

Academic consortia in India

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Preamble

The higher education system in India is large and complex. India has the third largest higher education system in the world, behind China and the United States comprising of more than 400 universities, 17,625 affiliated colleges, 16,602 professors and 1,04,81,042 students including 16,602 research students. The total enrolment has increased from a meagre 0.1 million in 1947 to 10.48 million in 2005. Colleges, affiliated to 131 affiliating universities, constitute the bulk of the higher education system in India contributing around 89 percent of the total enrolment. Other than this, India sends a very large number of students overseas. About 123,000 Indian students were studying abroad in 2007, 83,000 of them in USA and 25,000 in UK.

On the research front, hundreds of labs under different government agencies carry out a large part of research. An ever increasing number of foreign companies are also setting up labs. India has the third largest scientific and technical manpower in the world. In terms of R&D investments, India is in the top ten countries in the world. Some of the Indian research labs are as well if not better equipped than labs in the West. Rough estimate of R&D investment, as % GDP in India is about 1.00%. About 70% of R&D investment in India comes from the government, but industry's share is also steadily increasing. India publishes about 35,000 papers annually and these appear in about 2,500 journals. As not all of these journals are available in most institutional libraries in India, many Indian researchers may not know what other Indians are doing in their own field. If we look at papers published by India and China in different fields, Data from Scopus show that India moved up from 13th rank in 1996 to 10th in 2006 among nations publishing the largest number of papers. In the same period China moved up from 9th to 2nd position.

Vision oriented efforts since Independence has led to Government Departments for Science & Technology, Atomic Energy, Space, Electronics, Oceanography, Biotechnology, Research Laboratories belonging to Council of Scientific and Industrial Research, Indian Council of Medical Research, Indian Council of Agricultural Research, Indian Council of Social Sciences Research, Defence Research and Development Organisation, Indian Space Research Organisation. Research and Development (R&D) institutions and higher learning institutions in India are engaged in advanced studies, leading to development of new applications, new techniques, new products and new technologies. The R&D organizations have also developed expertise in their respective areas that are now recognized worldwide. Such institutions are now collaborating with world's leading institutions with varying degree of partnerships. But after a few years of stagnation, now science in India is looking up. Both investments and research output are increasing. Several new institutions and central universities are coming up.

Access to Information in Educational and Research Institutions in India: Current Scenario

Leading Indian scientific research institutions, such as Indian Institute of Science (IISc), Indian Institutes of Technology (IITs), Indian Statistical Institute (ISI), R&D Institutions under the Council of Scientific and Industrial Research (CSIR) and Indian Council of Medical Research (ICMR), now have considerably greater in-flows of sponsored research, supported by industries, enterprises, as well as international and national funding agencies. Technology transfers, technology incubation from these institutions to the enterprises and consultancy services for the national development are also very significant. That is why cash inflows to research institutions of this segment (i.e., institutions of national importance) are comparatively higher than other segments (i.e., non-elite institutions and universities). Typical of the leading scientific research institutions is the Indian Institute of Science (IISc), The Indian Institute of Science, Bangalore, which was started in 1909, has a very high international standing in the academic world. It provides facilities for post-graduate research and teaching in several important emerging areas of science and engineering. The Institute currently has more than forty academic departments, with about 2500 active researchers pursuing research. It has about 500 faculty members and 2000 students and publishes about 2000 research papers per year. The Institute has one of the best computing and network facilities in the country and researchers have online access to a large number of e-resources, including leading bibliographic and citation databases, data sets, over 12000 e-journals, 50000+ eBooks and other web resources.

