

Costing and Pricing Models in Science and Technology Libraries : **Part 2: Pricing Models**

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- differential pricing;
- local considerations for selection: who, how, what?;
- use-based pricing vs standard packages;
- unbundled and integrated media resource packages;
- the role of selection agents;
- pricing models and payment schemes: differential pricing and the changing role of the subscription agent.

ABSTRACT

New information creation and distribution technologies allow for a complete revolution in traditional scholarly communication networks and their pricing schemes. Traditional paper-based journal, preprint, and technical report mechanisms are now available online at reduced costs, and with significant enhancements. In addition to realizing cost savings through removing the costly paper distribution infrastructure (i.e. printing, transportation), online materials can be modified, enhanced, and personalized (i.e. hyper linked, unbundled, customized, and packaged) in new entirely ways. New charging mechanisms need to be developed for these options. We will assume a user-based charging plan will continue, although it may be challenged by direct and/or indirect charging models (i.e. government sponsorship, author page charges, etc.) Individual cost model approaches, combinations of these cost model options, and/or packages of services can be purchased or leased by individual organizations or consortia of organizations. Agents, and in some cases publishers, will transform from convenience-based buying/invoicing organizations into aggregators and packagers of primary and secondary materials.

LOCAL CONSIDERATIONS

There are a large number of options for organizations to consider in order to provide the most appropriate services for their particular users' needs. How should one start to evaluate these options? Understanding local information needs is the first step. This process of understanding local user needs is important in order to create the best profile for efficient purchasing. However, at what point does it become more effective to stop doing detailed local decision-making and to outsource these decisions to agents who can create packages for "standard types" of information users?

In determining which plans are best for your organization there are a number of factors that need to be analysed. Example questions that must be asked include: what are your specific user needs; what can you afford; can you share these costs with other organizations; do you want to provide unlimited user access, monitored access, or intermediary access; and are there any important equipment limitations within your organization?

Organizational Factors:

Every organization must start analysing the appropriate payment options by clearly determining the exact requirements of its particular population. Factors to consider are the organizational research profile (scope, depth, and timeliness of coverage), the number of affordable simultaneous users, the value of seamless links between and among various materials and services, the percentage of commercial vs educational users, and any relevant country (GNP/developing) status. Another consideration is will you charge your own internal organization members for these uses, and if yes, will the system allow you to capture this use data? These factors may immediately identify best or impossible service options.

Differential Pricing and Package Plans:

Many services offer different pricing for the same service based upon organizational characteristics (i.e. number of researchers, type of organization). In some cases the cost may be related to the level of service provided (i.e. number of simultaneous users, number of products from the vendor). Using the buying power of large numbers of similar libraries, consortia of libraries may obtain services at group discount.

Competing and Complimentary Services:

As the field of online information becomes more mature, mergers and affiliations among suppliers create competing services, and in some case overlapping services. It is not uncommon to be forced to buy multiple copies of selected full text journals as part of complementary aggregators. The industry is still in the early stages of development, and therefore techniques and standards do not yet allow seamless connections between all desirable and logical resources.

The future direction of the information industry is not yet clear, and a variety of possible scenarios are under exploration. The current isolated index and abstracting services are adopting a variety of approaches to linking to full text resources. Some use proprietary software and only link to selected partner publishers (Chemical Abstracts' ChemPort). Some A&I services have banded together with publishers to create a central resolver (CrossRef) to point to full text items at the host location. (This will not work for those who obtain their full text material from aggregators, and this is called the "appropriate copy" dilemma.) Another approach that is gaining momentum is one in which individual organizations host their own resolvers and provide seamless linking to resources using the SFX software (available for purchase from ExLibris).

There are circumstances in which libraries may desire pre-created packages of integrated indexes and full text resources across publishers. In these well-defined populations there is a place for subject aggregators (e.g. ProQuest) and/or Profile services developed and offered via subscription agents (e.g. tailored EBSCOhost services).

