Financial programming and multicriteria decision analysis: one more tool on librarians' hands?

Anthi Katsirikou*
Library Director, e-mail: anthi@library.tuc.gr

Abstract.

As the economics of libraries become more and more complicated the libraries' interest in economic and financial analysis is never been more crucial. This paper examines the difficulties associated with the application of financial analysis. Financial programming and financial planning models for libraries are also been discussed. The library's state of the art and its economic relations are mentioned along with the peculiarities of the product "information" and some principles on its cost measurement.

The Decision support systems (DSS) can provide that forms, which the decision could take in order for the DSS to be considered as alternatives solutions of given problems, in relation to the chosen criteria, and the importance given to each criterion. The proposed method is the Analytic Hierarchy Process (AHP) that aids to non-qualitative criteria to be quantified and measured.

Keywords: Financial programming, decision support systems, library costs, library management.

* Corresponding Address: Technical University of Crete, Library, University Campus, 73100 Chania, Greece. Fax: 0030 821 69919, e-mail: anthi@library.tuc.gr.

Introduction.

Nowadays there is an increasing expansion of using the business models to run non-profit organizations. The contemplation of the user or the citizen as a client, the definition of the service as a high quality product and the cost -benefit analysis are topics, which have been inserted in the library's field directly from business and have been accepted as the main managerial model.

Libraries offer various services and users are charged for many of them when making use of that services. In other words, services bring about money to libraries. That is why libraries not only need to understand and adapt methods and techniques of gathering money but also to invest it in the most profitable way.

Libraries apply the a priori research and restriction of the information resources for the current and potential user needs. This is secured by the systems planning and operation of the creation, synthesis, collection, classification, storage, preservation, access, search, interpretation, performance and free and prompt flow of information, through every means and sources, local or remote in an economically effective way, for the social environment improvement.

Without financial management, the mission and the goals of Libraries, which are implemented by a variety of means, reveal the weak points of Libraries organization and function. Furthermore, the peculiarities of Libraries are revealed when compared to the business world; that is the method application difficulty is revealed, which are inspired and planned for business world.

Some decades ago, libraries justified being knowledge and information providers by purchasing books and journals, by cataloguing them and promoting them to readers.

However, things have become more complicated since then, as:

- There is a huge increase in the quantity, range and variety of globally published resources,
- There is a multiplication of resources, print and non-print,
- There is an increase of users and authors.

During the last 5 decades, there is an explosion in the number of Universities, students, theses, and research journals; an explosion which is associated with a tremendous increase

in the scholar and publishing production. A Navigation to Internet could persuade about the above mentioned complexity and increase of information supply and demand.

Library's roles are more and more dependent on external providers of specialized information and services. Library undertakes the difficult job to evaluate and organize these information services to offer them to users. Technology and networks have assisted the development of information services provision, as the form of the presentation and the availability of information has altered.

Some insist that economic analysis is not applicable to libraries, because their production is not materialistic concerning humanistic values such as knowledge, well being, culture and the spiritual calming. Furthermore, if information is considered as a commodity and a product for sale and a purchase for profit, according to the market values and rules, that means that information is not a common good, necessary for the whole of society.

The response to it is that economic analysis is relative to libraries, because both economy and libraries are engaged to the rare source distribution in order to satisfy competent goals.

The Literature and the arguments go on, the present paper however considers the economic and financial analysis as tools on the librarian's hands for facing significant dilemmas. Library's job can be quantified and the Decision Support Systems and the Multicriteria analysis can aid library's decision makers to choice the optimal in every case solution, according to the criteria hierarchy, which is set.

The Libraries' interest in Financial Analysis.

Library budgets around the world have been inadequate due to:

- The influence of electronic information,
- The influence of new technologies,
- Increasing costs for library materials, and
- Governmental funding restrictions.

Furthermore, the economics of libraries are threatened by:

- Rapidly increasing costs of materials, human resources and equipment maintenance,

- The increased number of integrated information sources and libraries' dependence on them,
- The vendor's ability to outflank libraries in order to approach directly the user, that is to say economic sources waste for the parent Organization[i].

