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New Directions in Digital Information Delivery in the Web Environment at the Canada Institute for Scientific and Technical Information

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Abstract

Purpose: In 2007, NRC-CISTI launched two new online electronic discovery services, Discover and eBook Loans. This is just the beginning of changes at NRC-CISTI. The paper describes the new services, NRC-CISTI's plans for transforming document delivery and the importance of these emerging business models for libraries.

Design/Methodology/Approach: The paper is conceptual in nature, describing the Discover and eBook Loan services, discussing NRC-CISTI's plans for transformation from print to electronic document delivery and the impact of the growing dominance of electronic literature, on library resource sharing models.

Findings: The new breed of Web-based user oriented services have aroused different reactions in the library community, some very positive, some neutral, some negative. As NRC-CISTI embarks on more changes to its services it will work within the library community to make these services relevant to their needs.

Originality/Value: Newly emerging information delivery services related to the digital landscape underlines the richness of new ideas in the library community to improve access to scholarly literature for users.

Keywords: Electronic Articles; Electronic Books; Document Delivery; Electronic Document Delivery; Interlending; Web Services; Service Oriented Architecture; Resource Sharing

Introduction

In 2007, the Canada Institute for Scientific and Technical Information (NRC-CISTI), introduced two new resource-sharing services, Discover and eBook Loans, oriented to the Web user. This paper describes the new digital landscape facing NRC-CISTI and libraries, and how NRC-CISTI is responding to this shifted paradigm. It discusses how users, who would have been served by traditional library resource-sharing services, can now find a wealth of information resources, some free, some paid for, on the Web without turning to libraries. The challenge for library resource-sharing is to find new ways to serve their users that are convenient and “where they are”. Libraries for their part have not been standing still. NRC-CISTI’s new services and future plans will be described. The paper will conclude with a prognostication of where things are going and what libraries and resource sharing activities are doing and must do to stay relevant in serving user needs.

What is NRC-CISTI

Recognized globally for its document delivery service, the National Research Council’s Canada Institute for Scientific and Technical Information (NRC-CISTI), based in Ottawa, Canada, is one of the world's leading sources for information in all areas of science, technology and medicine (STM). NRC-CISTI provides access to a wide range of products, services and relevant information for its clients in the form of databases, articles, e-books, conference proceedings and reports. It is also Canada's largest publisher of scientific journals and books, through its publishing arm, the NRC Research Press,. With the ever-growing knowledge-based economy, NRC-CISTI, as part of Canada’s National Research Council plays a role in the Canadian innovation system of ensuring access to scientific information and providing knowledge discovery tools from a local information infrastructure as well as carrying out research in information science.

The Information Landscape facing Libraries

With the rapid rise of the Internet, there is great uncertainty in how users find, obtain, share and use information. Players in the search engine field that existed only a few years ago are gone or reduced in relevance with Google dominating that space. People are reading online or downloading documents immediately rather than seeking out a print version. Social networking sites such as Facebook and MySpace have replaced the old Internet discussion groups which in their time replaced face-to-face meetings and the phone. Instant messaging is replacing e-mails among recent generations of users Websites replace print telephone directories as the means of finding a business or person. Researchers and scientists are using the Internet as their preferred place to discover new research sites such as PubMed, Google Scholar and Scirus. Electronic publications are replacing print in the scholarly community and the tipping-point is nearing when they will become the version of record (Johnson et al., 2007). All of this demonstrates the challenge the Internet poses to traditional tools and services including library catalogues

and resource sharing. Furthermore the rapid pace of technological change as new players and emerging models defies easy prediction of what is next. From online banking to online shopping to online research, people's behaviours are changing with every advance in technology. Everything in the Internet culture is setting up a new way of thinking about access to and delivery of information.

Technology is simply a tool, an extension of a user's stated desire. Given the opportunity, a user will want easy access to what they desire. This expectation for easy access is always managed in the context of the user's capabilities and available tools. Given the opportunity and availability, the user will want to control the interaction as much as possible such that they have the desired outcome, they desire choice so that they can make the best choice between similar things that meet their need. In turn they desire convenience such that they do as little work as is necessary to obtain what they desire. Finally, they wish to interact within their own community, whether it is Facebook or MySpace. Today's technology facilitates the user's ability to control the context of their information seeking through the use of convenient desktop search engines like Google which put a multiplicity of choice and communities at their fingertips. In the Web-world, users are also creators and there is a profusion of creation going on with individuals wanting to comment on existing content or create additional content themselves. They expect to be able to do this everywhere on the Web including on library websites. This last trend can be seen as scary by some because it implies the "wisdom of the crowds" = denigration of authority or de-professionalization. For others, such as the authors of *Wikinomics*, Don Tapscott et al. this is a new beginning of collaborative creation and innovation in the world that all would be well-advised to recognize.

A way to understand why today's users are using libraries less is to understand that there is a gap between the user's desire and what libraries can offer as a value proposition. To give a few examples of the gap, users want immediate downloads over later paper delivery; the convenience of easy to use self-serve websites -- not cumbersome catalogues, registration systems or websites designed by and for professionals; online interactions that fit into their sense of community and collaboration -- not organizational websites that sit apart from community sites and are not personalizable; easy access to things that are of value to them beyond what is available at the local library.

To paraphrase Tom Storey, writing in OCLC Nextspace in 2006, libraries exist to provide value but if that value is no longer perceived to meet the users' needs, the perceived value of the organization, and its brand, will be minimized (Storey, 2006).

What is true of mass culture is also true to some degree for all elements of that culture. Under this assumption, scholarly research and communication will be influenced by wider consumer behaviour, particularly as a new generation of researchers assumes their place in research institutions.