While the elite institutions have reasonably good information provision facilities that support scholarly communications, the not-so-elite institutions and much of the universities are struggling to achieve the same. The associated problem is mainly related to the accessibility of literature. The reason is primarily shrinking budget. There is paucity of funds for the primary literature, i.e. subscription based scholarly journals. The subscriptions of scholarly periodicals, especially the high impact journals, are also increasing very rapidly, at the same time, library budgets almost remained the same. The recent years have been particularly bad for Library funding as India faced steep escalation of exchange rate of US \$ and Euro against Indian Rupee (almost a 25% increase). This has eaten into the Serials budget of almost all the Institutional Libraries. In a few cases there has been big scale cancellation of print journals. All educational institutions in India, especially the universities, continue to face acute shortage of funds to subscribe to international scholarly journals. It is estimated that a typical university in India subscribes to less than two hundred international journals. Moreover, some of the Indian universities do not subscribe to any international journals at all. While there are around 50,000 scholarly journals, all research institutions and universities in India put together had combined subscriptions to only around 2,500 journals in print till recently. Many smaller colleges and institutions subscribe to fewer than hundred journals. Most colleges, including those imparting postgraduate and doctoral programmes, do not have financial resources to subscribe to any international journals, their subscription list includes few Indian journals and a few popular magazines.

The scholar's preference to publish in high impact journals for recognition in the elite world demands the necessity of acquiring such literature in the library. One mode out of this has been the increasing reliance on the Library Consortia to provide the access to Scholarly contents. The fund crisis is also working out to be an opportunity for Open Access movement. Here open access literature, both open access journals as well as Institutional Repositories play a vital role, both in terms of research communication and access. The ICT infrastructure

necessary to take advantage of the open access has improved to a considerable extent in India. India has adopted the Open Access much ahead of other developing countries. More than 130 peer reviewed open access journals are being published out of which 94 titles are by 6 major publishers like Indian National Science Academy, Indian Academy of Science, MedInd, MedKnow, Indianjournals.com and Kamala-Raj enterprises. The Journal of Indian Institute of Science from my own Institute had taken the Open Access route right from the start of the online version of these journals.

Emergence of Consortia in India

The accessibility to international journals in Indian universities and technical institutions has improved many fold with setting-up of a few Government-funded library consortia. Prior to setting up of these consortia, the access to e-journals was restricted to a premier institutions like IISc, IITs, IIMs and a few central universities who were subscribing to a few e-resources including bibliographic databases on CD ROM, a few e-journals accessible free with subscription to their print versions and a negligible fraction of journals on subscription. After launch of the “Indian National Digital Library in Engineering Sciences and Technology (INDEST) Consortium” in 2003 and “UGC-INFONET Digital Library Consortium” in 2004, availability and accessibility of e-resources increased phenomenally in centrally-funded technical institutions (IITs, IISc, IIMs, IIITs, etc.) and universities, setting in a new culture of electronic access and browsing in educational institutions. A number of library consortia have emerged in India in past five to six years. Some of the important consortia and their activities are described below:

INDEST-AICTE Consortium: The Indian National Digital Library in Engineering Sciences and Technology (INDEST) Consortium was set-up by the Ministry of Human Resource Development (MHRD) in year 2003 to provide access to selected electronic journals and databases to 38 centrally-funded technical institutions including IISc, IITs, NITs, IIMs, IIITs, ISM, SLIT, etc. Currently, the Ministry provides funds required for subscription to resources for 42 centrally-funded institutions including IISERs, new NITs and IITs. Besides, 60 Government or Government-aided engineering colleges and technical institutions have joined the Consortium with financial support from the AICTE. Moreover, the Consortium also welcomes other institutions to join it under its self-supported category. 690 engineering colleges and other educational institutions have joined the Consortium under its self-supported category. The total number of members in the Consortium has now gone up to 788.

UGC-INFONET Digital Library Consortium: The University Grants Commission initiated the UGC-INFONET Digital Library Consortium in year 2004 in order to provide access to a large number of scholarly journals from reputed publishers, aggregators, scholar societies and university presses to universities in India. Under the Consortium, more than 5,000 full-text scholarly electronic journals from 19 international publishers are made accessible to 100 universities in the first phase of its implementation. The access was extended to 150 universities in 2006. The Consortium provides current as well as archival access to core and peer-reviewed journals in different disciplines. Access would ultimately be extended to all 171 Indian universities that come under the purview on UGC. The programme would also be extended gradually to affiliated colleges. The programme is wholly funded by the UGC and monitored by INFLIBNET (Information and Library Network) Centre, Ahmedabad. The UGC-INFONET Digital Library Consortium has recently launched its “Associate Membership Programme” that facilitates private universities and other institutions to subscribed electronic resources through the Consortium on its own.

