated computer software, the task can be accomplished but qualitative reference can never be measured in terms of cost and time.

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