In the context of scientific and scholarly research institutions, such as university and national libraries, there is always a question of how much the world of consumer behaviour impacts on researcher information seeking. There is a suggestion that

researchers are being strongly influenced by market trends. They need validated peer reviewed information to make the correct decisions before embarking on extensive long-term research. Feedback from a 2007 study, commissioned by NRC-CISTI, showed that researchers are adopting new information seeking tools, albeit carefully and still depend on the support of libraries to acquire content:

“I went back to Google Scholar as being ‘exceptionally useful’ because you can get right to the full text. Access is extremely important to me.”

“I think there are features that I don't use that I don't know about. I need to spend more time experimenting with new features. But I think it would be good to have more tutorials online on these resources ...”

“I use our librarians to teach me how to use search terms more effectively. And I usually e-mail them to ask them to buy articles.”

“Too much information, too much crap – hard to separate good stuff.”¹

The difference when searching for scholarly information is that there is a need for sophisticated tools to provide access given the fact that much scientific information of value is still held behind commercial pay-walls available only to subscribers or through pay-per-view. Open Access research, while having an impact in making more scientific information freely available, still does not represent a critical mass of scholarly publications such that a free model is predominant. The fact that there are multiple publishers and now authors providing online access to this information also makes it all the more difficult to find what is being sought. Such information has to be searched-for in many different ways and a searcher has to make repeated and varied attempts to be sure all the right information is found. The same search may need to be repeated across time as developments in science move rapidly, particularly in the frontiers of new or cross-disciplinary research.

Another observation about scholarly information is the greatly enhanced visual nature of the Web and its attraction to users. Early versions of the Internet were text-based. Now images proliferate. A text-heavy website today will suffer in comparison to one using images and graphics to display research concepts. This has implications on the types of information that researchers expect to find online. For example, currently, research articles are delivered in PDF format but, now there is an expectation of availability in HTML or XML, with interactive graphics and linked digital objects.

For researchers, the opportunities of visualization are important for scholarly communication and for sharing research results because when articles use graphics and images, a scientist can, often at a glance, determine its importance and usefulness to his or her research. An impact for libraries is that the scanning or copying from paper copies is becoming a poor substitute to online access to the electronic full-text of the article for users. Libraries, like NRC-CISTI, are encountering more complaints about poor quality

¹ Outsell (2007) [NRC-CISTI: STM Market Feedback - research report \(internal study\)](#)

copies and scans using the same equipment they have used in the past not because the equipment has become poorer, but because user expectations of what constitutes an acceptable copy have risen.

The Web is delivering needed information directly to the user in a way that is convenient and richer. How does traditional Interlibrary Loan ILL and document delivery compete in this context?

Impact on Resource Sharing

What is true for other library services is true also for library resource sharing. Users are starting their search for articles and books on Google, and if they do not find what they are looking for there, they are not necessarily taking the next steps to try to obtain that information through their libraries (OCLC, 2005), (OCLC, 2006), (CIBER 2008). Publishers are setting up pay-per-view sites and more articles are available through open access, allowing users to bypass libraries and obtain single articles directly from the source. In this context, it is becoming less likely that they turn to using resource sharing services such as ILL or document delivery, which are available only after they have searched the catalogue or used the library's website resources. While this is more or less true depending on the level of integration the library has achieved within its community (and there are libraries who have been very successful at enticing their users to use their extended services), it is true that users are less patient and more demanding – putting libraries in a continual catch-up mode. Even in the scientific and academic scholarly communities, users are starting to look for information on a search engine like Google, in preference to other established sources. In worst case scenarios, scientists, who are thought to be more conscientious information seekers, are, according to the RIN study, concluding that if the information they seek is not quickly available, it is not worth pursuing (RIN, 2007).

This poses challenges for libraries including NRC-CISTI, which itself has a large local user population of NRC scientists as well as a large population of external clients, when deciding what direction to take to best meet user needs for materials both held and not held in the library collection. To date, all of the services that have been developed to help users obtain information whether in or outside of the local collection have been based on the belief that the user will eventually come to the library to obtain information. The notion that users may simply give up before even reaching this point undermines a fundamental assumption that the library can serve the user from the beginning to the end of the information-seeking continuum. It also puts into question the amount of resources and effort being put into extended document search services such as ILL and document delivery.

Facing a loss of relevance, libraries need to take up the challenge of meeting the changing needs of users to be able to obtain information as early in the user's finding workflow as possible. In the electronic environment, this means having library metadata exposed earlier, as widely as possible, and making content accessible very shortly thereafter through immediate download to the desktop. While great strides have been made in terms

of making electronic content available on the desktop through package deals with publishers and faster delivery from print collections through investment in ILL management systems, library resource sharing suffers from the fact that users bypass it because they either have given up, believing the local library does not hold the needed item, or decide that ILL is too slow or cumbersome to meet their needs. The very fact that more and more content is easily available for download through the local library's electronic collection only serves to highlight, for users, the longer delay to obtain materials from remote sources such as other libraries in resource sharing networks. As has been pointed out in the literature, users are finding materials online that they are not able to access. If libraries do not find a solution, others will (Oberlander, 2007).

NRC-CISTI in a Changing World

The tough question facing NRC-CISTI is how to succeed in this changing environment and is being echoed by others within the community. Market leaders, like Google, are prepared to stop products quickly when it is clear that the model will not work, such as Google Answers. It is difficult to know what will succeed and what will hold user attention given that the user is ultimately in control. This demands that the organization develop a technology architecture that can quickly be adapted to new needs and new services.

There are also many questions about how will information be accessed? Is it horizontally, as is suggested by the CIBER study on user information-seeking behaviours, or vertically by domain, such as PubMed for health information? Will organizations prefer to support access using simple, task oriented tools to allow users to obtain content quickly and leave or to attract them to a site with advanced discovery tools in order to research and later manipulate information found in a repository? An organization that focuses too much on one or the other approach may be putting all its eggs into one basket and therefore miss the changing mood of the market. At the end of the day, organizations like NRC-CISTI must ask themselves questions of who are its core constituencies within or outside the borders of their countries and who they want to be as organizations. They must be prepared to choose a path and stick to it. Ultimately their users' needs must guide their approach.

