

Strengthening R&D information systems through library consortium: A case of CSIR laboratories

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Examines the changing face of libraries particularly with regard to the journal subscription from print to electronic form through formation of consortia. The benefits accrued to the library and information system of CSIR laboratories owing to formation of a consortium to access e-resources is discussed. Concludes that the CSIR laboratories library and information systems have been strengthened following the widening of the journals base after the formation of the consortium.

Introduction

Libraries have been important institutions since time immemorial. India is one of the oldest civilizations of the world with a glorious past of higher learning institutions and libraries. In ancient and medieval period, libraries were part of the royal houses and monasteries and later they descended to public domain as a part of higher learning system¹. In independent India, libraries and information systems have been made an integral part of higher learning system. Information and knowledge plays a very vital role in over all development of societies and nation building. Information and knowledge are the products of society and these flows through various information resources, particularly peer reviewed R&D journals.

Journals are basic input for R&D work and they are increasing three folds every 15 years². Costs of journals in the last twenty years has increased 226% in terms of dollars which may be further compounded by currency conversion³. The budget of libraries to acquire all such information resources also has increased by 110% during the same period but vis-a-vis the cost escalation of journals, there is a substantial mismatch of 116% (226% -110% = 116%) which has constantly been causing reduction in journals information base of the R&D institutions. Making matters further complicated is the ever increasing number of R&D journals, R&D workers, new disciplines, institutions and global competition. The

estimated number of international STM (science, technology and medicine) journals is about 25,000 and out of this about 15,000 are peer-reviewed⁴.

With the advancements of ICT applications, Internet and World Wide Web, there is a shift from print to electronic resources. Electronic resources offer tremendous possibilities and advantages over print media which includes the ease of use, shareable nature, availability on Internet and universal acceptance of web technology. The enhanced features of online access provided through web technology such as hyperlinks to related texts and links to multimedia also provide value-addition to these sources. For libraries, management of print sources has been a problematic task. With e-journals, libraries will no longer be required to maintain the print collections that involve follow up of missing issues, binding, shelving, re-shelving, lending, etc.

Changing face of libraries

Libraries no longer are the warehouse of information, but rather a gateway to information and knowledge. Availability of information and knowledge is key to success. Librarian is not merely a collector but rather a gatekeeper of information and knowledge. Traditionally, the libraries have been functioning as stand alone entities building comprehensive duplicate collections, but now it is in a network of shared resources. Rapid technological advancements during past two decades, particularly for

information handling, delivery and management have been resulting in paradigm shift of libraries.

In the past, the size of collection has been the criteria of library's reputation, recognition, and proportional value in the system and consequently libraries focused on collection building. However, the concept of collection building in libraries has undergone transformation to connection building with the aid of available technologies. Libraries are building more and more connectivity with resources of other institutions/organizations for satisfying information needs of their users. It serves as facilitating, capacity building point to user community at local, national, and international level, and providing all available services to users in any part of the network on equal basis⁵.

Owning to access model has emerged due to availability of resources on network economically. The concept of owning the information resources is on decline and access to remote information resources has gained dominance which would continue being economical and user friendly.

Single library subscription to consortium based subscription is mutually beneficial to libraries and publishers. Many consortia have facilitated saving anywhere from 20% to 70% revenue when buying as consortium (group) compared to accrued individual library prices. This is possible due to technology and collective buying power of consortium.

Satisfying the information needs of the users is the prime objective and goal of a library but even the best library can satisfy only up to 80% needs of their users and it is considered as the core of users information demand. The remaining 20% information needs of users which form the peripheral nature of information demand is being satisfied through national or international documentation/information centres/institutes etc. Now with the advent of consortia, core demand is shifting to consortia and library's own collection building approach is concentrating on peripheral demand of users.

Similarly, shift from personalized to network based services, bibliographic to full text databases, print to electronic resources, timed access to any time, any where access are various changes faced by libraries presently.

