

## Managerial Decision Making and the Budgetary Process

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The budgetary process is an important undertaking in any organization, and one which demands much time and effort of the organization's administrators. The main task of the administrators of any organization is to manage the organization so that the goals and objectives of the organization are met. The administrators must create, plan, organize, motivate, communicate, and control in order to accomplish this task. The budgetary process requires that important decisions be made so that the allocation of resources within the organization is in keeping with the goals of the organization, and enables the accomplishment of its objectives effectively and efficiently.

Prentice, in her *LJ Special Report* on library financial management, points out the managerial problem facing library administrators today:

Limitations on funds force library planners to set priorities. All desirable services cannot be provided and some must be sacrificed. How can library planners utilize existing resources

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so that maximum benefit can be realized from each dollar? What are the library's objectives and have they changed during the past two decades? Will funding limitations change those objectives? How can the library manager go about planning for services in a constricted-budget environment? What methodologies for planning and what types of information are necessary for making the best possible choices?<sup>1</sup>

The need for well articulated goals and objectives and priority setting within the goals and objectives cannot be overstated. Administrators need to consider the organization's goals and goal priority in order to make decisions which will lead to accomplishing the objectives. Allocation of funds within the library should reflect the goals and objectives of the parent organization and of the library. The goals and objectives must be clearly stated and widely discussed during and after their formulation. All who work in the library as well as all appropriate administrators, boards, or others who oversee or advise the library administration must be involved in the library's goal setting process, in the establishing of priorities, and in the frequent reassessment of the goals and priorities. Since most library administrators must present budget requests to the larger organization of which the library is a part—central administration, municipal, county, or state government, college or university administration—the library administrator must know and understand the goals of the larger organization and how and why the library is essential to accomplishing those goals. The library's goals must not only be compatible with the goals of the parent organization, but should also serve to enable the parent organization to achieve some of its goals. The library administrator should use these goals and objectives statements, as well as evidence that they are being effectively and efficiently pursued, to make the best possible case for the library receiving an appropriate share of available funding.

Other decision making techniques should be part of the budgetary process in addition to well stated goals and objectives. Linear programming, goal programming, queuing, network models, and other quantitative techniques have many applications in libraries. These techniques, from operations research or management science, allow one to analyze and solve many managerial decision problems which are encountered in libraries. Unfortunately, though, while the usefulness of these techniques have been successfully used to analyze and solve relevant problems in libraries, very few librarians have used the results of such studies or implemented these techniques to solve other problems. Several people have commented on this lack of implementation of quantitative managerial techniques in library management and sought to explain the reasons. Bommer thinks that

the main reasons are the use of too complex models—the degree of model sophistication exceeds the technical capability of the organization and crucial variables are often assumed away or ignored—and the failure on the part of operations researchers to emphasize implementation.<sup>2</sup> Bookstein and Kocher believe that the causes are the difficulty of the subject (it requires a background not generally found in librarians), the interest of many operations researchers in solving a problem rather than in applications, and the inability of library managers to take advantage of the availability of personnel specializing in quantitative management techniques due to budgetary constraints.<sup>3</sup> As Bookstein and Kocher point out, however, operations research techniques can lead to more effective library management through their approach to problem solving.<sup>4</sup> With limited budgets and increasing demands for materials and services, librarians must take advantage of techniques which will enable them to allocate their resources and manage their libraries more effectively and efficiently. The gap between theory and real world applications must be bridged so that the potential benefits of these techniques can be realized.

A few examples of specific quantitative techniques, library applications, and their effect on the budgetary process are presented to demonstrate how these quantitative techniques are important to budgeting decisions.

**Queuing Models.** The formation of writing lines is a common phenomenon which occurs whenever current demand for service exceeds the current capacity to provide that service. The ultimate goal of a decision maker who applies queuing theory is to achieve an economic balance between the cost of service and the cost associated with waiting for that service. The decision maker uses queuing theory to minimize total cost of service and waiting time by manipulating the controllable variables such as number of servers, speed of service, and order of service. Queues form in the course of most library operations—at the public catalog, at the reference desk, at elevators, at photocopy machines, at the circulation desk, in the cataloger's work area, in the reshelving area. By using queuing models, library administrators can determine the optimal staffing of service points, the number of shelvers, or the appropriate amount of various types of equipment to provide as more technology is applied to library operations. Each of these had budgetary implications. If, for example, the optimal staffing of service points is not possible, one can use the queuing model to examine the outcome of other staffing solutions and determine the average waiting period that will result from each possibility. With such information, a decision can be made with the knowledge that most feasible options have been considered.