For NRC-CISTI, a key question is how its future information delivery services will be provided from electronic and print collections in light of:

- New and changing user demands for convenient service
- Declining traditional document delivery
- A competitive and rapidly changing information delivery environment
- The rising cost of information, particularly copyright fees
- The need to transform services and update infrastructure to be more flexible

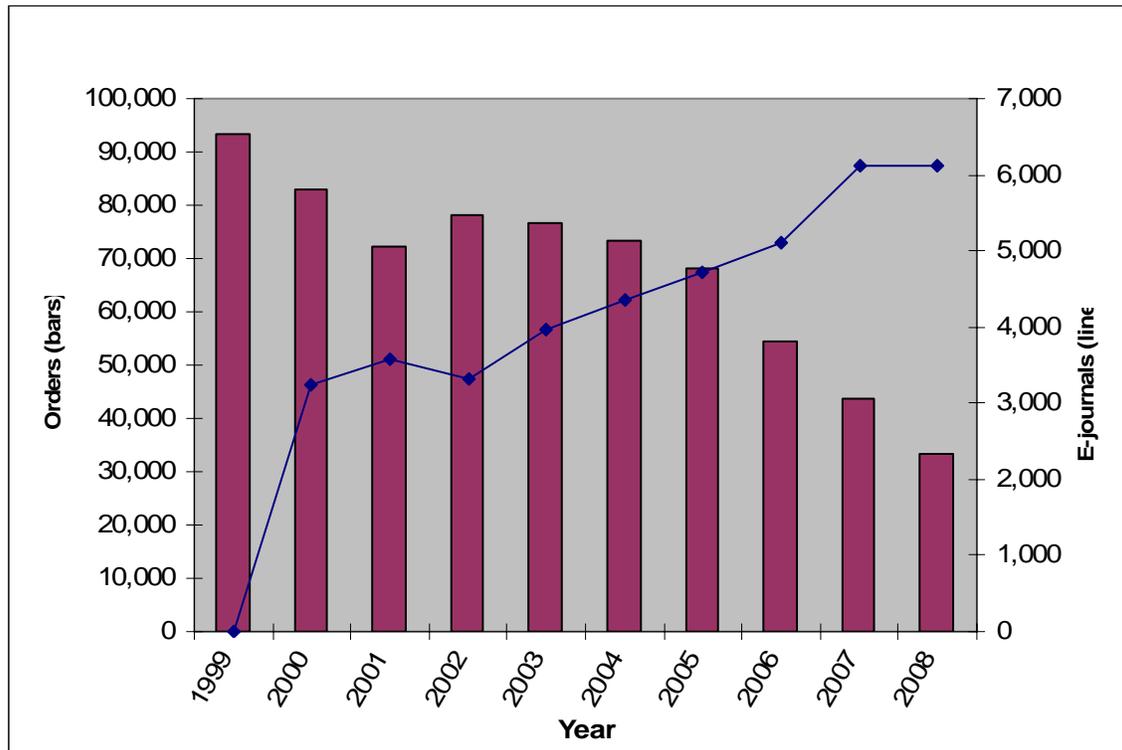
User Expectations and Resource Sharing:

The issue of changing user expectations has been explored above in the context of challenges for libraries. Resource sharing organizations and networks need to be able to provide easily accessible, convenient entry points for users so they can do more of the work themselves. Much has been accomplished in this regard by libraries offering unmediated enduser ordering and electronic desktop delivery but the electronic environment is driving convenience to a whole other level of “point-click-download”.

A disconnect is appearing in terms of demands by users for better quality documents. NRC-CISTI has observed more complaints about the quality of documents scanned from print without any other changes in the environmental variables. While taking steps to address quality concerns, it cannot stem the migration towards preference for the electronic. Electronic articles today include higher quality graphics and other digital objects such as videos consistent with the highly visual nature of the Web. Delivery from the electronic version has been found to be less costly from a process point of view because the very much more manual costs of retrieving print, making copies, scanning and delivering are avoided.

Libraries in other parts of the world, with the notable exception of the United States, are seeing a decline in traditional interlibrary loan resource sharing (McGrath, 2008). NRC-CISTI has charted this trend among its local National Research Council users who are requesting fewer local document deliveries from the print journals as the number of electronic subscriptions available to them increase.

Table 1: Ten-year comparison of local NRC-user document delivery orders placed with NRC-CISTI (red bars) vs. rising number of NRC e-journal subscriptions (blue line)