Parts of a library's economic functions are mentioned below:

- Buying bibliographic and cataloging services,
- Paying subscriptions to cooperative schemes,
- Replacing print with electronic material,
- Replacing periodical and conference subscriptions with ILL,
- Paying the access to specialized scientific information in electronic form by agents,
- Using Network for accessing bibliographic sources and libraries' catalogs,
- Development of Audiovisual collection and multimedia,
- Software, System and Equipment maintenance costs, hold a significant part of the budget,
- Investing more than the past, to staff continuing education and training,
- Staff participation to national and international innovation projects,
- Aspiration of income from donations, letting out the library's place for social events or conferences.

Roberts[ii] refers to the suggested principles on which an academic library might be run:

1. The library /Information services required by the institution should be provided in the way that is most cost-effective for the institution.
2. Within the library, deployment of resources –of money, staff and accommodation- should be optimized.
3. The valid use of library sources- stock, staff, equipment and accommodation- should be maximized.
4. Abuse of resources should be minimized.
5. Individual members of the institution should not pay for facilities or services that they need to fulfill their function in the institution.
6. Whether the library should carry out the cost of a facility or service or require departments to pay for it should be determined according to cost-effectiveness.
7. The library should not transfer its costs to users.

Questions as to how libraries will respond to the escalating pace of change, how library managers will fund the acquisition of multiple information formats, how they will meet the

expanding service needs of their constituents, and questions as to how they will compete on campus for a piece of a shrinking institutional resource base, have served to magnify the uncertainty that is threatening the most heartfelt beliefs about librarians[iii]. It is obvious that decision makers are limited of the gradually decrease financing and of the gradually increase services, from which they have to choose for supplying the users.

Financial Programming and Libraries.

Economics are defined as the occupation on the ways that people and societies look for in order to satisfy physical needs and desires. Economic analysis is able to assist the decision makers on the estimation of alternatives and on the cost decrease or on the cost effectiveness increase.

The Financial analysis job is the capital budgeting, dividend policy, stock issue procedures, debt policy and leasing[iv]. It also includes the financial programming, that is the results of the combination of investing and economic decisions[v].

Economic analysis can provide useful information to decision maker about alternatives. That's why it is a serious aspect of library management. The librarians' occupation in economic analysis aids to the quality and price control of the products[vi] and to the estimation of the cost and value of them. Furthermore, it contributes to the maximum use of products.

Librarians should rethink what it is they do in order to survive from the changing economy and to handle the forces that emerge from these issues… Librarians need to admit and deal with the fact that there are alternatives for library services.[vii]

Whenever we propose spending some resource-time, money or effort- for some future advantage or benefit, we are advocating an investment decision. Two trends are entered at work:

1. The increasing impact of modern technology, communications technology, data processing, etc., upon library operations. Investment decision is inherent in the nature of technological change. With a prospect of future savings or efficiencies, we implement a more modern technology. That implementation requires time, money, or effort, that is, an investment.

2. Toward continued high inflation. A natural result of this trend is the need for more convinced justification for investment decisions and more sophisticated presentations of those justifications.[viii]

Recent trends in the information business have included:

- The perception of declining resources.
- The introduction of contracting out into all sectors of the information world, from the corporate information unit through to the public library.
- The impact of market testing programs.
- The move towards cost center based management of financial resources.
- The need to ensure that money expended on information services is well spent.
- Perceived demands for improved levels of service.
- An increasing emphasis on the development and establishment of performance indicators.
- An increasing necessity to make inter- rather than intra-organizational comparisons.
- The move from purchasing ownership of information to purchasing access to information.[ix]

Financial programming is necessary because:

- Investment and financing decisions interact with each other and should not be made independently. The whole may be more or less than the sum of parts.
- It helps the establishment of concrete goals to motivate managers and provide standards for measuring performance.
- It avoids surprises and thinks ahead about how the managers should react to unavoidable surprises.
- It tells which projects work and what could go wrong with them.
- It traces out the possible impact of today's decisions on tomorrow's opportunities.[x]

The financial planning process is represented in Figure 1[xi]. The planner, located in the center, is responsible for the information collection in the process of decision-making. The financial planning process is represented as follows:

- Goal and objectives identification of financial planning,
- Competitors assessment and their possible reactions,
- Market forecast and product demand,
- Market description and the environment in which the organization operates,
- Economic and political forecasting,

- Assessment of the internal strengths and weaknesses of the organization for the determination of attitude on future challenges and opportunities.

[Figure 1].

