TCO and ROI: Assessing and Evaluating an Institutional Repository

This is the third time I've had the pleasure to talk about institutional repositories on the same program as Carol and James and each time I learn something new from their presentation. Last time we were together, at the SEALL meeting in Georgia in April, our charge was to consider institutional repositories as an essential element of the institution's infrastructure. Rather than reiterate, from the Maryland perspective, what Carol and James have explained very thoroughly, I thought it might be worthwhile to focus instead on how to estimate costs and assess the repository's effectiveness and value to the institution. One way to do this is to perform a Total Cost of Ownership assessment. TCO is a decision-making methodology that, at its most basic level, assembles an "estimate of all direct and indirect costs associated with an asset or acquisition over its entire life cycle."

TCO is not a new concept, it has been around for many years, but with the increased emphasis on the need for updated and enhanced computer hardware and software and with fiscal resources shrinking just as libraries are attempting to "do more with less," a TCO analysis may help libraries reach a better informed, more thoroughly researched decision.

On the surface, a TCO analysis would seem to be a fairly straightforward process. After all, isn't it just a matter of getting prices for hardware and software and determining the cost of staffing? While TCO can be used to determine the financial implications associated with the implementation of an IR and, at a minimum, should examine the direct cost of hardware and software and of personnel it should also take into consideration the indirect or 'hidden' costs for ongoing operations such as training, system upgrades, licenses, technical support, and loss of accessibility due to system downtime. While not specifically part of TCO, a thorough analysis should also take into account intangibles such as the complexity of the implementation, the timely delivery of the product, and the availability of an effective exit strategy or a clearly delineated migration path for software and hardware upgrades.

Performing a TCO analysis allows institutions to establish the "true" cost of each component of an acquisition and to be comprehensive it should include both start-up costs as well as costs for annual, ongoing maintenance. Although a Total Cost of Ownership study is not a substitute for a cost-benefit analysis, by developing multiple TCO scenarios, it is possible to compare costs and attempt to determine the cost-effectiveness of the options.

Whether or not TCO is performed, the parameters for the repository should be determined in advance. This will clarify the scope and nature of the project as well as serve as a blueprint for the implementation. To initiate that process, the following questions might be asked:

What type of content will be included? Only scholarly material or will it also contain administrative and instructional documents? Will it be strictly text-based, or include other formats and media, such as audio and video files and images? Is it intended to be a permanent, historical, digital archive of the organization's scholarly output or envisioned to serve as a marketing or a recruitment tool for the institution? Will it be limited to contributions from faculty, or will student scholarship be included? Will other activities, such as conferences, symposia, and lectures be included? Will it focus attention on the full scope of the institution's scholarship or is it likely to be limited to a single discipline or a few departments? Will it include only current material, or will retrospective material be included?

Is adequate technical support available? What responsibilities will the technical support staff have with regard to the repository? In addition to the academic and administrative computer applications they support, will they have the time, interest, and expertise to provide the level of support a project of this nature requires? Do they have the necessary programming experience?

Does the institution have the hardware needed to implement and maintain a repository? Are there adequate servers and other hardware components? Will additional hardware be needed to handle future expansion and development?

What level and size of staff support will be required? Who will be responsible for day-to-day operations? Decisions will be needed regarding the solicitation of content. Who will maintain contact with authors and manage copyright clearance? What sort of training will staff need to add documents to the repository, including scanning, preparing pdfs, and creating metadata? Is the administration committed to supporting the project? Will the parent institution provide the funds or will the library take on the responsibility for funding the implementation?

The TCO assessment combined with answers to fundamental questions such as these will help shape the essential nature, purpose, and scope of the repository.

As the institutional repository movement approaches its 10th anniversary, questions about its efficacy are beginning to surface together with the ongoing debate over the choice of platform. Earlier this year, ALCTS, the Association for Library Collections & Technical Services, sponsored a series of webinars on institutional repositories. A recurring question asked by the attendees was "how did you decide whether to implement the repository locally or use a hosted solution?" The answers to that question revealed that many institutions, as Karen Coyle pointed out ".... do not usually perform rigorous analyses to justify their [decision]."

Why is that? Certainly as librarians we have the tools and the skills required to undertake careful, systematic, unbiased assessments as evidenced by our experience in writing and evaluating Requests for Proposals (RFPs) for a variety of products and services. Are we hesitant about taking responsibility for the repository and unclear who should take the lead in implementation? I don't think so, because we are not shy about calculating risks and entering into entrepreneurial endeavors when we believe they will prove beneficial to the organization.

I believe the reason libraries don't do adequate due diligence is that they fall victim to one of the biggest misconceptions about implementing an institutional repository, that local implementation using open source software is the most cost-effective solution. In 2006, Karen Schneider, who blogs as the Free Range Librarian, wrote:

"I hate the idea that for some librarians if a particular software is open source, hands down, it's the right choice. The right choice is the software that meets the mission. While the principles behind open source are admirable, when an open—source product doesn't meet your library's needs, your first obligation is to your users.... Software isn't 'free' unless the labor to maintain it is 'free.' "

I don't have any hard and fast evidence to prove my theory, and perhaps it's a moot point. As librarians, our job is to demonstrate that we are responsible stewards of the resources entrusted to us, and that includes determining which institutional repository software and platform offers the best "fit" for the organization.