CSIR E-Journal Consortium: The Council of Scientific and Industrial Research (CSIR) constitute of 40 research laboratories in India. The CSIR E-journals Consortium was the first major and formal consortium at national level. The Consortium started with access to ScienceDirect (Elsevier Science) for all of its 40 laboratories in 2001. The extent of the CSIR E-Journals Consortium was restricted to only one publisher (Science Direct) till 2005 because of lack of commitment to funds and resources by the CSIR management and problems in getting commitment for retaining print subscription by participating institutions. After delay of couple of years, the CSIR E-journals Consortium, in the year 2005, has entered into agreement with 11 publishers to access about 3316 international journals across all its the laboratories / institutions. Thus, the expansion of information base of CSIR laboratories / institutions has increased from 20 -200 print journals to 3,316 e-journals for its every user. The Consortium is wholly funded by the CSIR and is monitored by NISCAIR, a CSIR institution situated in Delhi. In 2009 the Consortium failed to reach License agreement with Science Direct forcing the Institutions to go in for their own individual subscriptions.

MCIT Library Consortium: The Ministry of Communication and Information Technology (MCIT) Consortium caters to the information requirement of 9 institutions including NIC, CDAT and CDOT (with its offices in multiple locations). Funded by the Ministry of Communication and Information Technology (MCIT), the Consortium subscribes to 5 electronic resources including IEL Online, ACM Digital Library, Indian Standards, Science Direct and JCCC. Established in 2005, other activities of the Consortium include establishing institutional repositories, national making union catalogues, creation and maintenance of library automation software called e-Granthalaya.

DAE Consortium: The Department of Atomic Energy (DAE) Consortium caters to the information requirement of 36 institutions including BARC, TIFR and SAMEER. Funded by the Department of Atomic Energy (DAE), Govt. of India, the Consortium subscribes to e-resources from 4 publishers (including Science Direct, Springer, MathSciNet) for providing access to around 2,000 e-journals. Established in 2001, the Consortium is administered by the BARC, Mumbai.

ERMED-NML Consortium: Electronic Resources in Medicine (ERMED) Consortium is an initiative taken by Director General of Health Services operated by National Medical Library. Started in 2008, presently ERMED members are 72 Government Medical Colleges/Institutes across the country. ERMED is providing access to over 1600 medical journals.

Forum for Resource Sharing in Astronomy (FORSA): At present, there are eleven institutional members. The Consortium facilitates e-access to Journals and Books and promotes Resource Sharing and ILL among Astronomy related Institutions.

Consortium for e-Resources in Agriculture (CeRA) : A Consortium on e-Resources in Agriculture (CeRA) has been established in 123 agricultural / animal science universities / deemed universities / research institutes of the Indian Council of Agriculture (ICAR). CeRA provides access to 1500 online journals, books and data base available in Veterinary, Animal, Fisheries and Agricultural Sciences.

Health Science Library and Information Network (HELINET): HELINET is operated by the Rajiv Gandhi University of Health Sciences, Karnataka. The consortium was started with a vision to improve the quality of education and research in the Health Science

colleges/institutions in Karnataka state through enhanced access to high quality medical information. The major benefit of this consortium is providing access to more than 600 core international e-journals.

All the above Consortia in India could be categorised under the following:

Open Consortia: This type of consortia is very flexible and it is the wish of members of consortia to join and leave at any time when they please. INDEST Consortium is an example to this.

Closed Group Consortia: It is within defined group either by affiliation and collaboration, among them like CSIR, DAE, IIM Consortium and the formation and operation of the consortia guidelines and its administration are fairly simple and easy.