Financial planning is a process of:

- Analyzing the interactions of the financing and investment choices suitable to the firm,
- Projecting the future consequences of present decisions, in order to avoid surprises and understand the links between present and future decisions,
- Deciding which alternatives to undertake (these decisions are embedded in the final financial plan),
- Measuring subsequent performance against the goals set in the financial plan.[xii]

The future business planning of the organization can take various forms depending on the period it covers:

- Short term planning for the next year,
- Long term planning for the next 5-10 years that includes wider goals and the aggregate policy of the organization.

In planning, there are the alternatives, which the decision-maker has to choose from. These solutions might propose a dynamical performance of the organization with big investments and new services, an innovative procedure establishment, a restrained development, a plan of expenditures curtailment or a policy of services in a payment basis. Every proposed solution holds the scheduled inflows and outflows related with it.

The size of the organization determines how detailed is the analysis the financial plan contains. The basic elements of the plan will be similar, however, to firms of every size:

1. Proforma statements (forecasts) balance sheets, income statements and statements describing sources and uses of cash. These statements embody the organization's and the library's financial goals. It is common that the main financial source of libraries is the organization that they belong to and the Government.
2. Capital expenditure and library strategy. The plan will also describe planned expenditure, usually broken down by category (expenditure for replacement, for

expansion, for new services and updated information products) and by division or operation of library. A thorough justification report of money spent should be available along with the clarification of the organization strategies used for achieving financial goals. These written descriptions record the end result of discussions and negotiation between library manager and top management.

3. Financial planning. This part of the plan include a discussion of income policy, beyond the organization or Government financial support, such as services sale, donations etc.

Libraries' as governmental non-profit organizations include in their financial plan their budget, which reveals their goals, strategic planning and the previous year financial report.

Stoffle[xiii] considers that "budgeting (the justifying, allocating, raising and managing library funds) is one of the two essential components in library management, the other being creativity".

Talbot[xiv] defines a budget as the "statement in monetary terms of the organizational intent concerning the library's programs and priorities".

It is however essential that all concerned with the information unit to understand that the overall budget process is also the means of providing political and social interaction between the unit and its organization and user communities.[xv]

The purposes of planning and the desired end result determine the requirements for effective planning. Emphasis is given on two different points:

1. Accurate and consistent forecasting. Effective planning requires administrative procedures to ensure that relevant information and expertise are not passed by, even if they are inconveniently scattered through the firm.
2. Finding the optimal financial plan. In the end the financial manager has to be able to judge which plan is best. There is no model or procedure that comprehends all the complexity and intangibles encountered in financial planning. As a matter of fact there will never be one. This bold statement is based on the following law:
   Axiom: The supply of unsolved problems is infinite.

   Axiom: The number of unsolved problems that humans can hold in their minds is at any time limited to 10.

   The law: Therefore, in any field there will always be 10 problems which can be addressed but have no formal solution.

Financial planners have to face the unsolved issues and cope, as best as they can, with judgment.[xvi]

Financial planning models.

Most corporate financial models are simulation models designed to project the financial consequences of alternative financial strategies under specified assumptions about the future. The models range from general purpose ones to models containing literally hundreds of equations and interacting variables[xvii].

A financial planning model structure is represented in Figure 2.[xviii] A financial planning model describes the logic behind the calculations for a proforma income statement, balance sheet, and cash flow statement or cash budget. These types of models are also known as accounting models because accounting definitions are used as a basis in the estimation of future values. In a financial planning model the proforma statement accounting logic is linked or integrated in such a way that information resulting from decisions or the calculation of values for one statement is filtered into the other statements. It should be underscored that an effective financial analysis requires that all three financial statements can be incorporated into a single monolithic model. It is this type of financial statements model organization, which makes it possible to perform cash breakeven sales and return on investment analysis.[xix]

Cost accounting is the process of allocating resources to activities to show the cost of each individual activity. The techniques and results of cost accounting … will:

- Specify the cost structure illustrating how the budget is made up and how it is spent by in functions undertaken by the information unit,
- Assist in supervision of the efficiency of operations,
- Provide information allowing the calculation of service prices,
- Provide pricing aids allowing for decisions in relation to in-house provision or contracting out,
- Allow comparison of cost between different information systems,
- Allow new or changed services to be estimated,
- Help review financial performance,
- Assist in preparation of budgets,
- Assist in re-planning and re-budgeting exercises.[xx]

[Figure 2]

