Assessing the Value of Public Library Services: A Review of the Literature and Meta-Analysis (Project META)

Jennifer Weil Arns
School of Library & Information Science
University of South Carolina
Columbia, SC
jarns@mailbox.sc.edu

Karen A. Miller
School of Library & Information Science
University of South Carolina
Columbia, SC
millerk8@email.sc.edu

ABSTRACT
This poster summarizes results of the IMLS funded University of South Carolina META project that explored the application of meta-analysis techniques to develop a robust model of public library economic value. Completed in 2014, the project approached this topic with two fundamental questions: (1) whether the reviewed public library valuation studies provide mounting evidence concerning the contributions that public libraries make to the economic prosperity of the communities they serve, and (2) what steps need to be taken in order to strengthen this assertion? The results of the analyses performed to answer these questions suggest that Americans typically receive five to six dollars for every dollar they spend on public library services. The results also lead to recommendations concerning strategies that could add strength to this assertion and provide a powerful new argument for the continuance of public library services: more detailed reporting practices, greater methodological consistency, and systematic consideration of intangible benefits.

Keywords
Meta-analysis, public libraries, public library valuation, economic value, economic benefits, IMLS.

INTRODUCTION
As Robert Behn (2003) indicates, there are many reasons to measure organizational performance. They typically begin with two basic questions: is my organization doing what it is intended to do and is my organization doing what it is intended to do well? Beyond this point, performance assessments can be used to guide the allocation of funds, motivate and direct employees, identify needs for improvement, and foster organizational culture. In the public sphere, perhaps even more importantly, performance measures are also powerful tools for communicating programmatic value and accomplishments to stakeholders and constituents.

In the case of public libraries, programmatic value and the contributions public libraries may be expected to make to the lives of those who live in the communities they serve are often readily apparent. The demand for their products and services is strong and rising. They are currently visited over 1.5 billion times a year, and they circulate 2.5 billion items annually (IMLS, 2014). People typically speak positively about their public libraries. They take pride in the presence of their library buildings and provide long hours of volunteer services on their boards and governing bodies.

Characterizing the economic value of these services has proved more challenging (see, e.g., Lunin & Abels, 1996; Saracevic and Kantor, 1997). Over the past several years, the importance of these assessments and the measurements needed to produce them have been recurring themes in public library discourse. Arguments made by Glen Holt and Donald Elliott (2003) have figured prominently among these themes. The Urban Libraries Council (2007) and the Online Computer Library Center (OCLC) (2010), among others, point to the importance of economic valuation. There are now a good number of studies that have used a variety of approaches to assess the economic contributions of public libraries. Less progress has been made concerning the expected magnitude or consistency of those estimates.

Completed in 2014, the IMLS sponsored project described in this poster approached this topic with two fundamental questions: (1) whether the studies reviewed provide mounting evidence concerning the contributions that public libraries make to the economic prosperity of the communities they serve, and (2) what steps need to be taken in order to strengthen this assertion. The poster presents the steps the META project used to arrive at its major conclusion: American communities can typically expect to receive five to six dollars of benefits for every dollar they spend on public library services. Because there is a strong likelihood that this estimate undervalues public library
services, suggestions are made for providing a more holistic assessment approach that leverages the rich imagery still associated with today’s public libraries and the original objects obtained through public library services.

META-ANALYTIC FRAMEWORK

The prefix meta derives its meaning from the Greek word μετά that speaks to position and suggests concepts such as among, with, after, and change. In the domain of research, meta-analysis speaks to a different type of conformity and the idea that “instead of looking at any study in isolation, we need to look at the body of evidence” in order to understand the utility of events or interventions (Bornstein, Higgins, & Rothstein, 2009, p. xxi). Phrased differently, meta-analysis attempts to “integrate results from existing studies to reveal patterns of relatively invariant underlying relationships and causalities, the establishment of which will constitute general principles and cumulative knowledge” (Hunter & Schmidt, 2004, p.16). Utility is increased and knowledge advanced when synthesized data are found to conform to similar principles or results.

The term meta-analysis appears in the Library and Information Science (LIS) literature in the early 1990s, most notably with Trahan’s (1993) pilot study that used this approach to explore a question of continuing interest: the comparative effectiveness of computerized versus paper-based information retrieval systems. Trahan noted that it was necessary to reject many studies due to insufficient data reporting. Mead and Richards (1995) pointed to the role that information specialists can play in systematic literature reviews providing a foundation for meta-analysis papers. Saxton (1997) reported the results of a meta-analysis of reference service evaluation studies, noting that of the fifty-nine studies initiated in the thirty-year period from 1965 to 1995, only seven reported the descriptive data and statistical measures required for meta-analysis.