Centrally Funded Consortia: In this model, consortium will solely depend on the parent body, usually a Government Agency. A few examples are INFONET by UGC, ICMR, CSIR.

Shared-budget Model: In this model, the participating libraries take the lead and form the consortium. IIM and FORSA are examples of this model.

Publisher Initiatives: The Consortium for Emerald Full-Text Library (published by the Emerald Publishing Group) is recent example. Here, consortium members will get deep discount price to the participating libraries. Few of the INDEST members have joined the Open Consortium offered by Wiley to get cross access to resources.

National Consortium: The significance of this model is national level licensing of products, as in INDEST and UGC INFONET.

Now we will look in greater detail at the two major Consortia in India- namely INDEST and UGC-INFONET.

INDEST-AICTE Consortium

Background

The “Indian National Digital Library in Engineering Sciences and Technology (INDEST) Consortium” was set-up in 2003 by the Ministry of Human Resource Development (MHRD) on the recommendation of an Expert Group appointed by the Ministry. The IIT Delhi was designated as the Consortium Headquarters to coordinate its activities. The Consortium enrolls engineering and technological institutions as its members and subscribes to electronic resources for them at discounted rates of subscription and favourable terms and conditions. The Ministry provides funds required for subscription to electronic resources for 48 centrally-funded Government institutions including IITs, IISc Bangalore, NITs, IIITs, IIMs and few other Institutions that are considered as core members of the Consortium. The benefit of consortia-based subscription to electronic resources is not confined to its core members but is also extended to all educational institutions under its open-ended proposition. 60 Govt. / Govt.-aided engineering colleges are provided access to

selected electronic resources with financial support from the AICTE and 787 engineering colleges and institutions have joined the Consortium under its self-supported category. The total number of members in the Consortium has now grown to 895. The Consortium was re-named as INDEST-AICTE Consortium in December 2005 with the All India Council for Technical Education (AICTE) playing a pivotal role in enrolling its approved engineering colleges and institutions as members of the Consortium for selected e-resources at much lower rates of subscription. The INDEST-AICTE Consortium is the most ambitious initiative taken so far in India. It is the biggest Consortium in terms of number of member institutions in Asia. The Consortium attracts the best possible price and terms of agreement from the publishers on the basis of strength of its present and prospective member institutions. The Consortium subscribes to over 12,000 electronic journals from a number of publishers and aggregators. The INDEST-AICTE website (<http://indest.iitd.ac.in> or <http://paniit.iitd.ac.in/indest>) hosts searchable databases of journals and member institutions to locate journals subscribed by the Consortium, their URLs and details of member institutions.

Governance

The Consortium operates through its headquarters set-up at the IIT Delhi under a National Steering Committee consisting of members from amongst beneficiary institutions under the Chairmanship of Director, IIT Delhi with Chairman, AICTE as its Co-Chair. A National Review Committee has also been set-up under the Chairmanship of Joint Secretary (Technical Education) with an overall responsibility for making policies, monitoring the progress, coordinating with UGC and AICTE for promoting the activities of the Consortium. Co-operative subscription to electronic resources is the principle task of the INDEST-AICTE Consortium with focus on providing consortium-wide access to electronic resources to support education and research in core subject areas of its members. The Consortium is responsible for carrying out negotiations with publishers and aggregators of electronic resources for getting better deals. It also negotiates terms of licenses and agreements with the publishers. The Consortium performs all functions including invoicing, receipt of payments, ordering and payment to publishers on behalf of its member institutions. Besides, the Consortium also coordinates with the funding agencies for release of payments for its core and AICTE supported members. The major terms of reference that the Consortium takes into consideration while negotiating with the publishers includes: i) Lowest rates of subscription for all member institutions; ii) Access to archival backfiles along with current subscription; iii) Archival backup or perpetual access to e-resources; iv) Cap on annual increase in rates of subscription; v) Print-independent (preferable) subscription to e-resources with deep discount on print vi) Print-dependent subscription to e-resources with cap on annual increase on rates of subscription to print; and vii) Better terms of license for access to e-resources.