For a better understanding of the relations among the elements of the model, the systems approach method[xxi] is used, as it is shown in Figure 3[xxii]. The base system is represented as the place which the manufacturing operations take place. These operations are brought about by a set of rules generated in the metasystem, which is a design and control mechanism that produces a set of rules, performance measures and performance standards. The environment consists of two parts, exogenous environment, reflecting influences over which the internal system has no control, and the endogenous environment consisting of all the variables under control by the system.[xxiii]

In the case of library management the "manufacturing system" is translated into "acquisitions, technical process and services", the exogenous to library environment consists of the collaborative departments of the Organization to which the library belongs[xxiv] as well as the relations, which it develops outside the Organization[xxv], whereas the endogenous[xxvi] environment consists of operations which correspond to the exogenous environment relations and manipulate the financial and organizational topics.[xxvii]

For example, there is an increasing use of new technologies by libraries, which makes the relationship between libraries and computer centers ever closer and dependent. One area of this evolution is financial. Libraries have controlled the majority of resources related to print sources, which means that librarians have greatest management influence and financial control over corresponding issues.

[Figure 3.]

System analysis distinguishes between three types of flows within the firm, physical goods, information and funds. The systems approach emphasizes three main elements significant to the financial planning system of the firm.

1. The recognition of the simultaneous and interrelated flows of physical goods, information and cash flows. The system should not only be able to

control cash flows but also should be able to play an important role in structuring and controlling information and cash flows.

2. The interaction between financial decisions and other management functions. For the effective functioning of the total system, a system must take into consideration their influence on, amongst other things, research and development activities, production and marketing planning.
3. The nature of the firm as an adaptive mechanism. In interacting with its external environment, the firm behaves like an adaptive and learning mechanism. The planning and control function are part of a feedback and correction system designed to achieve a fast reaction time both to mistakes and environmental changes.[xxviii]

The model aids the library to examine the consequences of its plan, however the results are depended on the characteristics and the assumptions that the user inserts in it. The results are probabilistic, neither veritable nor false. The forecasts of models draw usefulness and entity only from their comparison with the reality[xxix].

The peculiarities of library's product and the problems on the information cost accounting.

Information, as a library product, has some peculiar properties, other economic other not, in relevance to the rest products. Some of them are:

1. Information is an abstract concept, is Weightless and does not occupy space and therefore cannot be measured directly.
2. Information causes a living system to utilize energy, which, in turn, causes an observable behavior.
3. Information is the ability to cause work and that information can be measured by the work it causes,[xxx]
4. Information is ephemeral, apart from the cases of storing,
5. Information is expandable, compressible, substitutable,
6. Information is transportable, diffusive and sharable, its value increases as the distance to be transported increases,
7. Information has value that often increases with reuse and repackaging,
8. Information does not depreciate, but is freely available,
9. Information is extremely difficult to control,[xxxi]

10. Information is paid only once, even if it is produced twice or more times,
11. Information can be used again and again by the same person or by different ones, with the possibility of benefit of each use,
12. Information use increases multiplicatively its value,
13. Information can provide awareness that work has already been done, thus preventing its duplication,
14. Information allow improved planning and decision making by the way it reduces uncertainty,
15. Information stimulate creativity and innovation,
16. Information give leads to new work,
17. Information can be an opportunity to exploit,
18. Information makes someone's work or life easier or better.[xxxii]

From librarian's point of view, information as a product add value by locating, evaluating, selecting, cataloging, indexing, storing and supplying it to users, who process and repackage it. In other words, the added value to the product "information" pro-exists because of the existence of the library.

Cost analysis is principally the measurement of the monetary (and time) sacrifice made to achieve certain ends. Cost analysis deals with the question of 'how much does it cost to do Y' or 'what is the cost of X'. The analyst isolates those areas of task, which are considered relevant to the given end, and on which information is required for descriptive or decision - making purposes. There are two basic kinds of cost analysis methods: work measurement methods and estimation methods (really a subclass of the former). [xxxiii]

Because of the identity of the product, library services are quite difficult to be costed and value measured. The right organization and operation of the library could act as a positive argument, but it proves the quality not the value, so it is necessary to find ways for measurement of the value of use. Perhaps, what could happen is the consideration of the allocated operations of the library as competent among them in order that the cost of one would consider as alternative of another[xxxiv]. However in library context, it is not allowable to choose the criterion of the cheapest solution as the popular one. The main criterion is quality (subject coverage, content, suitability, use easiness and friendliness, relativity to other sources etc) and its expression in economic value.