NEW FACTORS

Unbundled materials:

Of course, one of the advantages of the new online distribution network is that the newly released article-level materials can be distributed as individual unbundled items in “virtual journals” based upon user search criteria (i.e. one-time subject searches, saved subject searches, current awareness profiles, citation histories).

The ability to unbundle articles (and even portions of articles such as charts, tables, and images) means that our pricing models can no longer be satisfied by traditional journal subscriptions. The traditional model guaranteed revenue that was required in order to support the expensive paper distribution infrastructure.

Use-based Pricing:

The advent of electronic distribution has allowed tracking of article use. This means it is now possible to determine costs based upon actual use data. It may not always be most efficient to track every use, so in some instances there will still be a logical place for some types of subscription and/or packaging services.

Merging Options and Future Scenarios:

As we move from simple subscriptions to alternative costs models, we may see a variety of approaches. These may include tiered levels of subscriptions supplemented with transactional billing (Pay-Per-View); purchasing portions of articles or pieces from other types of materials (sound bytes from supplementary materials); the seamless integration of various media types (imagine importing a movie review within an online movie); and supplementing purchased materials with free non-peer reviewed web-based materials (imagine pointing to equipment suppliers for required materials mentioned in articles.) See Appendix 1 for one possible Multiple Tier Charge-Back model.

SUMMARY

After reviewing the changing parameters in the information creation and distribution network as described above, it is safe to say that gone are the days of one product/one price for all users. And that is not all bad - although it does make selection more difficult.

If we are to pay at all for educational material (OAI “open source” federated search services and servers can deliver a new approach), there is some merit to differential pricing based upon levels of use (e.g. number of simultaneous users), types of use (e.g. basic service vs. added-value service links), and types of user populations. Many questions remain in order to implement this complex scenario; for example, should commercial users [who gain far more financial benefit from this information sharing] pay more toward infrastructure support than educational users?

In the future actual use statistics may be a better basis for pricing than gross FTE estimates which often include miscalculations (i.e. large organizations with small departments or programs and/or small programs that have very intensive programs).

However, in some instances it may be more cost effective to use one-time population analyses to choose 'standard' cost packages for typical user populations.

Some cost models will be product-based while others will be subject packages across products and vendors. We will probably see both a repackaging of these possibilities customized to particular user populations and the use of broadcast technologies (e.g. MetaLib) to create virtual collections across services. Of course, free access [with peer review costs covered by a combination of federal subsidies and corporate contributions] is another approach.

Let us now look in detail at some of the issues involved in the current and future cost models. We will focus on the three questions: who pays, how to charge, and what is the product?

COST MODEL ISSUES

WHO PAYS

In addition to the standard subscription model, in which a person or organization pays a fee for paper or electronic access, there are a number of other charging scenarios now on the market. They include charging the author, sharing costs between authors and users, government subsidies, and subsidies by producers.

1. Modified page charges

In these tools a publication fee (page charge) is paid by the author either at the time of manuscript submission or at the acceptance stage. Examples include:

- New Journal of Physics (<http://www.njp.org>) - page charges
- BioMed Central (<http://www.biomedcentral.com>) - charging authors per article (hoping libraries will pay larger subsidy)
- ARLO, Acoustics Research Letters Online (<http://asa.aip.org/arlo/>) - page charges plus institutional subsidy
- MRS Internet Journal of Nitride Semiconductor Research (<http://nsr.mij.mrs.org/>) - page charges and subsidies
- Journal of High Energy Physics (<http://www.iop.org/Journals/he>)- subsidized/free online, paper requires a subscription
- Advances in Theoretical and Mathematical Physics (<http://www.intlpress.com/ATMP/>) - an overlay on part of the LANL arXiv.org archives. (charges for selected peer reviewed articles from free eprint server)

2. Funded by federal subsidy

In these tools the U.S. government is funding the required technical infrastructure, and in some cases the peer review process.