Resource Sharing

As INDEST-AICTE Consortium does not subscribe to all resources for all its members, the document delivery and inter-library loan is, therefore, crucial to the success of the Consortium. The J-Gate Custom Content for Consortium (JCCC), designed specially for the Consortium, provides content-level access to all the electronic journals subscribed by all IITs, IISc and IIMs (14 institutions) by the Consortium or by these institutions individually. Besides IITs, IISc and IIMs, the JCCC is made accessible to all other core members of the Consortium including IISERs, NITs, SLIET, ISM, NERIST, IIITs and NITIE. The service facilitates generation of automated inter-library loan requests directly by a user to one of the IITs, IISc and IIMs. While all requests for articles subscribed by the INDEST-AICTE Consortium are routed to IIT Delhi (Consortium Headquarters), requests for e-resources

subscribed by individual IITs, IISc and IIMs are routed to the respective institution(s). The Consortium headquarters maintain statistics of transactions done through the JCCC.

Electronic Resources being subscribed by the Consortium

Sl. No	Full-text e-Resources	Core	AICTE	Self-Supported	Total
1	ABI / Inform	15	0	5	20
2	ACM DL	39	0	50	89
3	ASCE	32	36	83	151
4	ASME	34	37	174	245
5	ASTM Standards + Digital Library	28	0	4	32
6	Capitaline	13	0	0	13
7	CRIS INFAC	6	0	0	6
8	DEL	0	0	53	53
9	EBSCO's BSC	13	0	0	13
10	Emerald Xtra	13	0	15	28
11	Euromonitor	13	0	0	13
12	ICE Thomas Telford	8	0	0	8
13	IEC Standards	8	0	0	8
14	IEL Online (1 User)	13	60	428	501
15	IEL Online (15 Users)	8	0	1	9
16	IEL Online (5 Users)	23	0	21	44
17	IET Digital Library	0	0	6	6
18	Indian Standards	29	0	9	38
19	INSIGHT	6	0	0	6
20	Nature	37	0	0	37
21	OSA (Optics Infobase)	8	0	0	8
22	ProQuest Science	22	2	5	29
23	Science Direct	34	0	136	170
24	Springer (1200)	8	0	0	8
25	Springer (1300)	28	0	0	28
26	Springer (520)	0	0	97	97
27	Wiley InterScience	6	0	0	6
28	AIP/APS	13	0	0	13
Sl. No	Bibliographic Databases	Core	AICTE	Self-Supported	Total
1	Compendex	8	0	2	10
2	INSPEC	8	0	1	9
3	JCCC	47	0	0	47
4	MathSciNet	13	0	13	26
5	SciFinder Scholar	8	0	0	8
6	Web of Science	8	0	0	8

Training of Users and Library Staff

The INDEST-AICTE Consortium has signed tripartite agreements with the publishers of electronic resources and with their local vendor as third party responsible for providing training on resources at various member institutions. All institutions have been requested to take benefit of this arrangement and organize training programmes on various resources within their institutions. The INDEST-AICTE Consortium holds extensive training programme for the benefit of Library staff members from various institutions. Besides, all IITs / IISc, IIMs and NITs are also assigned to conduct training programmes on themes decided by the National Steering Committee at regional level /national level.

Analysis of Usage of E-Resources by the Core Members

Most publishers maintain detailed usage statistics compliant to an international standard called “Counter” for resources offered by them to the Consortium. Comparative usage statistics for member institutions is obtained from the publishers and is made accessible to the member institutions on the INDEST Web Site through an interface called e-RAMS (Electronic Resource Access Management System). Institutions with low usage are requested to optimize their usage. The analysis of usage statistics of e-resources by member institutions reveals consistent increase in usage of all e-resources from the year 2003 to 2008.