Instead of measuring quality in the traditional way, quality will have to be measured on the basis of how well librarians connect their consumers with the knowledge and content they need, regardless of where that content resides electronically.[xxxv]

In thinking about the value of something, we have to remember that it may have a value in the future, investment value, as well as a value now, the consumption value.[xxxvi] The measurement however is time-consuming because it is necessary not only to range the usage but also to measure the utility volume and the effectiveness to every user. The difficulty derives from the nature of the job, because:

1. Library activities are primarily intellectual rather than physical. While there are physical activities accompanying some of the intellectual ones, they are not of particular interest. We do not need a study to tell us to hire a fast typist to prepare book orders or that an electric typewriter is more efficient than a manual typewriter.
2. An employee's intellectual activities are not, in most cases, open to outside observers, and introspection is a difficult task to master.
3. Usable catalogs of intellectual activity do not exist; even if the activities were observable, we would have trouble in classifying them so that they could be used as a basis for standard comparisons.[xxxvii]

Furthermore, the information that causes benefit comes from the service, and not from the client's own work or ideas… value in use cannot be known before the information has been supplied. That means, that although the value of information in use can be used to justify expenditure on an existing information service, it cannot be used to advise resource allocation decisions about future services. Since value in use depends on evidence of value experienced by individual clients, it cannot be estimated.[xxxviii]

The most important criterion, apart from the saving of money and time, could be the benefit, caused by the information provision as an added value asset to users. It is obvious that the measurement of the usage results of the libraries will actually stay the most relative element, because the usage results are not widely known. Except of others, this approach is ideological and it is not able to solve practical problems of the everyday routines of libraries. So, quantitative and qualitative evaluation criteria have developed, to determine library policy and try to contribute to the cost accounting of library services. The Office of Arts and Libraries[xxxix] proposed 21 performance measures used to calculate indicators, which are discriminated in 4 categories (Service input cost measures, Service output measures, Service effectiveness measures and Service domain measures) and the Performance Indicators also discriminated in 4 categories (Operational performance indicators, Effectiveness indicators, Cost-effectiveness indicators, Impact indicators). Roberts[xl] refers to a detailed description of

the Units of measurement given by Clements[xli] who distinguishes them to 3 categories (New inputs in the library, Processing outputs of the library and Service functions of the library) and also to a detailed list of selected cost measures by library function, given by Hamburg et al.[xlii] McKay[xliii] has described 13 steps of the cost analysis process:

1. Identification of cost centers,
2. Listing of employee activities,
3. Selection of unit measures of output and period during analysis will take place,
4. Design paperwork/computer systems for staff to use for recording purposes,
5. Ensure that all staff record all activities,
6. Generate monthly summaries of employee activities,
7. Produce annual estimates for each employee,
8. Calculate cost of employee activities,
9. Consolidate data to each cost center,
10. Allocate non-personnel overhead costs,
11. Allocate indirect expenses,
12. Determine unit cost of each unit measure,
13. Reconcile costs determined during survey with operating costs for unit.

And Mitchell[xliv] recommends a computation method for human work on which the cost of purchases, leasing, repairs etc is added, whereas Raffel and Shishko[xlv] had described a systematic analysis of University libraries that is a cost benefit analysis of the library functions as a whole. In the same book, Charles Ikle notices that "An allocation of resources involves –either implicitly or explicitly- a comparison of alternatives. The more explicit, the more coherent, the more 'rational' this comparison is to be, the more difficult the task. The difficulties of analysis have many sources: A policy (or system) frequently serves several objectives; the future environment is always uncertain; and the costs and benefits of alternative policies (systems) are difficult to predict and hard to measure."

To abridge, the main problem is pointed out the quantification of qualitative entities, which is necessary for the decision maker to distinguish the optimal choice and make decisions. These cases are faced by the decision systems and multicriteria evaluation, which can quantify the qualitative elements.

Decision Support Systems[xlvi].

De Gennaro[xlvii] has observed that "Determining the right goals and the best strategies and timing for achieving them is the central issue in directing the libraries", that means decisions, decisions, and decisions. Decision Support Systems contain a number of operational models, which could provide specific answers to managers, using computer simulation or gaming techniques. The design philosophy of the Decision Support Systems (DSS) stresses the database as the heart of the system. Models draw data from the database and generate additional data, which in turn are placed in the database. There are two main advantages to this approach:

1. It supports the interaction between models that is so crucial to the system. Data is available to all models that need it, and the output from one model can be used as input to other models.
2. All data can be formatted and outputted by a common set of routines for display, report generation and analysis. The user, the decision maker, can interrogate the database for answers to specific questions rather than lifting and abstracting the necessary data from preformatted reports.