In North America, locally implemented repositories using open source software developed by Dspace, Fedora and EPrints are in widespread use. Dspace was developed at MIT in collaboration with HP and was first released in November 2002. Fedora – an acronym for Flexible Extensible Digital Object Repository – was developed jointly by Cornell University and the University of Virginia in 2001 to store, manage, and access digital content. Their merger earlier this year to form Duraspace will result in "new technologies and services that respond to the dynamic environment of the Web" EPrints was created at the School of Electronic and Computer Science at the University of Southampton in 2000 and is still being developed there. A relatively new entrant into the open source field is irplus, developed at the University of Rochester under a grant from the Institute for Museum and Library Services Foundation for the "management, dissemination and stewardship of digital materials."

It is probably fair to say that most large institutions with substantial technical and physical resources lean toward in-house implementation whereas smaller institutions with more modest technical and support options, or those implementing a repository to support a single discipline, such as law schools, find that it is

to their advantage to use their limited resources of money, time, and staff support to implement a hosted solution.

A widely implemented hosted option in the law environment and one that has also been adopted by larger institutions to support a variety of academic disciplines is the Digital Commons developed by Berkeley Electronic Press. This robust and highly customizable platform is recognized both domestically and internationally as a viable and reliable alternative to a locally implemented, open source IR solution.

Recently, JISC - the Joint Information Systems Committee - issued a "Repository Software Survey."

Similar to a 'consumer reports' study, the report is a comprehensive overview of available repository software. Although prepared for libraries in the UK, any organization planning to establish an institutional repository will find the information useful. It is worth noting however, that the survey leans heavily toward the technical aspects of implementation while matters related to the presentation of content are only minimally addressed. Therefore libraries interested in achieving a balance between a strong technical underpinning and an aesthetically pleasing front end should study the survey results with care.

In the spring of 2008, the Carolina's Chapter of ASIS&T, the American Society for Information Science & Technology, elevated the discussion on repositories to a new level with a program entitled "Institutional Repositories: the Great Debate" where arguments for and against the concept of an institutional repository where advanced. To continue what was, according to press reports, a very intense discussion, ASIS&T, in its April/May 2009 *Bulletin* issued the following provocative statements to stimulate additional "lively intellectual deliberation on the often contentious subject of the institutional repository:"

- * All universities should have an institutional repository
- * Libraries should lead the institutional repository initiative and development at their institution
- * Institutional repository success is dependent upon mandates
- * Institutional repositories should be built on open source software

Without going into detail – the articles are all freely available at the association's website (www.asis.org) – suffice it to say that both the pro and con arguments were cogent and persuasive and continue to spark (no pun intended) interest. Nevertheless, I felt a certain affinity with the remarks by Michael Day and Alexander Ball, who wrote:

... While the statistics ... suggest that most repositories are currently developed on open source platforms, a growing market for outsourced solutions exists The open source development model is likely to have a very significant role to play in helping to develop and link ... complex infrastructures, *but other approaches will still remain viable*. [my emphasis]

During the investigatory period at the University of Maryland School of Law we performed an informal analysis of the available repository solutions. We considered local implementation using open source software and explored the possibility of contracting with the university's main library for software support for an open source solution, since they had selected Dspace as their repository platform. As an Ex Libris customer – we use a number of their products including Aleph, SFX, and Metalib - we considered Digitool (the product Ex Libris markets as a repository) because we thought there might be advantages in terms of integration and interoperability if we stayed within the same "family" of products.

We also took stock of the technical qualifications and capabilities of our staff. Although the IT staff possesses many of the skills needed to enhance open source software, they are responsible for a host of administrative and academic computing tasks and it did not seem feasible or realistic for them to take on the development, implementation, and ongoing maintenance that an open source solution required. The initial development had the potential to be time-consuming and we were eager for a rapid deployment. We also realized that in addition to software and development costs and the expense of hardware and software maintenance, a hardware upgrade to accommodate software enhancements and expanding capacity might also be necessary, requiring a capital expenditure and the need for some period of downtime for installation. Our assessment revealed that start-up costs for a local implementation of the repository using

open source software might be as high as \$100,000 and subsequent expenditures could run to half that amount annually.

Consequently, we determined that the hosted solution on bepress' Digital Commons platform was best suited for our environment. The robust, powerful, back-end can handle a wide variety of content and the fully customizable front-end could be designed to reflect local requirements. In addition, the following factors entered heavily into the decision:

- implementation could begin immediately
- the site would be customized to our specifications
- branding compatible with the 'look and feel' of the law school's website was arranged
- a collegial atmosphere and a sense of partnership for product development were maintained
- hardware and software upgrades and maintenance were handled efficiently, without hampering accessibility
- the system is scalable, so we could start modestly and expand as necessary, thereby maximizing the product's potential and do so on a schedule that works for us
- suggestions for enhancements received rapid and positive response
- there is one all-inclusive annual fee which is affordable and, as they say in real estate, offers us the 'biggest bang for our buck' at a fraction of the cost of implementing an in-house solution
- related features, such as the ability to create individual, customizable webpages for faculty, support for image files, and options to facilitate electronic publishing, were also attractive features

And most importantly,

- we gained the flexibility and the luxury to concentrate 100% on populating the repository.