Increase in Usage of E-Resources for Various Groups Core Members from 2003 to 2008

There has been a steady increase in usage of various resources for different groups of core institutions from the year 2003 to 2008. The data reflects consistent increase in usage from 2003 to 2008 for all resources and for all groups of institutions under the core category..

Strategies for Effective Implementation

Considering the fact that funds required for subscription to electronic resources for most of the institutions are met by the Government, it is inevitable to take steps to ensure proper utilization of resources in all member institutions. Some of the important steps taken in this direction are as follows:

Promoting Use of Resources: Several steps were taken to promote usage of subscribed electronic resources amongst the member institutions. The Consortium maintains a comprehensive Web site on its activities, services and resources offered. A template web page for all member institutions was developed and distributed to all members institutions. Besides, training programmes and annual meets, both at institute level and consortium level, brochures and user’s manual was prepared, printed and distributed amongst member institutions. Moreover, soft copies of these tutorials are also made available through the INDEST Web site. The Web site also provides links to web-based online tutorials available for these resources.

INDEST-AICTE Consortium User's Group: With an aim to optimise usage of electronic resources made available through the Consortium, each member institution is required to constitute an Consortium Users Group Committee, which may be a sub-committee of the existing Library Committee. The Consortium User Groups are required to meet once in a month to review the usage and associated problems.

INDEST-AICTE Consortium Users Convention: It is obligatory for each institution to organize a Users Convention in their respective institutions for electronic resources accessible to them through the Consortium for the benefit of their user community. Several

member institutions are regularly organizing user conventions for electronic resources accessible to them through the Consortium.

Copyright and IPR Issues

The INDEST Website provides information on “Licenses and Fair Use” to sensitize users as well as librarians on issues of licenses and agreements that the Consortium signs with the publishers. The website provides details on what authorized users can do and what they cannot do. While most of the publishers allow inter-library loan, electronic delivery of articles are not allowed.

Reliability of Connectivity

Availability of adequate Internet connectivity and bandwidth are crucial for optimal use of e-resources subscribed by the Consortium for its member institutions. The ministry has taken steps to increase bandwidth and connectivity available to each centrally-funded institution.

ICT Requirement for Accessing Electronic Resources

A minimum level of hardware and software infrastructure is a pre-requisite for a user or subscribing institution desirous of subscribing e-resources so as to achieve efficient and effective interaction with subscribed resources. The INDEST Website and Compendium for member institutions provides recommendations on ICT infrastructure requirements for accessing electronic resources.

Archival Access / back-up

Unlike in print media, the electronic access is made available for the period of subscription. The electronic access generally gets terminated as soon as the subscription period is over even for the period for which subscription was paid. Most publishers have made offers for archival back-up or access to electronic resources if Consortium decides to discontinue subscription to their resources. The offers made by the publishers fall under one of the following categories:

- i) **Perpetual Access to Resources for Subscribed Period:** Publishers like Elsevier Science have a policy to provide perpetual access to their subscribed resources for the period of subscription. As a special case, the Elsevier Science has agreed to provide perpetual access to entire engineering science collection (consisting of about 200 titles) to all IITs and IISc in addition to titles subscribed by these institutions individually on termination of subscription.
- ii) **Back-up CD ROM made available during Subscription Period:** Backup on CD ROM is being supplied along with its web-based access for resources like ABI / Inform Complete and Proquest's Science.
- iii) **Back-up Data (raw) to be supplied on CD ROM on Termination on Subscription:** Several publishers, like EI Village and Springer have agreed to provide their data on CD ROM on discontinuation of service.
- iv) **Local Hosting of Electronic Resources:** ACM Digital Library has been set-up at IIT Delhi that hosts entire contents of ACM Digital Library using search and browse platform developed by I-Group. The local host of ACM Digital Library has been made accessible to all subscribing institutions. More recently, all publishers have been requested to provide full-text data on CD/DVD in a standardized format on completion of every year with the search and browse capabilities in-built. They are also expected to help us install these CD's/DVD's on our servers so that the data could be used instantaneously as the need arises.