Almost a decade later, Ankem (2005) provided a detailed discussion of the types of variables that figure in meta-analyses, the properties of the data needed for calculations, and three popular approaches to statistical analysis: Hedges and Olkin (1985), Rosenthal and Rubin (1978), and Hunter & Schmidt (1990). These approaches are exemplified Ankem’s meta-analysis of factors affecting information needs among cancer patients (Ankem, 2005). Speaking of the value obtained through meta-analysis, Ankem notes that “the reasons and advantages for any interested researcher to conduct a meta-analysis are that it (1) allows for more precise results related to a research problem as these results are a mathematical aggregate of those from various studies examining the variables in question, and (2) increases in [statistical] power” (p. 165). Other LIS meta-analysis applications are ably summarized in Saxton’s (2006) literature review.

Successful meta-analysis requires three conditions: a situation where a treatment or intervention can be defined, a standardized metric that can be used to assess the intensity of the treatment, and a level of methodological consistency that supports the comparison of observations. When these are present, the treatments function as independent variables.

PROJECT META

For the purposes of this project, the treatment of interest was considered to be an action: the expenditure of public funds. The intensity of the treatment was measured by the size of the expenditure, and the effect of interest was defined as the benefits that accrue as a result of the investment, all of which could be described in dollars. Given the variety of constructs that typically characterize these measurements, the combination of quantitative and qualitative approaches used in the LIS literature to assess value, and the variation in their treatment in the literature of interest, a multiple-method multi-phase approach was selected for assessment and comparison (Bryman, 2007; Schalock, 2001). The three META project phases consisted of: (1) data collection and analysis based on the user’s perspective, (2) data collection and analysis based on the institutional perspective, and (3) pro forma meta-analysis.

Phase 1: The User’s Perspective

During Phase 1, a set of over 200 citations were reviewed for relevance to the valuation of public library user benefits based on the following criteria: 1) the study included at least one economic cost-benefit measurement, 2) valuation methodologies were described, and 3) results were sufficiently standardized and detailed to be comparable to other studies. Further consideration was given to Saxton’s (2006, p. 167) amended criteria for statistical reporting and meta-analysis: 1) operational definitions of each of the variables mentioned in the article, 2) data indicating the mean, minimum, maximum, and standard deviation of these variables, 3) a list of the number of responses for each variable, 4) a clear description of the relationships between the variables, including the precise level of significance associated with the effect size observed, and (5) an explicit description of the study population and the unit of analysis. The final META bibliography is available at http://www.libsci.sc.edu/MetaWeb/valuationstudies.html.

As Van Houtven (2008) notes, cost-benefit data gathered using contingent valuation (CV) surveys present particular challenges when considered for statistical meta-analysis. Although CV is probably the most dominant analytical method in current use, our review of the studies revealed considerable variation in how CV (and related approaches) was actually conducted when applied to a specific public library. Without consensus as to the best way to apply CV methodology, problems arise when assessing reliability and validity within an individual study or across several studies. The studies generally do not report information essential for statistical meta-analysis, such as sample means and standard deviations; therefore, we initially approached the studies we reviewed using descriptive statistics.
The economic benefits reported in studies focused primarily on direct user benefits ranged somewhat widely between $2.70 and $13.50 when adjusted for inflation. The average benefit per dollar expenditure was $6.59. The median was $5.37. In studies including indirect user benefits, the total inflation-adjusted benefits per dollar expenditure ranged between $4.78 and $34.67. The median value is $5.77. The average was $8.76 when all the studies were considered and $6.57 when the largest and smallest values were removed.

Phase 2: The Institutional Perspective
The IMLS Public Libraries in the United States Survey data files used during Phase 2 included the State Summary files and the Public Libraries in the United States files of over 9,000 U.S. public libraries spanning 2008 through 2011. The “investment” construct was operationalized using the amount of local dollars committed to or spent on library services. The economic benefits derived from this investment were estimated using the University of South Carolina (SC) economic impact model described at http://www.libsci.sc.edu/SCEIS/home.htm.

In 2011 (the most recent IMLS file available at the time of the study), the direct benefit per dollar invested was $4.11. This figure rose to $5.63 when indirect returns were also considered. The direct return was highest in the Rocky Mountain ($4.91) and Plains ($4.80) states. The average total direct and indirect benefit was highest in the Rocky Mountain ($6.39), New England ($6.39), and Plains ($6.31) regions. The total benefit from a one dollar expenditure also appears to be somewhat dynamic, in this case showing improvements in some cases between 2008 and 2011 that significantly outpace other investment vehicles.

Phase 3: Pro Forma Meta-Analysis
During Phase 3, two approaches were used to explore the usefulness of statistical meta-analysis of information-related projects and to provide a third public library value perspective. The first set of calculations extended the Phase 2 regional analysis to explore the use of the fixed effects meta-analysis model. The second set of calculations explored the use of the random effects model using data from three library valuation studies.