Coping with the changes

As information resources are growing exponentially, keeping tab on all required R&D information is not possible

due to rising cost of resources, its ever-growing numbers, inter-disciplinary R&D work, and tools to have access to all such resources. This needs appropriate and economical means to manage scholarly information required for R&D organizations/ institutions. Following are the broad parameters, particularly for the developing countries, to cope up with the situation:

- Share and pool the resources available in various R&D organizations/ institutions of a country at larger scale,.
- Public funded R&D organizations / institutions need to undertake OA initiatives, at the institutional and national level, where research literature should be freely available and accessible to the worldwide R&D community,
- The R&D outputs of public funded organizations should be made freely accessible to all and be treated as a national resource for advancing scholarly work. The apex body or funding agency needs to start open access repositories, open access journals, etc., for scholarly out put of public institutions. It would be a catalytic boost for accessing R&D information resources and advancing knowledge on affordable economical scale,
- Libraries have a history of informal cooperation since ancient times and now social, economical, and technological factors have evolved the concept of consortium. Libraries should expand the existing information resource-base of the organizations through consortia formation,
- Realignment in library structure, space, facilities, collection, services, and skill up-gradation of available manpower need focused and special attention in the light of changed information environment and users requirements,
- Constant user education and awareness programme are essential to enhance usage and realize the optimum value of resources and money,
- Focus on evolving unified long term strategic solutions instead of adopting short term individual survival tactics to avoid problems at latter stage,
- Strengthen available information system; make it vibrant, amenable to changes and capable to provide divergent nature of information to users,

- Constant information resource auditing and use dynamics of users’ requirement as the base to build information resources comparable to world leading institutions,
- Evolve transparent, justifiable, equitable, uniform and unified approach for the benefit of larger users, particularly of developing countries, and
- The information resources available with public funded libraries/information centers be treated

as a national resource and access to this should be free of charge to all users for their scholarly work irrespective of user’s affiliation.

What is consortium?

In the second half of nineties, concept of library consortium gained significance^{6,7,8}. The factors that have evolved this phenomenon are the discovery of mutual interests of publishers and libraries⁹. A library consortium is a collective activity to provide shared expertise, access to new electronic and print resources, professional development, and new sources of funds¹⁰. Another definition of library consortia could be “the coming together of libraries to achieve a common goal that is beyond what an individual library could achieve on its own”.

From an evolutionary stand point, the consortium broadly may be defined as “an evolutionary form of cooperation among libraries / information centres to meet the challenge of constantly declining information resource base with R&D and academic organizations”. Figure 1 depicts the evolution stages of consortium. With information resource-base of libraries shrinking particularly in developing countries owing to cost escalation of information resources, library consortia makes it possible to expand information resources through an economically collaborative approach.