So, the user has an interrogation mechanism that allows him to access only the relevant portions of the new forecast. The user may access data and compare model output in a way that specifically supports currently under study without manually filtering and abstracting data from voluminous reports.[xlviii]

Purposes of DSS are:

1. Supplementing one or more of a decision maker's abilities.
2. Allowing better intelligence, design or choice, which are the three decision-making phases.
3. Facilitating problem solving.
4. Providing aid for non-structured decisions.
5. Managing knowledge.[xlix]

The DSS combine the man initiative and the machine operation. The functions of the decision maker and the operations of the computer are separated.

Through this procedure, the decision maker's knowledge and experience is increased while simultaneously the computer's exploitation capability is improved.

Multicriteria methodology uses multiple quantitative and qualitative criteria, the given weight of which declares the significance of them. Depending on the weight of every

criterion, the results of the method offer to the decision maker series of alternative solutions, among them the optimal by occasion choice.

Multicriteria evaluation within a framework of analysis in which difficult-to-quantify criteria give economic value benefits: The Analytic Hierarchy Process (AHP).

The method helps the decision-maker to examine topics which require attention from many aspects and the right choice is difficult to foreseen. This is a common dilemma for libraries as the example below shows. "Just in time" and "just in case" models for acquiring information highlight an important financial dilemma for most library managers. Managers get their money in part payment that obliges them to just in case financing. However, more services demand the structure to purchase with just in time payments without knowing the cumulative payment demands.

A problem is raised, along with its aspects, which requires investigation, eventually leading to an outcome. The AHP provides the possibility to the decision maker to solve complicated problems and to conclude to the optimal solution. It contributes to the clarification of the main goal and the secondary ones and the alternative ones and finally it organizes them in a structured model. In general, AHP involves five steps:

1. Breaking down the decision into a hierarchy of decision elements. A three level hierarchy is illustrated in this model. The first level is the overall objective of the decision problem; the second level is a list of criteria to be considered as important in achieving the overall objective. The bottom level is the set of mutually exclusive alternatives, which are to be evaluated through the AHP methodology. A hierarchy may have more than three levels, but the paradigm in Figure 4 is limited to three for simplicity of exposition.
2. Collecting input data by pairwise comparison of decision elements.
3. Checking the consistency of the input data using the maximum eigenvalue method.
4. Computing the relative weights of the decision elements as the eigenvector of the pairwise judgment matrix.
5. Aggregating the relative weights of the decision elements in order to obtain a numerical outcome.

The great strength of AHP is its ability to incorporate systematic checks on the consistency of judgments in the pairwise comparison matrices.[1]

[Figure 4.]

It is necessary to clarify the kinds of decision problems. There are three types of problems. The **Type I** problem, illustrated in Figure 5[li], refers to the Economic Value as the only criterion. That means that the decision is depended on the quantitative factors, which can be interpreted in financial terms.

[Figure 5]

The **Type II** problem, shown in Figure 6[lii] includes criteria, which are quantified but not in financial terms. It is a matter of fact that these criteria involve economic value, but their computation is hard. Lead-time reduction is measured in days and the quality improvement in percent of reject reduction. These criteria are measured and shown as units different than economic value. Needless to say, that the criteria must be independent.

[Figure 6]

The **Type III** problems, shown in Figure 4[liii], include criteria, which are not measurable in a performance scale or the values of every alternative in the performance scale are unknown. A judgment is required for the comparison of every criterion with the overall objective. In AHP the judgment is elicited as "the relative importance of criterion A to criterion B in relevance to overall objective". The term "relative importance" is not an unambiguous term. Under the "Present Worth" sense, the interpretation of the term is explicited: Relative importance is the relative contribution of every criterion to present worth.

The computations are made comparing by pairs, on a table, where the absolute importance, of every criterion, the relative one and the overall objective are compared. Simulation programs or various computer programs are used for the performance of every alternative criterion.

The AHP method, which is computerized includes[liv]:

- Structure, which contributes to the models development.
- Evaluation and Choice by the combination of inputs clusters.
- Capability of support of individual models as well as group models.
- Graphics for the analysis of group and individual models.
- Sources allocation.
- Question generation for the definition of the opinion of the sub-groups.