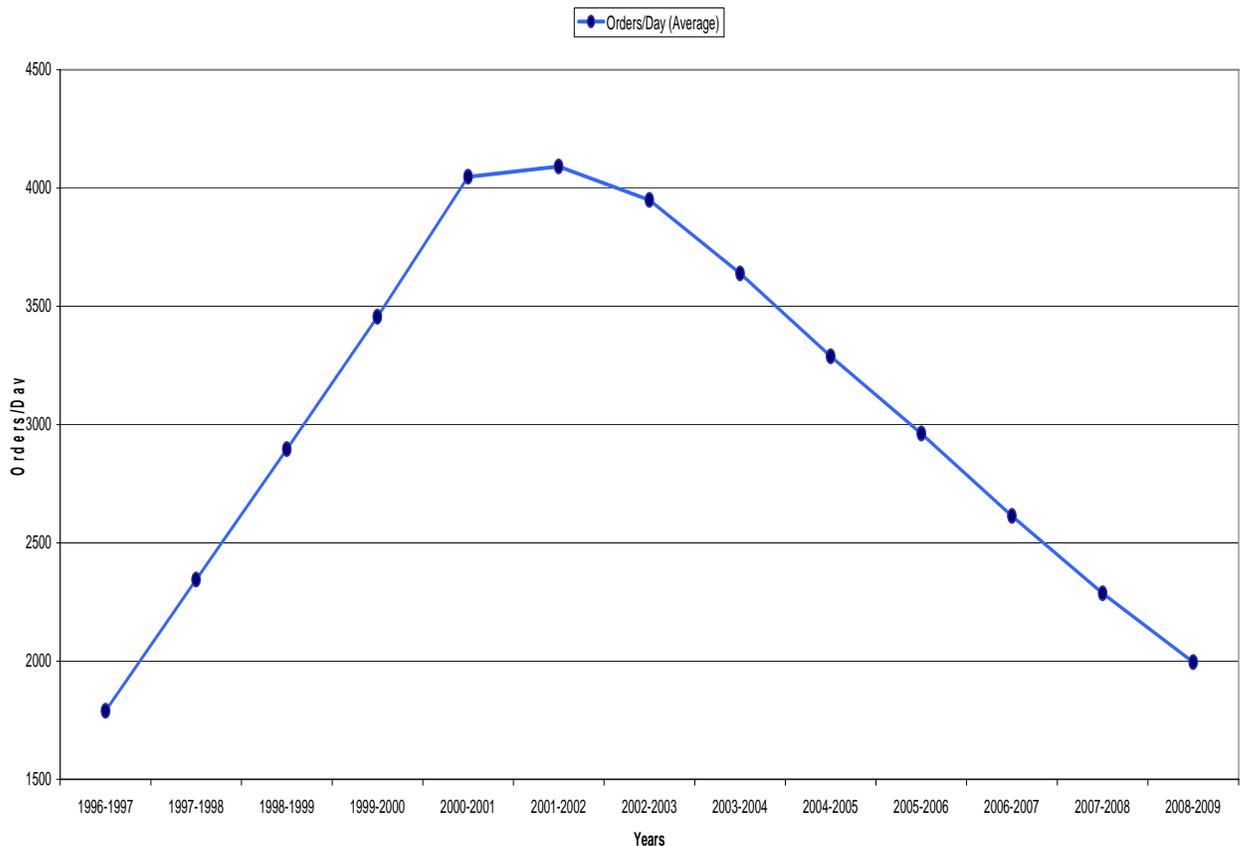
More worrisome is that faced with even the most user-friendly workflows for requesting documents through interlibrary loan, users might avoid making requests altogether if the service does not match their expectation of immediate access to information (RIN, 2007).

The choice becomes stark. Either respond to demand by providing the electronic version of documents or continue to deliver print copies in a context where the costs to deliver from the paper are higher, the service is slower, the quality is poorer, when there is user reluctance and while the supply of the source print journals is contracting.

Declining Document Delivery

Traditional document delivery, copying, scanning and delivering print articles, from central or national information centres such as NRC-CISTI, is on a steep decline as clients find other solutions for obtaining documents such as local and regional resource sharing networks, publishers, commercial vendors or open access sources. NRC-CISTI is charting a 13 percent decline in orders processed in the last year and has seen its level of activity fall back to where it was when it launched its Document Delivery Service over a decade ago. This same trend has been observed by other national document suppliers (Pfleger, 2007), (Gillet, 2007).

Table 2: Twelve year average number of NRC-CISTI Document Delivery Service orders processed daily



Competition

NRC-CISTI, as Canada's national science library, is facing heavy competition from other sources of information since the same content in its collection is now available from multiple points on the Internet such as publisher websites or open access repositories. In this context, organizations like NRC-CISTI have to make a strong case for their value proposition in their national communities, citing their place as supporting their nation's economy and innovation system by offering often subsidized, free and copyright-cleared access to their unique collections, offering easy access to content and as well, offering specialized knowledge discovery and linking tools that allow users to burrow deeper into electronic content repositories.

Rising Cost of Scholarly Information

Document suppliers face a big problem on the cost side. The price for scholarly information, particularly from commercial publishers in the sciences, is continuing to rise with an expectation of a nine to ten percent increase in 2009 (Van Orsdel, 2008). This increase is reducing the buying power of national libraries needed to be able to support their constituencies (Schöpfel et al., 2007). Furthermore, copyright fee costs, which must

be either absorbed by libraries and document suppliers or passed onto clients, are rising in tandem with subscription costs. As print journal subscriptions are cancelled by library acquisition departments, this problem will only get worse. There will be a reduced availability of print for resource sharing, creating a crisis for networks and systems built around affordable access to copyright exempt copies. The ability of libraries, and their users, to claim fair use or fair dealing use will be circumscribed by the fact that access to the electronic falls under contract law which trumps copyright law and fair use/dealing.