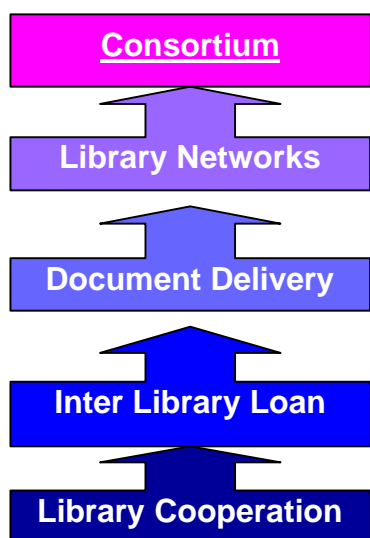


Fig. 1 — Evolution of consortium

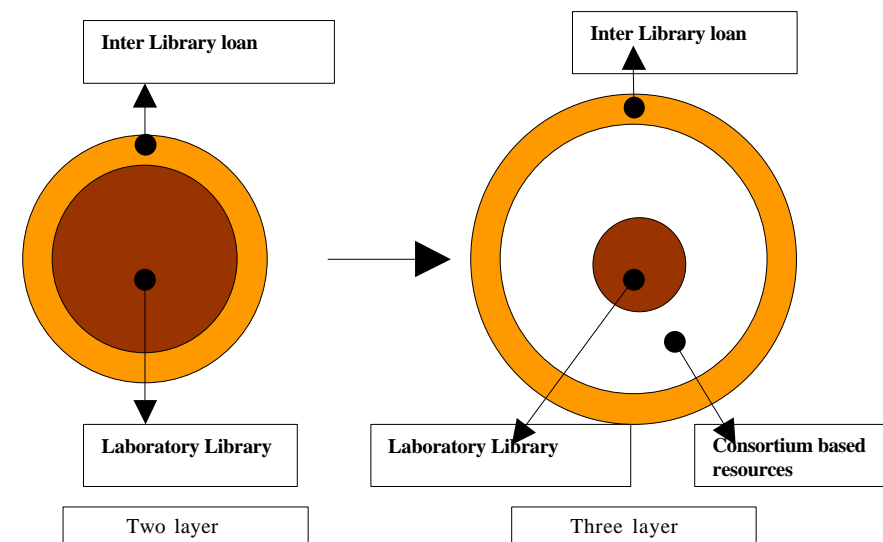


Fig. 2— A CSIR laboratory information system

Library and information system in CSIR

Council of Scientific and Industrial Research (CSIR) is a public funded R&D organization with a chain of 37 national laboratories and institutes located all over India. No two laboratories/institutes are identical in their work areas. The library/information centre in each laboratory/institute is an integral part that contributes to R&D activities in their respective areas. The libraries/information centers of CSIR laboratories/institutes were two layered information systems since their inception. The price rise of journals, technological developments and change in information seeking behavior of users in last two decades have necessitated the library and information systems to evolve new solutions to meet challenges arising out of the declining information resource-base in the laboratories that lead to the setting up of CSIR e-Journals consortium. This resulted in enhancing the existing two layer information systems to three layer information systems as shown in Fig. 2.

Information resources prior to consortium

Table 1 show that there has been a constant decrease (~66%) in the journals base of CSIR laboratories over

Table 1 — Journals base in CSIR system

Sl. No	Year	No. of subscription	Unique titles
1.	1993	8,384	5,126
2.	2000	3,356	2,500
3.	2005	2,717	1,732
4	2006	2,717	1,732
5	2007	2,717	1,732

Table 1a — Range of journals in CSIR laboratories

Sl. No.	Laboratories*	No. of Labs	Prior to the project
1	CSIRM, IGIB, CSIR HQ, CFRI, RRL-Jor, RRL-Jam, CMRI, CCMB	8	Up to 50
2	SERC, RRL-Bho, CGCRI, CBRI, IICB, NGRI, IHBT, CMERI, CIMAP, CSIO, NIO, NISCAIR, NEERI, RRL-Bhu, RRL-Tri, CRR, CLRI, IIP, NML	19	51-100
3	ITRC, CSMCRI, NPL, IMTECH	4	101-150
4	CEERI, NBRI, CFTRI, NISTADS, CDRI, IICT, NCL, NAL	8	151-200

* List of laboratories given at Annexure I

the last decade. Being a major concern this has necessitated the libraries to find out alternate solution to make available R&D information.

While laboratory size, areas of work and number of researchers vary, it is desirable to have comparable and adequate information resources irrespective of the size or strength of the laboratory. However, Table 1a shows that majority of labs (19) have access to only about 50-100 print journals.

Information resources after consortium formation

The CSIR e-Journals consortium was started in the year 2002 with one publisher, i.e., M/s Elsevier Science. Table 2 shows that in a span of 5 years, the number of publishers, journals and resources have increased tremendously.

Impact of consortium

With a large pool of resources available in the consortium mode, it is necessary to assess the impact of the consortium. The impact is measurable on different parameters including revenue saving, usage in terms of downloads, and contribution in international journals, etc. An estimate of notional revenue savings on account of e-access via the consortium vis-à-vis print access is shown in Table 3. It can be seen that the consortium mode of access has facilitated substantial revenue saving.

In order to assess the output of CSIR scientists, the number of papers published in SCI covered journals in the different years beginning from 2002 was retrieved.

Table 2 — Information resources after consortium

Sl. No.	Publishers	No. of e-journals	Date of access
1	Elsevier Science	1500	June, 2002
2	Blackwell	355	January, 2005
3	John Wiley	374	January , 2005
4	Springer	800	January, 2005
5	American Institute of Physics	16	February, 2005
6	American Soc. of Civil Engineers	30	February, 2005
7	American Soc. of Mech. Engineers	20	March, 2005
8	American Chemical Society	41	March, 2005
9	Cambridge University Press	74	March, 2005
10	Oxford University Press	69	March, 2005
11	Royal Society of Chemistry	37	April, 2005
12	Taylor & Francis	600	February, 2006
13	Emerald	126	April, 2006
14	IEEE	164	February 2007
15	Association of Computing Machinery	49	February 2007
16	M/s Nature Publishing Group	01	October 2007
Databases			
17	Web of Science		February 2007
18	Derwent Innovation Index		February 2007
19	Delphion		February 2007
20	ASTM Standards		February 2007
21	Indian Standards		February 2007

Table 3 — Notional saving: e-Access Vs print subscription

E-Access Vs Print	2005	2006
No. of Publishers	11	11
Unique Title	3970	4245
Lab Usage (Accessing lab x unique titles)	43125	56423
Average cost of journal	Rs. 1.3 lakhs	Rs. 1.3 lakhs
Cost in print model (1.3 x 43125)	Rs. 560.0 crores	Rs. 733.49 crores
Cost in e-Access model	Rs.25.0 crores	