- Public Library of Science (<http://www.publiclibraryofscience.org>) - free access to published biological and medical literature
- PubScience (<http://pubsci.osti.gov/>) – index and full text from selected publishers

- PubMed (<http://www.pubmed.gov>) - index and full text from selected biomedical publishers

3. Funded by the creating/sponsoring institution

In these tools the creating organization pays the support costs directly.

- DSpace (<http://web.mit.edu/dspace/home.html>) - MIT intellectual capital server (multi-media digital repository);
- Physical Review Special Topics - Accelerators and Beams (<http://prst-ab.aps.org/>) - American Physical Society

4. Shared funding

This tool is a test with a blend of government, society, university, and publisher support.

- Project Euclid (<http://projecteuclid.org/>) – preprints and commercial publications, with a peer review software overlay for independent journals in math and statistics

HOW YOU CHARGE

There are a number of methods used to determine appropriate charges for specific organizations. Entirely new methods must be developed to accommodate the new differential pricing options. Particular organizations receive price quotes based upon a variety of factors, which are specific to each service. These cost determining methodologies are still in the early stages of development and testing. A selection of models using a variety of approaches is reproduced below.

In addition to the standard transaction model, in which payment is made based upon the time and amount of data retrieved, there are a number of other available options.

1. Traditional individual library subscription model

There is a pre-determined fee for unlimited services, or a variable fee for specific levels of service (e.g. simultaneous users). This scenario provides guaranteed revenue for the producer – unrelated to actual use data. In addition to title-by-title subscriptions, vendors offer package plans that provide discounted prices for their entire title lists. This approach provides guaranteed revenue across all their titles, removing the incentive for organizations to review actual use data that might result in targeted cancellations. For those not selecting this type of blanket offer, and for those that previously did not purchase these all-you-can-eat packages, libraries traditionally performed use studies to determine cancellation candidates.

Alternative funding sources for producers are based upon a variety of criteria:

2. AMS productivity approach

Assuming there is a correlation between author productivity and the use of materials, this plan relates cost to organizational publication rates. There are some problems with this approach:

- (1) there is no adjustment for the different educational vs commercial values of information,

(2) there is no real proof of causation/viability between publishing rates and use (an example would be the heavy use of peer-reviewed material by commercial users who do not often publish)

3. APS Carnegie Research level approach

In this model a set of university research profile categories is used to determine use levels; PhD centers would be charged more than Masters or Undergrad schools. Weaknesses with this model are:

- (1) there is no adjustment for the different educational vs commercial values of information (how would one classify commercial corporations?),
- (2) the model does not address exceptionally strong and weak local anomalies (very strong programs within a lower-level school, or weak departments within a large university)

4. Consortial plans

These plans are usually of two types – Discount/differential and the BIG DEAL.

a. Discount/differential models

In this approach, a discount is provided to each member of the consortia using a complex sharing algorithm. In some cases the price is the same for all participants, while in other scenarios there is differential pricing within the consortia. Each organization determines whether to pay for only their current print equivalent subscriptions or a larger set of desired titles or services from within the entire package.

b. The BIG DEAL

In this model reduced prices are offered (to either individual libraries or consortia) if the organization(s) subscribe to all the titles produced by the publisher (as opposed to only their currently subscribed paper titles. For many libraries with few current subscriptions this package plan appears to provide good added value. In the short-term the All Titles plan provides access to a much larger number of titles for very little added cost; especially for smaller libraries. In this model larger libraries, with the largest subscription bases, are charged indirect hidden subsidies to provide this service to smaller schools. The adoption of this approach again removes the incentive for use-based data review at the title level and almost insures the continuation of infrequently used titles. It is no wonder that publishers prefer this plan in which there is no serious accountability for product quality. In recent reviews of the BIG DEAL, such as the one from early OhioNet experience, the studies are not based on normal library environments. Concerns with the evaluation methodology involve (1) a limited/different domain of titles when compared with paper titles, (2) limited seamless linkage options, and (3) a lack of understanding from early users about ‘novelty and ease of use’ factors as compared to long-term and fiscally based value decisions when selecting full text articles. Given these concerns and small data samples, it is far too soon to derive the actual costs and benefits of the BIG DEAL.