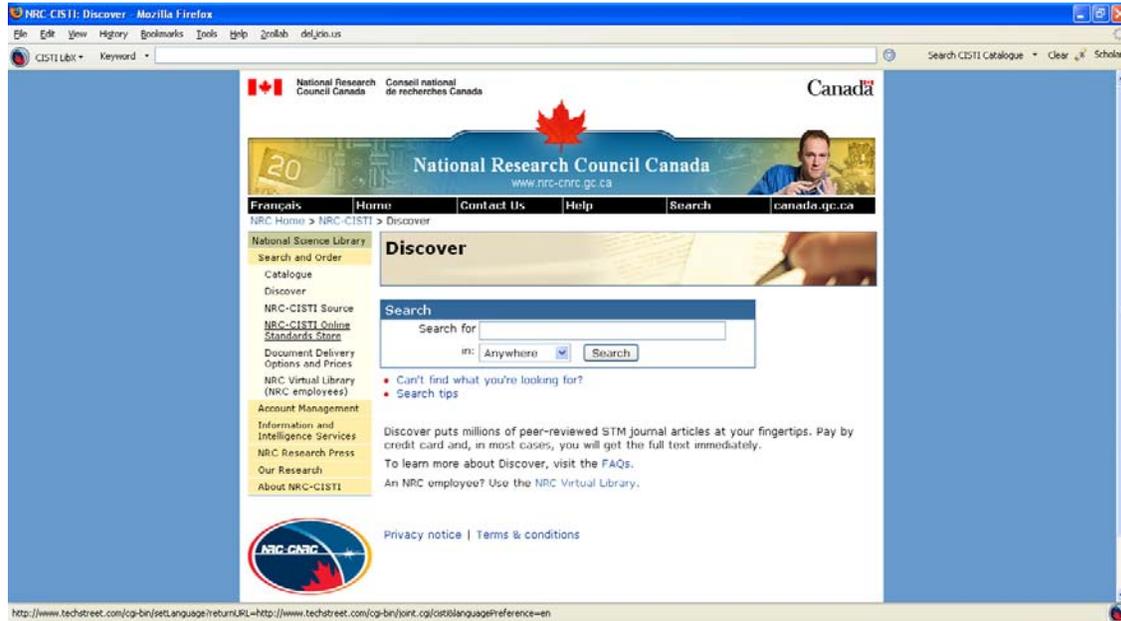
Transforming Services

Traditional document delivery providers like NRC-CISTI are adjusting their value propositions on how they serve their clients in order to retain their positioning in the electronic environment. The alternative of not changing will be reduced relevance and funding. NRC-CISTI is changing by creating a Web-based service environment relevant to the way users are expecting to find information. In 2007, it introduced two new services, eBook Loans and Discover, to allow users to download books and articles from NRC-CISTI using credit card payment. These services supplement NRC-CISTI's traditional document delivery ordering gateways, such as the NRC-CISTI Catalogue, but are transformative, pointing at the way users prefer to find information.

The Discover Service

Discover integrates search, order and payment processes within a single, easy-to-use Web interface. Built on a sophisticated information infrastructure the service provides wide access to over 20 million articles with over six million linking to full-text articles available for immediate download from its repository and the rest sourcing documents from the NRC-CISTI collection through the Document Delivery Service. Once a user finds a desired article and adds it to the shopping cart, they can then either continue searching for more articles or proceed immediately to checkout. Having made their purchase by credit card the user will either view any electronic articles online immediately or within 24 hours by e-mail link if the article is sourced from NRC-CISTI's print collection. Access to articles marked as "open access" come at no cost and can be viewed immediately. While there is no heavy registration required to use this Service (a delivery e-mail address is all that is needed), the user can choose to obtain documents through the NRC-CISTI Document Delivery Service if they have an account. Many of the article citations include abstracts so the user can make an informed decision before purchasing. While there are articles that date back to the 1800s, most articles date from 1993 onwards. A recent improvement made to the interface provides more search indexes on top of the original keyword search.

Illustration 1: Discover Search

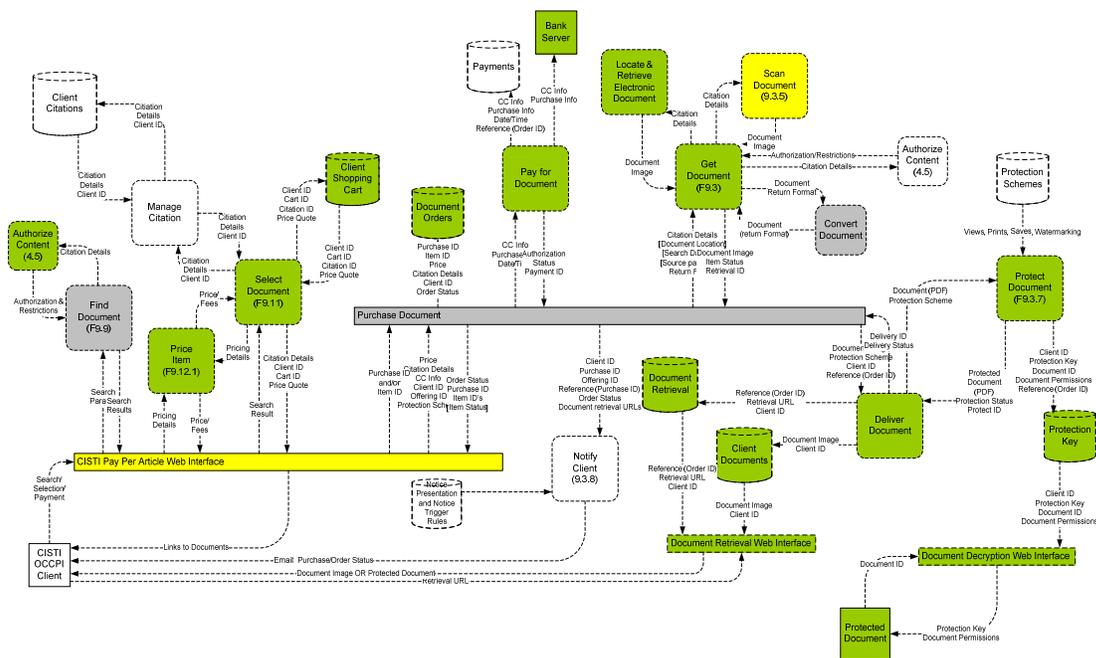


The broad goals in the development of Discover were to create a Web-based service that simplifies things for clients, redefines access to articles for users, has a modular, flexible Web-based service architecture that can be more easily modified in future—rather than building a black-box product or using a proprietary off-the-shelf solution. Building a solution that is easier to maintain for the organization makes the organization more sustainable.

The Discover architecture consists of a number of separate Web service components including Select Document, Price Item, Get Document, Protect Document (encryption), Pay for Document and Deliver Document. The service accesses metadata and content from NRC-CISTI's growing repository of locally-loaded scientific articles. NRC-CISTI partnered with Swets, Elsevier, Springer and the NRC Research Press to provide the metadata and content for Discover. More publisher electronic content and metadata will be added in coming years.