**Linear Programming.** Allocation of limited resources among various competing activities is a continual managerial task. The goal of a decision maker who applies linear programming is to allocate the resources so that a measurable goal is optimized, and any constraints are satisfied. Linear programming computer programs are widely available, too, so that the application of this technique is now relatively easy. An important library application with budgetary implications is the allocation of personnel within technical services or public services departments (number of professionals, support staff, and student or other hourly employees). As more technology is applied to library operations, the types of responsibilities and tasks to be performed in libraries and the level of skill and amount of time needed to perform them have been changing. Linear programming can be used to optimize the allocation of appropriate personnel to the various required responsibilities and tasks.

**Goal Programming.** Goal programming is similar to linear programming, except that instead of attempting to optimize a single objective, one attempts to satisfy as many competing goals as possible after they have been prioritized by importance. Goal programming is particularly well suited to decisions in the public sector since there are often conflicting objectives, trade-offs, and the necessity to satisfy rather than optimize.<sup>5</sup> The goal of a decision maker who uses goal programming is to reach a solution involving multiple, conflicting goals which minimizes deviations from the goals so that low order goals are considered only after higher order goals. An important library application for goal programming is allocation of the materials budget. There are many competing goals, and a resource which is usually inadequate to satisfy all of the goals. By applying goal programming to this problem, one is forced to prioritize the goals which have been identified. This process of prioritizing goals can in itself be very useful to decision makers, since they must make clear their assumptions and develop acceptable reasons for the rankings. As with the other techniques, alternatives can be examined to see what different results are obtained if the rankings of the goals are changed or if different goals are considered.

**Network Models.** PERT (program evaluation review technique) and CPM (critical path method) are models which are useful for planning and controlling projects, especially those which are one-time-only or infrequent and consist of interrelated activities and sub-tasks. The goal of a decision maker who uses PERT/CPM is to plan, monitor, and reorganize resources so that objectives can be attained efficiently and on schedule. Using network models enables one to

determine which activities are critical and must be completed on time to keep the project on schedule, the flexibility available for noncritical activities, the earliest expected completion time for the project and the best way to handle delays. An important library application which librarians should consider is modeling the application of technology to library operations. Using network models is especially important if one is considering computerizing circulation, acquisitions, or installing a fully integrated system. The whole process, from needs assessment, specification writing, requests for proposals, analysis of bids, signing the contract, site preparation, conversion of records, installation and training, to final operating procedures, should be included in the model. Such detailed planning will enhance communication, provide efficient monitoring of the process, identify potential problem areas for the development of contingency plans, enable the proper use of resources, and enable control and rescheduling of the plan as necessary. Computer programs for network models are readily available, too, for easy application.

Management is a continuous process of making decisions. As Turban and Meredith have pointed out, quantitative techniques can enhance the decision making process in the following ways:

- (1) They provide a systematic and logical approach to decision making.
- (2) They permit a thorough analysis of a large number of alternative options.
- (3) They enable evaluation of situations involving uncertainty.
- (4) They allow the decision maker to judge how much information to gather in a given problem.
- (5) They increase the effectiveness of the decision.
- (6) They enable quick identification of the best available solution.
- (7) They allow examination of a large number of alternatives.<sup>6</sup>

The budgetary process, as part of the decision making process, is also made more rational by the use of quantitative techniques. Because the use of quantitative techniques requires disciplined thinking about a problem, the assumptions, costs, and goals which are factors must be articulated. Comparative analysis can then be made of different strategies, so that the incremental costs and benefits of the alternatives can be determined. The library administrator can then determine the best choice among the feasible alternatives which will take the library toward its goals and objectives in an efficient manner.

Incorporating quantitative techniques into managerial decision making requires time, effort, and expense. Planning may be required to determine what information must be obtained, how to obtain it, and how best to evaluate it, before alternative choices can be fully considered using quantitative techniques. The necessary information may not be readily available, and decisions will have to be made between the cost of acquiring needed information versus the cost of making decisions without that information. The library administrator, like any manager, will have to decide what to investigate using these techniques, how to investigate it, and how to interpret the results of the investigation. The potential benefits of using such techniques, however, especially if they result in more efficient and effective allocation and use of the library's budget so that it can reach its objectives, are worth the time, effort, and expense required.

### Notes

- 1 Prentice, Ann. *LJ Special Report No. 7 - Strategies for Survival: Library Financial Management Today*. New York: R. R. Bowker, 1978, 1.
- 2 Bommer, Michael. "Operations Research in Libraries: A Critical Assessment," *Journal of the American Society for Information Science* 26:137-139 (May/June 1975), 137-138.
- 3 Bookstein, Abraham and Kocher, Karl. "Operations Research in Libraries," in *Advances in Librarianship*, vol. 9, ed. by Michael Harris. New York: Academic Press, 1979, 178-179.
- 4 *Ibid.*, 144.
- 5 McKenna, Christopher. *Quantitative Methods for Public Decision Making*. New York: McGraw-Hill, 1980. 248.
- 6 Turban, Efraim and Meredith, Jack. *Fundamentals of Management Science*. Plano, TX: Business Publications, 1981, 10.