5. Agents with profiles

In the future, the complex options and licensing issues may make it fiscally advantageous for “purchasing agents” to create pre-determined subject profiles for types of libraries. For example, a basic package would serve the typical undergraduate library in biology. A set fee, or a customized tiered subscription model (Appendix 1) might be created for individual

subject areas, across a few disciplines, or for an entire library. These profiles would be based upon the required scope and depth of resources, as determined by the intensity level of research and the requirements of teaching departments. Organizations would want to perform some level of annual review in order to monitor existing plans, but would want to keep these reviews to a bare minimum in order to avoid large overhead costs for in-depth analyses.

Eventually the ability to review use data within profiles may allow for modifications to pricing agreements and/or result in migrations away from subscriptions to purely use-based costs for selected tools.

WHAT YOU ARE CHARGED FOR

One final consideration in selecting a product is what services and enhancements are included or optional within the tool. The new electronic distribution systems may allow for nearly free online distribution, removing the expensive (approx. 20% of costs) costs associated with paper production and transportation. Only the essential information provided by peer review, format preparation, and distribution will need to be subsidized. There are a variety of services and content options available ranging from stand-alone tools to seamlessly integrated portals. Some services provide options that can be added at a premium price, but other services automatically include all options with no ability to remove those that duplicate already owned local tools.

Service options:

The following services are among the variety of options available or under discussion.

1. Aggregators

Some services (Academic Search, ProQuest) provide self-contained subject based collections of articles from across a variety of publishers. In many ways these are the beginnings of Virtual Journals and subject packages as described above through the agents.

2. Full text links

Some subject-based indexing services (Ovid) contain the full text to selected material within their systems. Others (EBSCOhost) both house some full text locally and also point to outside material from selected full text services and publishers.

3. Local resolvers

Many services now include some sort of local resolver service, which allows seamless connections to full text materials to which an organization subscribes. This often requires libraries to store subscription information on a local machine, but some vendors allow this information to be stored on their servers. For example, SilverLinker software is used for making connections from SilverPlatter journal indexes to full text publisher sites.

These vendor-based linking services compete with newly developed local resolvers such as SFX. If your library runs an SFX resolver, and the service you utilize supports the new OpenURL standards for citation information, there is really no need to double-pay for this linking service through your vendor. Most vendors do not offer a discount for this scenario,

but you can choose to drop the annual support costs for their local resolver software if you did use it at one time.

4. Multi-media and non-journal material

In addition to providing “virtual journal” packages, there is also movement toward including other types of data within publisher packages. For example, Springer-Verlag offers within their LINK system journal information PLUS other material (i.e. online reference information and chapters from book series). It is even possible to sell parts of documents (i.e. charts, tables, references from reviews). For the present time this enhanced service providing new unbundled information is offered as part of your existing link package while the charging mechanisms are being explored and developed.

Once again, one would develop differential pricing models based upon measured use. These models would also need to be developed for types of libraries (i.e. corporate, academic, government, unique disciplines, size/scope/budget concerns).

In the end, it is easy to imagine that a variety of models may be endorsed by each library. Smaller libraries may choose aggregators for broad coverage and pay-per-view options or consortial approaches for less frequently used materials. Medium size or intensely focused libraries may choose aggregators for broad coverage, and virtual journals and subject packages in selected areas. Large research libraries may still select some aggregators for broad coverage, but will develop both profiles for tiered subject plans and/or SFX links connecting indexes to full text subscription items and free web material.

In summary, we have moved from a simple but somewhat unfair one-cost/one-product environment into a more complex but perhaps more accountable differential pricing mode. Along with this complexity comes the ability to customize and evaluate products based upon user profiles. This will significantly change the roles of the selector and the subscription/purchasing agent. Only time will tell how many of these options will be fully developed and found financially plausible.