Illustration 2: Discover Service Architecture

CISTI Enterprise Architecture: Execution Domain Target State – Discover Service (as of 2006)



NB: The author wishes to acknowledge the contribution of Stephen Anthony who created this diagram.

Due to publisher restrictions on the dissemination of commercially published articles by third parties such as NRC-CISTI, each article's PDF has to be encrypted to prevent multiple copies from being created. NRC-CISTI uses the FileOpen Systems' plug-in for encrypting Adobe PDF files, a solution used worldwide by document delivery services such as Infotrieve and Subito. As noted above, NRC-CISTI supports open access to scientific literature by allowing users to automatically download electronic articles flagged as open access, without paying.

This year NRC-CISTI will be linking Discover to Google Scholar search results to be available to users where they are, and not just on the NRC-CISTI website.

Future enhancements made possible by using a Web-based service modular development approach:

- Linking the service to Web entities beyond Google
- Opening up the Web services to other organizations to create business-to-business links with their delivery systems
- Developing partnerships with other organizations to enable greater access to research literature through an expanded information infrastructure
- Adding Web services such as Find Title and Locate Document that allow other organizations' metadata to be used
- Increasing the number of electronic articles available from the e-repository

- Applying a Canadian copyright fee regime
- Making Discover an OpenURL target so that other organizations' users can access their own electronic collections rather than purchasing

Future opportunities being explored:

- Recognizing account-based clients
- Adding billing options for organizations
- Adding reporting functionality for organizations
- Adding recommender services
- Embedding ContextObject in SPAN (COinS) in result displays
- Offering slices of the database for domain-specific research
- Integrating catalogue metadata for books, conferences, reports

Discover moves NRC-CISTI from the print document supply model toward being a truly digital library. The Discover implementation project has itself transformed NRC-CISTI's technology architecture to be more modular, flexible and reusable which is consistent with NRC-CISTI's goal of having a Service Oriented Architecture (SOA). It is a service that better meets the needs of individual researchers and clients by offering them the ability to control the interaction in a get-in/get-out, light registration (e-mail address only), e-commerce Web interface.

With the completion of the project, NRC-CISTI will not only help achieve its goals and objectives of offering seamless access to electronic information, better maintaining its alignment with the NRC Strategy for offering gateways to services. Users of the new service represent the planned target audience of small business and research clients in Canada. NRC-CISTI is aware that many endusers, particularly in the commercial sector, either do not have libraries or that their companies have cut their libraries.

With more documents delivered by digital download, users of this service will see improved document quality compared to scanning from print, particularly for images which are important in interpreting scientific results.

The service reduces barriers by offering a free article search, an easy to use order and payment service and immediate downloads of articles from major scientific publishers such as Elsevier, Springer and the NRC Research Press, and by offering the service at an affordable and competitive price. It is also expected that, in the near future, this service will allow NRC-CISTI to reach clients through search engines beyond its own website, like Google.

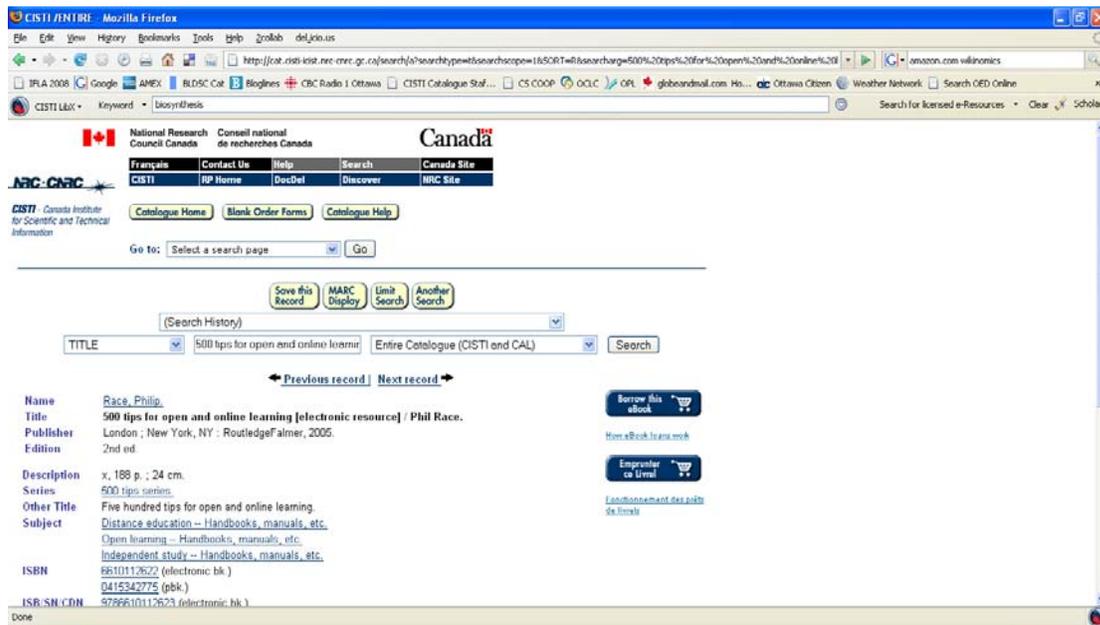
Discover allows NRC-CISTI to continue to be able to deliver content in a way that meets the needs both of library and non-library clients and maintain its relevance in the new digital environment.

eBook Loans Service

In 2007 NRC-CISTI, partnering with Ingram-MyiLibrary, launched an innovative new service called eBook Loans, taking the traditional book loan model electronic. In recent years, e-books have been receiving more and more attention from publishers, libraries and consumers. The International Digital Publishing Forum (IDPF) reports that e-books are experiencing a growing popularity in the form of increasing sales in the United States.² Prior to engaging MyiLibrary in this partnership, NRC-CISTI had conducted a client survey to gauge the interest in this novel electronic book service approach and found a clear majority of responses stating they were interested in seeing this service created. An international virtual-project was carried out to implement the NRC-CISTI-MyiLibrary eBook Loan Service. This service offers instant access to tens of thousands of electronic books from scholarly publishers, including Springer and the NRC Research Press. Furthermore the service is open to all Web users coming to the NRC-CISTI site, but libraries in particular will benefit from reduction in costs associated with interlibrary book returnable processing costs such as receiving and returning print loaned material.