The whole process is quite simple; the user raises the goal, the criteria and the alternative solutions. According to his opinion, judges the weights of the relative importance of every criterion and its alternatives. The criteria may be either quantitative or substantial.

When the model: Goal- Criteria- Alternatives is ready, the program proceeds to comparisons per pairs of the alternatives with the criteria and goals, according to the user choice. In this way, the importance or not among criteria is pointed out along with the importance or not of the alternatives relatively to every criterion. The scale of the importance is noticed as: Extreme, Very strong, Strong, Moderate, Equal. Then, the system automatically produces the criteria and the alternatives quantifications and as final result the optimal solution.

Epilogue.

In the near future, when the electronic information will be more expanded and advanced and networks will connect the library and the university, the teachers and the students, when virtual collections, virtual catalogues, virtual faculties, virtual students will exist, then the necessity of a wiser handling of the budget will become more pressing and urgent. At that time, financial management techniques as well as Decision support systems models will be recognized as the appropriate tools of library managers.

The libraries will use the business methods widely. The production process of a high quality product and the cost procedure will become routine. The service supply in a payment basis gains ground continually. So, librarians have to be taught the methods and techniques of how to gather, invest, protect and manage the money gained, apart from the standard budget.

In spite of the above, Librarians must remember that their primary business is to know, who their customers are, and what kind of services they need. Libraries do not determine institutional priorities but follow and fulfill them as best as possible. However, by setting priorities or provoking changes, libraries are gradually becoming the final decision-makers.

Autobiographical Notes.

Anthi Katsirikou has been the Director of the Library of the Technical University of Crete since 1985. She received her Degree in Library and Information Science (1982) and the Degree in Political Studies (1989). Now she is currently working towards her Ph.D. degree in the field of Library Management.

Her research interests focus on Innovation Management and Management of Change in libraries. She's a member of IFLA, IATUL and ALA.

Mail address: Technical University of Crete, Library, Campus, 73100 Chania, Greece. E-mail: anthi@library.tuc.gr

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[vi] Wherever the term "products" is used, we have to remember that it includes "services" too. Service means product according to modern management and production theories. The most difficult point of the analysis is the quantification of the "service" production, quality, value, worth in opposition to "product".

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[ix] McKay, D., *"Effective financial planning for library and information services."* (London: Aslib, 1995).

[x] Brealey, ibid.

[xi] Sprague, R. M. Jr, "System support for a financial planning model." *Management accounting* 1972 (June): pp 29-34.

[xii] Brealey, Ibid.

[xiii] Stoffle, C, "Funding and creativity." *Bulletin of ASIS,* 17(1990-1): pp. 16-18.

[xiv] R. J. Talbot, "Financing the academic library." In Galvin, T. and Lynch, B. eds. "*New directions in higher education: priorities for academic libraries, no 39".* (San Francisco: Jossey-Bass, 1972): pp. 35-44.
[xv] McKay, ibid.
[xvi] Brealey, ibid.
[xvii] The automation of financial systems helps to reduce the cost of data processing. There is, however, considerably less opportunity to improve the quality of the financial planning system by using a computer than in the case of production scheduling. The reason is that the computer will not solve any of the critical problems of the financial information system. In general, it will help to do better, what is already done fairly well. The initial applications of computers to business were principally in routine record- keeping activities like accounting. The benefits of the computer to budgeting may be noted in two important stages: 1. In the preparation of the budget various revisions may be necessary before financial and management personnel agree upon the data to submit to divisions and eventually to corporate management. While making modifications would be impracticable if done manually, repeated computer runs easily handle them. As a result the basic budget document can be drafted more realistically. 2. The greater detail in which the budget may be prepared. Each budgeted expenditure may be classified by a code to incorporate organizational characteristics of the expenditure, like the administrative level, the division, the broad purpose of the expenditure, the specific project etc. This flexibility in reporting makes it easier for management to determine the effectiveness of its controls over expenditure at different levels. Jenkins, ibid.

[xviii] Hayen, R. L., "Applying decision support systems to small business financial planning." *Journal of small business management* (1982): pp 35-46.
[xix]. Hayen, ibid
[xx] McKay, ibid.
[xxi] A system may be defined as a "collection of activities, operations or elements that interact with one another". Cleland and King define the term system as "an organized of complex whole; an assemblage or combination of things, parts forming a complex of unitary whole". Cleland, D. I. and King, W. R, "*Systems analysis and project management*." (McGraw Hill, 1987).
[xxii] Jenkins, ibid.
[xxiii] Ibid.