Fixed Effects Model
The Phase 2 regional public library valuations were further analyzed with the Comprehensive Meta-Analysis (V2) software package. In Phase 3, the regional mean economic values and standard deviations were analyzed to determine the effect size of interest—the overall mean total return. The fixed effects meta-analysis model was selected for the analysis because the IMLS data contains the population of public libraries in America, the regions are sub-sets of the population, and it can be assumed “that there is one true effect size . . . which underlies all the studies in the analysis” (Borenstein, Hedges, Higgins, & Rothstein, 2009, p. 62). An omnibus test was run of the null hypothesis that all of the region mean total returns are equal. There was sufficient evidence to reject the hypothesis with 95% confidence (alpha = .05, Q-value = 24.142, degrees of freedom = 7, p-value < .001) and conclude that the differences between the region means were real differences that were not solely due to measurement error. The fixed effects model produced a point estimate of the effect size or mean total return for the regions of $6.12.

Random Effects Model
During the second Phase 3 analysis, data from three sources were used to explore the meta-analysis random effects model: (1) Aabø’s (2009) review of public library valuation studies, (2) the 2010 SC Economic Impact study, and (3) the 2011 IMLS Public Library Summary File analyzed using the SC economic impact model. For consistency with Aabø’s study, the IMLS and SC study total returns were treated as return on investment (ROI) ratios rather than dollars. The meta-analysis random effects model was chosen for this exploration because it could not be assumed that the three studies shared a common, true effect size or ROI. Unlike the fixed effects meta-analysis model that derives a point estimate of the effect size, the random effects model produces an estimate of the mean of the studies included in the meta-analysis.

An omnibus test was run of the hypothesis that the three study mean ROIs were equal. The results suggested sufficient evidence to reject the hypothesis with 95% confidence (alpha = .05, Q-value = 7.337, degrees of freedom = 2, p-value = .026) and conclude that the differences between the study means were real differences that were not solely due to measurement error. The summary confidence interval generated using the random effects model tells us that we can be 95% confident (alpha = .05, p < .0001) that the true effect size — the population mean ROI of the studies — is between 4.92 and 6.49.

CONCLUSIONS
This project suggests mounting evidence that public libraries contribute to the economic prosperity of the communities they serve and that these benefits typically range around five or six dollars for every dollar spent. Despite the methodological variation that characterized the CV studies reviewed during Phase 1, the figures reported are remarkably similar. It does not seem to matter whether the subject is a single library, a system of libraries, a statewide, or a countrywide study of libraries. When expressed in constant 2011 dollars, the direct return from investments generally ranges between $2.70 and $13.50 despite major variations in the manner in which the data were collected. The average return is $8.76 when all the studies are considered and $6.57 when the highest and lowest values are removed. The median value is $5.78. The results of the Phase 2 calculations harmonize surprisingly well with these results and lend them reasonable credence, as do the results of the exploratory statistical meta-analyses performed in Phase 3. Taken together, these results further align with reports of strong and growing demand for public
library services and provide prima facie evidence that millions of Americans consider their public libraries a “good deal” and an attractive investment.

From an analytical perspective, these results also suggest three avenues that could be pursued in order to add weight to these observations. The first, further meta-analysis of the type described by Rosenthal and Rubin (1978) and explored in Phase 3 of this project, requires additional independent studies which meet the statistical requirements described by Ankem in 2005 (p. 175), among others: variables that are adequately defined and measured, accurate reports of the sample sizes used in the analyses performed within a study, magnitude of test statistics observed, and other information relevant to test statistics.

Secondly, better use of survey data could also add weight to these findings. The SC methodology used in this project was chosen as a matter of convenience and for the purpose of example, but we are not suggesting that is necessarily the best or right one for these types of calculations. Many heads are typically better than one and a more versatile or encompassing group of calculations might provide a more nuanced picture and calculate these values more surely. This type of cooperative approach could also provide additional support for the CV efforts we described earlier.

A third, and perhaps quite fruitful, approach would involve looking more carefully at the intangible outcomes and benefits that are typically not taken into account in these cost benefit estimates. These types of benefits are typically considered more difficult to measure, but they tend to resonate when tied to local policy objectives. There are also distributive questions that need to be considered since it is likely that availability of information and public library service is more critical in some instances than in others.

ACKNOWLEDGMENTS

The authors acknowledge the many valuable contributions of Dr. Robert V. Williams, Diantha Schull, Chris Cunningham, and Somervell Linthicum. This research could not have been completed without the generous support provided by The Institute of Museum and Library Services (IMLS Grant # RE-04-08-0047).

REFERENCES