The MyiLibrary collection of e-books is findable through the NRC-CISTI Catalogue by clicking “Borrow the eBook” which places the book in a shopping cart.

Illustration 3: eBook Loan Service Search Result and Order Screen

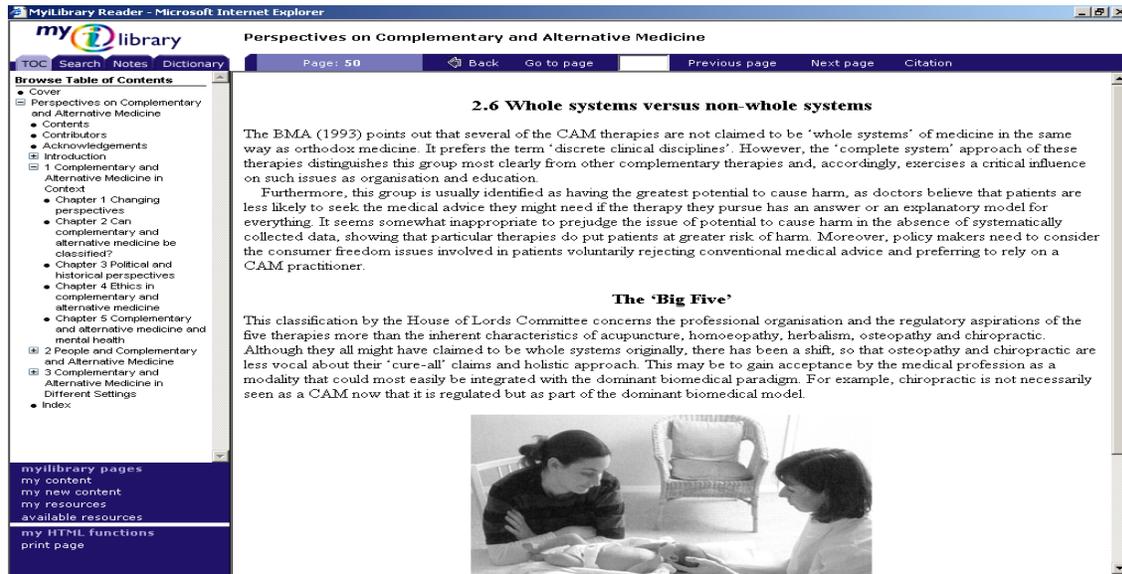


The service, like Discover, uses a ‘registration-lite’ model with payment by credit card allowing 30-day online access to the borrowed e-book. Intermediaries can perform the borrowing transaction and automatically forward the e-mail with link to their end-user.

² International Digital Publishing Forum (2008) [Industry Statistics](http://www.idpf.org/doc_library/industrystats.htm) (updated to Q4 2007) Link to: http://www.idpf.org/doc_library/industrystats.htm

Access to the e-book is through any common Web browser requiring no additional reader equipment. There are limitations on the number of pages that can be printed, but copying and pasting is not restricted allowing users to copy excerpts as needed into other documents.

Illustration 4: MyiLibrary E-book Page Screen



A variant form of the eBook Loan service allows all employees at the National Research Council of Canada to access the e-books directly, without seeing the payment screens. This different licensing model has NRC-CISTI only being billed for the books viewed by NRC employees.

The eBook Loan Service transforms the way NRC-CISTI loans books moving away from the traditional print interlibrary loan returnable model to one consistent with the digital Web environment. It presents a cost-efficient solution for organizations seeking a better way to serve patrons who do not traditionally visit the library onsite, such as remote users.

In future, NRC-CISTI and MyiLibrary plan to make the service more available through library networks such as OCLC and continue to demonstrate the service to libraries through conferences and other forums.

The development of the eBook Loan Service is discussed at more length in a paper by Woods and Ireland presented at the 10th ILDS Conference in Singapore in October 2007 (Woods et al., 2007).

Upcoming Developments at NRC-CISTI

In 2007, NRC-CISTI completed important work on services that position it well for the future including a content authorization module for accessing publisher electronic content starting with its NRC clients, integrating bibliographic linking tools into its NRC-CISTI Source product and modernizing its fee management systems setting up a direct link with the Copyright Clearance Center (CCC) Web-service gateway for more reliable on-the-fly calculation of copyright costs.

This year, NRC-CISTI will continue the transformation by letting Internet users access Discover through a Google Scholar link and offering eBook Loans through OCLC WorldCat Resource Sharing. This will allow NRC-CISTI to be able to better meet the client where they are, rather than expecting that they will always be coming to the library website. NRC-CISTI will be launching a new generation of searching and alerting Web services built on the Discover platform that will allow any user to search for articles from its electronic repository and create alerts based on subject or table of contents delivered through e-mail or RSS feed. NRC-CISTI will be hosting a digital repository both for commercial publications and National Research Council publications. All of these new tools and services put more emphasis on the user having control of the interaction which is more convenient for them, and getting more articles in their hands quicker so that they will have the information and need not be frustrated.

By 2009, it plans to offer portal access with personalization and collaboration tools for clients of the National Research Council. It plans to partner with the Canadian Institutes of Health Research, leveraging the information infrastructure to speed up access to domain-based literature in the medical and health sciences to and for Canadians. It is part of a group of other like-minded organizations seeking to enable access to raw scientific data in Canada. A Canadian Federal Science e-Library is being developed in partnership with other federal libraries.