Continuous Communication

Continuous communication amongst members of the Consortium is considered the life-line of a consortium. Continuous communication is necessary to link each member with the practices of the Consortium and to involve them at policy and operational level as a team. The Consortium promotes communication at the following two levels:

Communication at Consortium Level

The INDEST-AICTE Consortium keeps a close liaison with all its members. A mailing list with archival facility has been made operational at the IIT Delhi to facilitate communication amongst members of the Consortium. All technical and administrative contacts of each member institutions are members of the INDEST mailing list (indest@eprint.iitd.ac.in). The Consortium maintains an interactive Web site (<http://panit.iitd.ac.in/indest> and <http://indest.iitd.ac.in>) that is kept updated regularly. The User Convention and Users Group, being established at various institutions, also serves as communication channel within an institution as well as between member institutions and Consortium. Besides, the Consortium holds Annual Meets and Workshops for the benefit of its member institutions. Moreover, J-gate Custom Contents for Consortium (JCCC), designed specially for the INDEST-AICTE Consortium, facilitates resource sharing amongst member institutions and serves as means to increase communication amongst member institutions.

Communication at Institutional Level

Through a communication from the Ministry, all member institutions of the Consortium are advised to hold user convention and training programmes in their respective institutions. Local representatives and representatives of the publishers are required to impart training at institutional level in such training programmes. The INDEST website maintains a calendar of training programmes and user conventions organized by its member institutions.

UGC-INFONET Digital Library Consortium

Background

The UGC-Infonet Digital Library Consortium was formally launched December, 2003 by Honourable Dr. A P J Abdul Kalam, the then President of India, soon after providing the Internet connectivity to the universities in the year 2003 under the UGC-Infonet programme. The Consortium proved to be a boon to university libraries, which have been discontinuing subscription of scholarly journals because of “Serials Crisis” that refers to exponential and continuing increase in subscription cost of scholarly journals. The crisis is a result of rise in cost of journals much faster than the rate of inflation, increase in number of journals and the paucity of funds available to the libraries. The universities were given benefit of access to e-resources under the UGC-Infonet Digital Library Consortium in a phased manner. In the first phase that began in 2004, access to e-resources was provided to 50 universities who had Internet connectivity under the UGC-Infonet Connectivity programme of the UGC. In the second phase, 50 more universities were added to the programme in the year 2005. So far, 150 universities out of 171 that come under the purview of UGC, have been provided differential access to e-resources subscribed under the Consortium. These e-resources covers almost all subject disciplines including arts, humanities, social sciences, physical sciences, chemical sciences, life sciences, computer sciences, mathematics and statistics, etc. The programme is wholly funded by the UGC and executed by the INFLIBNET (Information and Library Network) Centre, Ahmedabad. The UGC-INFONET Digital

Library Consortium, on the basis of sheer strength of present and prospective numbers of universities, has attracted the best possible price and terms of agreement from the publishers. The Consortium provides current as well as archival access to more than 5,000 core and peer-reviewed journals and a number of bibliographic databases from 23 publishers and aggregators in different disciplines. The INFLIBNET Web Site hosts a search interface to search these journals, their URLs and member institutions. The benefit of subscription to e-resources will also be extended to the colleges, to begin with the College for Potential with Excellence (CPE). The Consortium also plans to launch its “Associate Membership Programme” wherein private universities and other research organizations would be welcomed to join the Consortium for selected e-resources.

Current Status

The Consortium provides differential access to more than 5,000 scholarly journals and ten bibliographic databases from 23 major publishers (including scholarly societies, university presses and aggregators) to more than 125 universities. Besides access to their current issues, most journals are available with their archives from 1997 onwards. Some of the publishers like American Chemical Society, Institute of Physics, and JSTOR provide access to their contents from Vol. 1 onwards. The access to e-resources is IP-enabled for the universities covered under the consortium. Users in the universities can browse, search, download and print full-text articles relevant to their research and academic work without any restrictions in terms of number of articles that they can download or number of simultaneous users. Multiple users can access the databases and e-journal platforms simultaneously. The INFLIBNET Web Site (<http://www.inflibnet.ac.in>) hosts a search interface to search these journals, their URLs and member institutions. The INFLIBNET Centre, Ahmedabad also maintains one print copy of the journals from several publishers as a national print archive. The research and academic community can refer the print journals at the INFLIBNET Centre.