Despite the factors favoring a hosted solution, the decision was not made lightly. Concerns about the wisdom and appropriateness of outsourcing a project of this nature were raised. How stable was the system and how secure would our data be? What contingency plans would be in place, should the company go out of business? If we decided to migrate to another platform, how easy would it be to extract our data and what format would the data be in? Would there be a way to contain costs? Throughout our investigation, we revisited these questions a number of times, so that by the time our agreement with bepress was finalized, we were confident that all of them had been answered to our satisfaction.

Now in its 4th year, the repository has become much more than a permanent, historical, online, digital archive of faculty publications and is being used to expose the depth and breadth of the institution's intellectual output and expand access to scholarly content. It has also become a platform for the school's marketing, outreach, and public relations activities, drawing attention to the law school's many and varied activities and raising awareness about the law school's ambitious agenda among legal practitioners, alumni, legislators, and the community at large.

As librarians, we have a long and successful history of counting things – think of the annual ABA statistics, and – rightly or wrongly - of ascribing value based on "quantity over quality." However, in higher education, the emphasis now has shifted. Outcomes, not outputs, are important. Quality trumps quantity. At the macro level, we need to demonstrate that library services are recognized as valuable institutional assets and aligned with the strategic objectives of our parent institution.

Return on Investment (ROI) is a technique used by the business community to determine "the amount of value received [for a product or service] relative to the amount of money invested." In the library world, interest in ROI as an evaluation tool is gaining momentum and a number of studies are now being carried out in an effort to establish the value of the library, its collections and services in relation to the amount of institutional investment.

At the micro level, the principle of ROI might also be applied to determine the value of the repository to the institution. ROI uses numerical terms to express value. Metrics such as the number of items in the

repository or the number of new items added annually may offer some clues about the repository's value. Or perhaps the number of times an item is accessed, or better still, the number of times the full text of an item is downloaded may be seen as useful indicators of value. We might compare the number of downloads of repository content with the number of downloads for the same content in SSRN.

Even citation analysis – to discover how often and where repository content is cited – might prove helpful. And statistics provided by Google Analytics offer a fascinating perspective of the repository's range and influence. While quantitative measures are relatively easy to gather, and fairly straightforward to interpret, a more interesting, albeit more challenging way to gauge the repository's value is to initiate a Return on Investment study using subjective measures. While not the typical ROI approach, over the long term harvesting opinions and perceptions instead of facts will yield information to support or refute assumptions based largely on anecdotal evidence including:

- the institution's visibility is heightened
- scholars gain access to new outlets for their research and scholarship
- promising opportunities for collaboration and expanded interdisciplinary investigation and study are discovered
- the repository facilitates faculty recruitment and encourages faculty retention
- a wider pool of potential student applicants are attracted to the institution
- new benefactors and opportunities for philanthropy are exposed

By becoming proactive and utilizing techniques from the realm of marketing and public relations such as surveys, polls, random sampling and questionnaires, evidence may be obtained to validate the repository's importance. By ranking comments and feedback from stakeholders, including faculty, students, staff, alumni, donors and others, much more can be learned about who is using the repository, how content is discovered, and how satisfied users are with the information they find, than the facts alone might reveal.

Last fall, during an address at the SPARC meeting on institutional repositories in Baltimore, David Shulenberger, formerly provost at the University of Kansas, and now vice president for academic affairs at the National Association of State Universities and Land-Grant Colleges, posed the following rhetorical question:

Many campus activities will be suspended by the budget crunch, many more will be modified, and few new activities will be initiated Given these circumstances, why should a digital archive be initiated or why should faculty and staff care about making an existing digital archive more viable?

He answered as follows: "I suggest that a well-populated digital repository promoted as a resource ... can do much to increase the value ... of the [institution]."

Rather than a 'one size fits all' solution, it is important that the marketplace offers choices that allow us to satisfy the needs, interests, and capabilities of diverse scholarly communities and to foster competition, experimentation, software development, and the evolution of best practices, all of which improve the institutional repository environment.

The reasons behind a decision to implement an institutional repository may be complex. As custodians of the institution's resources, the Total Cost of Ownership methodology offers a systematic, focused, approach to the assessment process. A Return on Investment analysis, particularly when it combines objective and subjective measures, will help us to substantiate the assertion that the repository is an essential and valuable element of the institutional infrastructure. The repository highlights institutional and individual achievements, showcases the wide-ranging endeavors of the law school community, and supports what our new dean refers to as the law school's 'trajectory of excellence.' This is an excellent time to implement a repository.