In the next few years, NRC-CISTI plans to offer more knowledge discovery services built using the same Web-service platform such as recommender services, better tools for helping clients serendipitously find information of use to them. To be able to learn more about this new generation of services, NRC-CISTI has launched an experimental platform with some of its newer Web-based services called NRC-CISTI Lab that anyone can try out. (<http://lab.NRC-CISTI-icist.nrc-cnrc.gc.ca/>)

The flexibility of using a Web-service architectural approach is that NRC-CISTI can open itself up to other organizations so that they can use all or part of these information access Web-services for their own clients. This has the potential for productivity breakthrough as it will shift more resource sharing activity from time-delayed document deliveries to immediate electronic content downloads.

As the eventual target state for information access and knowledge discovery, NRC-CISTI wishes to:

- Meet the user where he or she is seeking information through Google or the library website, *wherever they are*, by allowing other organizations to load or crawl its metadata and post it on their sites.
- Provide value and impact for the user who wants more control over their own online interaction with organizations like NRC-CISTI
- Make available more of its scientific collection at a smaller content level, i.e. the article or paper through purchase or digitization and storing it on its local e-repository for easier access.
- Be a reliable source of organized, aggregated and filtered information such that the organization has “stickiness” i.e. people will want to come back and use its services again.
- Promote information literacy so users learn to filter and interpret information, sort the good from the bad, and use the best tools available to them
- Have a technology infrastructure sufficiently flexible to meet the rapidly changing Web environment driven by user expectations and new business models.

Importance of New Electronic Service Models for Library Resource Sharing

These new services are part of a new set of ideas emerging in the library resource sharing community to improve access to scholarly literature in the digital environment. To succeed libraries, including NRC-CISTI, need to be able to offer more access to their digital collections and those of resource sharing partners in a way that meets the immediate information needs of users. Services like NRC-CISTI’s Discover and eBook Loans can help by demonstrating successful best practices in Web-service development in a rapidly changing Web environment.

Libraries are accepting the challenge by offering new and innovative services that are Web-enabled and meet the user where they are, rather than demanding people to come to the library or its website for access to the collection. This is reflected in a variety of library-based initiatives to rebrand services to better meet the information needs of today’s users.

A sampling of resource sharing best practices to position libraries to be “where the user is” includes:

- The Rethinking Resource Sharing group in the U.S. is promoting a Web plug-in called GET-IT that allows users to order a document that they find on any website in a self-serve model from a variety of different sources including their own library, a document supplier, a publisher, a bookseller, etc.
- Montana residents receive book loan deliveries direct to their doorsteps in an OCLC sponsored initiative reminiscent of the popular Netflix delivery model.
- The British Library and INIST make research articles conveniently findable on Google for instant downloading. NRC-CISTI plans to offer the same Google access this year. The British Library has gone another step making its BL Direct service available through OCLC’s OpenWorldCat.org site.
- Libraries are delivering materials “just-in-time” to the patron from online publisher sites and bookseller sites like Amazon rather than obtaining them

- through acquisitions or resource sharing networks when it is more efficient to do so.
- Google Scholar makes it easy for libraries to make their link resolvers functional for local users.

The reaction in the community to this new breed of service has been mixed, from very positive to negative and everything in-between. The eBook Loan Service has been presented in various different library conferences in the past year and in each case much interest has been expressed in the service. Favourable comments have been expressed about the opportunity it presents to better serve remote users and the reasonable \$25 pricing. By the same token, observers have encouraged NRC-CISTI to explore other access points and payment methods such as OCLC WorldCat Resource Sharing IFM payment (which it is currently doing). The British Library saw huge jumps in hits on its BL Direct Service once it went up on Google.

Other reactions have been more negative or neutral. The user-centric approach taken in developing the Rethinking Resource Sharing GET-IT Plug-in has the potential to bypass existing local ILL department policies and ordering processes raising concerns of the visibility of the library and how to ensure the user has received the document. There is unease around services like eBook Loans, Discover and BL Direct that carry with them encryption on the content, limiting fair use or fair dealing rights of users. The high fees for these services limit demand. The payment method of credit card limits who can place orders simply because some organizations cannot use them. Just-in-time acquisition by ILL departments is challenging traditional collection development policies.

NRC-CISTI wishes to acknowledge the concerns created by such services and plans to improve its digital information delivery services to ensure they are relevant to user needs. The next generation of NRC-CISTI information delivery services are in planning and a key audience whose concerns need to be addressed will be libraries and information centres who wish to make these services accessible to their end-users.

Ultimately there is a trade-off between offering immediate access to electronic content or continuing to depend on delivery from print. Delivery from the electronic offers productivity gains for libraries and users but with increased copyright costs compared to print. The greater danger facing library resource sharing is what will happen with the supply of print contracts or simply ends as the tipping point is passed? National document suppliers such as NRC-CISTI, the British Library and INIST are building alternatives now based in the digital environment so that resource sharing can continue uninterrupted when the traditional print ILL model ends. Success will require negotiations with rights holders who are making the content available to NRC-CISTI. This is a natural role for national science centres such as NRC-CISTI who have national mandates to ensure access to the world's research literature and can be trusted as honest brokers between publishers and libraries.

Conclusion

To maintain relevance library resource sharing must adapt to the new rules of the road in the Web world that increasingly put the user in the driver's seat. From search and discovery to downloading, library resource sharing needs to be part of the solution so users can access locked-up knowledge beyond what they find in Google results and their own library catalogue. National libraries, like NRC-CISTI, exist within the mosaic of global resource sharing that encourages collaboration to ensure the needs of the common user are met by all. As such, NRC-CISTI encourages dialogue in the library resource sharing community about how to better serve users to make it simple for them to access what is not immediately available because it resides elsewhere or offline. NRC-CISTI expects there will be an ongoing conversation with its library resource sharing partners as it further develops its Web-oriented information delivery services to meet ever-evolving user needs.

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