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MANAGING DIGITAL LIBRARIES: THE VIEW FROM 30,000 FEET

Using cost benefit analysis to justify digital library projects

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Abstract

Purpose – The purpose of this paper is to describe how cost benefit analysis can be used as a tool for financial-based decision making in digital library project management.

Design/methodology/approach – Using theory and example, the author discusses the use of cost benefit analysis in cases where the financial value of costs versus benefits must be considered.

Findings – Cost benefit analysis is useful as a tool for making project decisions based on financial considerations. However, given the inherent subjectivity of valuation of intangibles, the outcome of a cost benefit analysis is not absolute.

Originality/value – This paper fills a gap in the digital library project management literature by applying a tool that has been traditionally used in large-scale, governmental project plans to the world of library project management. In doing so, project managers in libraries will be better prepared to make decisions based on financial considerations.

Keywords Cost benefit analysis, Digital libraries, Project management, Project planning

Paper type Viewpoint

In previous articles in this series, we have looked at some of the many techniques that project managers can use to better facilitate the management of digital library projects. Thus far, the focus has been on optimizing overall project flow. Pareto analysis, paired comparison analysis, Pugh matrix analysis, and decision tree analysis are techniques that are used by project teams to determine which tasks or options will have the biggest impact, how to forge a path when multiple paths are possibilities, and selecting options when there are multiple factors or divisions to be considered.

What we have not considered so far is how financial measures can be used to determine if a project should proceed, or not. A project team can spend a lot of time developing viable paths to execute a project. However, the project team also needs to answer the basic question of whether a particular project is worth pursuing given the required amount of time and money it will cost to implement. Cost benefit analysis is a widely used technique in the private sector for determining whether it makes good economic sense to start or continue pursuing a project. In the current economic climate, the use of cost benefit analysis can be a compelling methodology for justifying a project.

What is cost benefit analysis?

In most libraries, there are many good ideas for projects. Selecting which ones to implement depends on a number of factors. One of the most important, however, is whether the library will get the appropriate value back from a project. For example, if it



costs a library \$500 a year to maintain an electronic reserves system, a library that only processes 500 reserve items a year would probably find that the cost of maintenance is justifiable. However, if the maintenance cost were to be \$7,500 a year, the justifiability of the cost might be called into question.

Cost benefit analysis was first proposed as a technique for decision making by Jules Dupuit (1844). Although the formal technique has historically been associated with governmental planning and budgeting processes, over time the process has been adapted and modified to work in other environments, especially in the private sector. Today, cost benefit analysis is mainly used to provide financial justification for a decision by supplying detailed information that demonstrates the financial benefits of a project outweigh the costs. For the digital library project manager, some of the questions cost benefit analysis can answer are “Is the proposed system a good use of funds compared to another solution?” and “Will the system pay for itself over a period of time?”

In general, the advantage of cost benefit analysis is that it is a straightforward method for determining the costs of a project (Prest and Turvey, 1965). The method is not completely objective but it does provide a simple formulaic process for costing a project. Basically, the formula consists of subtracting the costs associated with a project from the sum total of the benefits of performing the project. The computation of cost is complicated somewhat by various monetary valuation techniques that may be modeled as part of the costs, such as the time value of money used for purchasing goods and the valuation of intangible items such as cost of a lost opportunity, which could be quite subjective. For the majority of digital library project managers, however, less complicated financial models will suffice.

In order to accurately compute costs, a project manager must determine the recurring and nonrecurring costs associated with a project. Recurring costs, such as maintenance, must be included each year of the project budget whereas nonrecurring costs (such as the costs associated with starting the project up) must be amortized over the course of the project. Additionally, the project manager must determine the “hard” and “soft” costs of a project. For example, if a project involves purchasing new software, it will be clear that the purchase of the software is required – this would be considered a hard cost, as it is unavoidable. The cost to implement the software is not necessarily obvious and could potentially be done in several ways. For example, the labor cost of programmers that may need to make modifications to the software that has been acquired has to be considered as part of the project costs as does the time used by staff to test the software. These costs are usually termed “soft” because they are frequently intangible and often are not inherently obvious.

Cost benefit analyses usually include a “payback time” or “breakeven point” which provides a measure for when the project is “paid for.” In most cases, the benefits of a project take some time to be realized. Depending on the mix of factors, a project can pay for itself either quickly or over the long term. In order to determine when a project “pays for itself”, the value of the benefits of a project have to be transformed into an amount of time that it takes for the benefits of a project to be greater than the costs to implement and maintain the project. Depending on the nature of the project, the payback time can be a major factor in determining whether a project is implemented as the calculations may demonstrate that it takes too long to realize the benefits of the project.

Cost benefit analysis in action

The simplest model for computing cost benefit analysis is to only use simplified costs and benefits. For instance, many libraries are trying to decide whether to host their repositories locally using open source repository software or to use a vendor-hosted repository product. Consider the case where the cost of implementing the open source repository is:

- \$5,000 for a new server and 2 terabytes of disk storage;
- \$5,000 for external programming support to install and configure the repository; and
- the estimated lifespan of this solution is three years.

The cost of housing the repository material in a vendor-hosted solution is \$350 a month for the first three years. The first cost that factors in our decision is determining the average monthly cost for a locally provided solution. The formula is the sum of costs divided by the estimated lifespan: $(5,000 + 5,000)/36 = \$277.78$. The second cost we have to calculate is the total cost of the vendor-hosted solution over the same period of time: $\$365 * 36 = \$13,140$. Assuming that the locally hosted repository is a benefit, the payback time would equal the local cost (i.e. benefit = \$10,000 divided by the hosted cost (\$13,140) distributed over the three year lifespan. In our example, the benefit to cost ratio is 76.1 percent of three years which is approximately equal to two years and seven months. In this case, the breakeven point of the locally hosted solution is not that much greater than the vendor-hosted solution. In this case, the determining factor may be whether the library has available cash to pay for the upfront costs (the local solution) or whether the budget situation makes it more plausible to distribute the cost evenly over the course of the three years (the hosted solution).

This does not, however, take into account the value of intangible costs and benefits, which can be highly subjective. For example, if the repository were hosted at a vendor site, we could use the time of the programmer for other projects. If we used the salary of the programmer as a baseline measure, it would be relatively easy to compute the value of this benefit. On the other hand, our institution may view having a repository hosted locally as a highly prestigious accomplishment. Valuing what this prestigious accomplishment is worth would be very subjective as there are no objective standards for measuring prestige.

Furthermore, cost benefit analysis can be complicated by human factors that influence the valuation of costs and benefits. Too often, project managers place too much emphasis in subjective estimates on past projects (Flyvbjerg *et al.*, 2002) that seem to be similar to the one at hand but are not because the scope of the project is significantly different (either larger or smaller) and the skill level of the project team is different. The biases of the team may also promote "positive thinking", which can lead to overestimating the ability of the team to perform. Finally, the project team may fail to recognize the inherent interest they have in project success. All of these factors, if not accounted for, can lead to unduly optimistic subjective valuations. Consequently, given the inherent subjectivity of valuation of intangibles, the outcome of a cost benefit analysis can be misleading if the project manager is not careful.

Given the limits of space, we have not been able to fully explore the wide variety of applications of cost benefit analysis. This is unfortunate because having a solid financial basis for making project recommendations is one of the most powerful tools a

project manager can have. Project managers interested in learning more about the theoretical and practical applications of cost benefit analysis are advised to consult Nas (1996). Although this book is relatively difficult to locate in hard copy, the majority of the text is available online through Google Books.

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