Related URL for locating many of these services:

Yale Science Libraries Journal Update page
<http://www.library.yale.edu/scilib/jrnlisol.html>

Appendix 1

PRICING MODELS: PAST, PRESENT, AND FUTURE?

NASIG, 13th Annual Conference
University of Colorado at Boulder, June 21, 1998

The published article, "Pricing Models: Past, Present, and Future?" *Serials Librarian* 36 (1/2): 301-319 (1999), briefly addresses the major factors leading to change in the academic STM journal market and then focus on a number of possible cost models that may supplement and/or possibly replace the current paper-based distribution systems.

The Goal of this Cost model analysis:

The goal is to create a relatively simple, predictable, review able flat-rate budget scheme for quality STM items with market value AND support for the archiving of non-marketable (non-core) information items in relation to both local and global needs.

The focus is on a balance between guaranteed publishing revenue (as subscriptions or other packages) and transactional fees through direct billing or aggregator gateways.

Two assumptions underlie this proposal:

1. tenure and promotion will accept the validity of the peer-review process whether the item is distributed as a marketable or non-marketable item, and
2. abstract and indexing (A&I) services will cover both marketable or non-marketable items.

The Main Points:

Recognition that not all quality scientific information can be distributed on a commercially successful revenue basis. Some items, even the entire literature from some disciplines, may need to be housed on non-profit servers. This may be due to a number of factors such as small user bases or little perceived economic importance for the field.

Non-journal material and non-peer-reviewed material will become important items, and should be included in both the A&I services and future information packages.

Differential pricing should exist for various user populations. Large universities should not pay the same amount as small colleges for the same data -- if the data is used differently. Ultimately usage should determine costs. Some plans now include variable costs measures for CPU time, profit or non-profit missions, percent contribution to work in the field, etc.

Libraries are more interested in flat-fee plans, and are willing to pay a small premium for this service instead of creating cumbersome tracking mechanisms -- for often used materials.

Transactional (pay-per-view) and "Prepay Block" materials may not be commercially viable unless there is a large enough subscription base for first production costs. Those items that do not survive in the market world will migrate to the "Tier 2" non-market arena.

The Tier 2 arena will be subsidized by a balance of direct or indirect government, commercial, and society dollars. The balance will be determined by the perceived value of the material to the larger population. (Higher value equals higher public funding.) Logical hosts for these Tier 2 services might include present organizations (e.g. CRL and OCLC) and newer options (a la LANL preprint server).

Over time, publisher based cost models will be migrated to discipline based plans. These plans will be organized around aggregators that will maintain flexible tracking and validation options that closely match local site requirements.

Technology to accomplish these goals is not the problem; cooperation among publishers, A&I services, and faculty will be the most difficult element. All must recognize the long-term benefits to this model. If some movement toward such a model is not evident soon the present system will experience a crash in terms of tenure and promotion support. The drain on the higher end of the market from the currently subsidized non-marketable titles will create impossible subscription costs across the present system. Many current commercial titles will (and should) fall into the Tier 2 level.

The Tiered Model: (see accompanying image for visualization)

Provides:

- Two levels of desirable (and budgetable) flat-fee support for identified Core materials -- if the items are marketable. Annual statistical analysis determines the level of payment.
- Two levels of risky revenue support (payment dependent upon specific needs) for non-Core materials. Non-core designation is dependent upon local needs.
- One level of subsidized archives for non-marketable materials.
- New aggregator roles for search, charge, tracking, and validation across publishers, which will generate both costs (hardware and software) and revenue.

Questions:

Commercial ventures should support better editing and composition. If not, why pay?

Can added-value features be introduced faster through commercial development? If not, why pay?

Will A&I services increase their scope to include electronic peer-reviewed material? This is essential for the promotion and tenure process to function.

Will A&I services increase their scope to include non-peer-reviewed material? If not, other services will appear to federate searching across various databanks. (This is only important because the academic community has a real interest in the continuation of some form of A&I services in the future, and the stronger the product the better the search engines.)