Cost shown is in Indian currency; 1 Lakh = 0.1 Million , 1 crore = 10 Million

Table 4 — CSIR research papers in international journals

Year	Papers in SCI covered journals	% Growth over 2002	Total Impact Factor	Average Impact Factor	% growth over 2002
2002	1944	-	3171.739	1.632	-
2003	2273	17	3980.560	1.751	7
2004	2668	37	5067.160	1.899	16
2005	3018	55	6057.754	2.007	23
2006	3488	79	6918.322	1.983	21.5
2007	3727	92	7465.908	2.003	22.7

Table 5 — Full text downloads

Discipline	Downloads 2005	Downloads 2006	Downloads 2007
Chemical Sciences	1054073	1325423	1565023
Biological Sciences	748091	931877	946101
Engineering Sciences	323231	534283	702548
Physical Sciences	166162	241116	509413
Others	99649	278676	139572
Total	2391206	3311375	3862657
% Increase over year 2005		38.48	61.54

Data shows significant growth in terms of number of papers and IF (Impact Factor). Quantitative as well as qualitative improvement is seen in the years following the access to e-journals through consortium (Table 4).

The number of downloads from the subscribed e-journals is yet another measure of usage and impact of e-resources. It is seen that there has been a continual and steep increase in the number of downloads. Table 5 shows the full text downloads for the years 2005, 2006, and 2007 and it is found that the overall increase is 38% and 61% respectively in the years 2006 and 2007 over the year 2005.

Conclusion

Science is always and its affectivity has become more horizontal than ever before with the advent of computer and communication technology, advancement of World Wide Web (WWW) and competitive zeal of researchers. R&D organizations need a wide journals base to keep abreast with global developments. CSIR took cognizance of its depleting information base at the right time and accordingly enhanced the existing information systems from two layers to three layers. This has made CSIR information systems comparable to leading institutions of the world. The information base of laboratories was in the range of 20 to 200 international journals which now has gone up to 5000+ international journals, similarly, contribution of CSIR researchers in international journals have risen to 79% in last five years. Full text downloads

have increased from 11000 in July 2002 to 350000 in March 2007. The notional savings on this account is Rs. ~535 crores. Upgrading the CSIR information system is proving effective in meeting its researcher's divergent nature of information requirements.

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Annexure I

List with full names of CSIR Laboratories/Institutes

Sl. No.	Abbreviation	Name of Institutions/Labs
1	CCMB	Centre for Cellular and Molecular Biology
2	CBRI	Central Building Research Institute
3	CECRI	Central Electrochemical Research Institute
4	CDRI	Central Drug Research Institute
5	CEERI	Central Electronics Engineering Research Institute
6	CFRI	Central Fuel Research Institute
7	CFTRI	Central Food Technological Research Institute
8	CGCRI	Central Glass and Ceramic Research Institute
9	CIMAP	Central Inst. of Medicinal and Aromatic Plants
10	CLRI	Central Leather Research Institute
11	CMERI	Central Mechanical Engineering Research Institute
12	CMRI	Central Mining Research Institute
13	CRRI	Central Road Research Institute
14	CSIO	Central Scientific Instruments Organisation
15	CSMCRI	Central Salt and Marine Chemicals Research Institute
16	CSIR- HQ	Council of Scientific and Industrial Research
17	IGIB	Institute of Genomics and Integrative Biology
18	IHBT	Institute of Himalayan Bioresources Technology
19	IICB	Indian Institute of Chemical Biology
20	IICT	Indian Institute of Chemical Technology
21	IIP	Indian Institute of Petroleum
22	IMTECH	Institute of Microbial Technology
23	ITRC	Industrial Toxicology Research Centre
24	NAL	National Aerospace Laboratories
25	NBRI	National Botanical Research Institute
26	NCL	National Chemical Laboratory
27	NEERI	National Environmental Engineering Research Institute
28	NGRI	National Geophysical Research Institute
29	NIO	National Institute of Oceanography
30	NISCAIR	National Inst. of Sci. Comm. and Information Resources
31	NISTADS	National Inst. of Sci. Tech. and Development Studies
32	NML	National Metallurgical Laboratory
33	NPL	National Physical Laboratory
34	RRL-Bhopal	Regional Research Laboratory Bhopal
35	RRL-Bhu	Regional Research Laboratory Bhubaneswar
36	RRL-Jammu	Regional Research Laboratory Jammu
37	RRL-Jorhat	Regional Research Laboratory Jorhat
38	RRL -TVM	Regional Research Laboratory Trivandrum
39	SERC	Structural Engineering Research Centre
40	URDIP	Unit for R&D of Information Products