[xxiv] These collaborative departments could be the University Administration, Academic departments, Public and International Relations Office, Accounting Office, Computer center, Printing center, Building construction and Preservation department, Campus offices such as student associations etc. See also Hayes, Sherman and Brown, Don, "The library as a Business: Mapping the pervasiveness of financial relationships in today's library." *Library Trends* 42(3) (1994): pp. 404-19.
[xxv] These relations are the traditional library vendors, the Information sources providers, the Audiovisual and multimedia material providers, the Government Organizations, the Cooperatives such as Consortia, the partners on R&D projects, the Professional Organizations. See ibid.

[xxvi] Ibid.
[xxvii] One constant TQM theme stressed by Deming is the need to understand relationships: who are the customers, how does work get done, what internal relationships affect quality, who are the key players and teams in the organization; and more: with the library as the

central single unit: what other units in the parent organization does the library deal with financially, with what external financial institutions, vendors, and individuals does the library have a financial relationship, which library staff at what intensity deal with these financial relationships, how is the library perceived as part of larger institutions. Ibid. About financial relations of libraries see more detailed report above, at first chapter.

[xxviii] Jenkins, ibid.
[xxix] The models' advantages in general are: They form a frame for the problems investigation, They aid to the best understanding of the problem during the structure process, They offer the operation of data and principles for the testing of a variety of results, They contribute the intra –business communication, They offer a wider range of programming, They control the consequences of the plans. The models' disadvantages are: They don't give ever solutions, There is the risk of the simplification of the problem, Mathematics didn't represent every relation of the firm, Provide only forecasts, not what will be done, They are almost never accurate, The results are depended on the quality of inserted data.

[xxx] Simms, James R., "Information: its nature, measurement and measurement units." *Behavioral science* 41 (2) (1996): pp 89-103.

[xxxi] Young, ibid.
[xxxii] Whitehall, Tom, "Value in library and information management: a review." *Library Management*, 16(4) (1995): pp 3-11.

[xxxiii] Roberts, ibid.

[xxxiv] Anyway, plenty of the alternative services of the library are no possible to compare, for example between the carpet purchase for the reading room (quality criterion: cold and sound decrease) and the reference acquisitions.
[xxxv] Meyer, ibid.
[xxxvi] Whitehall, ibid.
[xxxvii] Mitchell, ibid.
[xxxviii] Whitehall, ibid.
[xxxix] Office of Arts and Libraries, "*Keys to success: performance indicators for public libraries*." (London: Office of Arts and Libraries, 1990):

[xl] Roberts, ibid.
[xli] Clements, D. W. G, "The costing of library systems." *Aslib proceedings* 27(3) (1975): pp. 98-111.

[xlii]. Hamburg, M. et al, "*Library planning and decision making systems"*. (Cambridge, Mass: MIT press, 1974).

[xliii] McKay, ibid.
[xliv] Mitchell, Betty Jo, Tanis, N. E. and Jaffe, J, "*Cost analysis of library functions*." (Jai Press, 1978).

[xlv] Raffel, J. A. and Shishko, R, "*Systematic analysis of University Libraries: an application of cost benefit analysis to the M.I.T. libraries*." (Cambridge, Mass: MIT press, 1969).

[xlvi] Mintzberg defines "decision" as a commitment to action, usually a commitment of resources. In other words a decision signals an explicit intention to act. Mintzberg, H, "*The structuring of organizations*." (Prentice Hall, 1979).

[xlvii] *De* Gennaro, R, "Managing the library in transition: shifting gears: Information technology and the academic library." In R. De Gennaro (ed), *Libraries, technology and the information marketplace: Selected papers.* (Boston, MA: G. K. Hall, 1987).

[xlviii] Sprague, R. H. and Watson, H. J, "A decision support system for banks." *OMEGA* 4(6) (1976): pp. 657-71.

[xlix] Holsapple, C. W. and Whinston, A. B, "*Decision Support Systems: a knowledge based approach".* (West publishing co, 1996).

[l] Boucher, T. O, "Multiattribute evaluation within a present value framework and its relation to the Analytic hierarchy processes." *The Engineering Economist* 37(1) (1991): pp 1-31.

[li] Boucher, ibid.
[lii] Ibid.
[liii] Ibid.
[liv] Visit http://www.expertchoice.com.