Objectives

The major aims and objectives of the UGC-Infonet Digital Library Consortium are: To subscribe electronic resources for the universities at a highly discounted rates of subscription and at the best terms and conditions; to extend the benefit of consortium-based subscription to all Indian universities and colleges; to extend the benefit of consortium to associate members of this Consortium; to impart training to the users, librarians, research scholars and faculty members of the institutions on the electronic resources with an aim to optimize their usage; to have increase interaction amongst the member libraries; to increase the research productivity of the institutions both in terms of quality and quantity of publications; to evaluate the usage of the resources subscribed; and to identify new resources that are required to be subscribed under the programme based on the availability of resources and funds.

Major Activities of the UGC-INFONET Digital Library Consortium

Major activities of the Consortium are as follows: i) To arrange subscription to electronic resources identified and negotiated by the members of its National Steering Committee; ii) To measure usage of existing e-resources and its impact of research output in terms of number of research publications; iii) To identify new resources relevant to the user community in universities; iv) Interaction with member libraries to ensure optimal utilization of subscribed electronic resources; v) Ensure access to subscribed electronic resources to member universities as per their subscription; vi) Organize training programmes for the member institutions on use of electronic resources; vii) Interact with

the officials in UGC for continuation and promotion of the programme; viii) Interact with ERNET India for providing uninterrupted Internet bandwidth in the member universities; ix) Initiate additional activities complementary to the present activities of the Consortium; and; x) Encourage interactions amongst member libraries.

Membership

The UGC-INFONET Digital Library Consortium has the following two types of members: **Universities under Purview of UGC:** 171 universities, Inter-University Centres of the UGC and deemed universities that are under direct purview of UGC, are entitled for getting e-resources through the UGC-INFONET Digital Library Consortium. Of 171 universities, 150 universities that have been given Internet connectivity under the UGC-INFONET Connectivity Programme, are being provided differential access to e-resources as per the decision of the National Steering Committee of the Consortium. Some of the universities of the remaining 21 universities will be covered in subsequent years. However, quite a few of these universities are highly specialized dealing with subjects like Urdu, Sanskrit, Hindi and Law, etc. As such, these universities do not have much use for e-resources that are being offer through the Consortium. The UGC provides funds required for providing differential access to electronic resources as well as Internet connectivity to universities directly under the purview of the UGC.

Associate Membership Programme It is proposed to launch “Associate Membership Programme” of the UGC-INFONET Digital Library Consortium with an aim to enroll private universities and other institutions as members with an aim to provide them access to e-resources at lower rates of subscription that is being offered to the Consortium. The Consortium has invited quotations from the publishers for its “Associate Members”. The Associate Members will be required to pay a fixed annual fee to the Consortium in addition to subscription fee for e-resource that they wish to subscribe.

Governance

The UGC-INFONET Digital Library Consortium is being operated by the INFLIBNET Centre. A National Steering Committee, consisting of members from universities and other experts under the Chairmanship of Prof. Ajit Kembhavi, IUCAA, has been constituted to guide and steer the activities of the Consortium. A National Review Committee has also been constituted under the Chairmanship of Prof. S.K. Thorat, Chairman, UGC with an overall responsibility for making policies, monitoring the progress, coordinating with other Consortium in the country and for promoting the activities of the Consortium.

Electronic Resources Subscribed by the Consortium

Electronic resources subscribed by the consortium can broadly be divided into the following two categories:

Full-text Electronic Resources Full-text electronic resources contain complete articles along with their bibliographic details. The consortium subscribes to full-text e-resources from academic societies, commercial publishers and aggregators like American Chemical Society, American Institute of Physics, Oxford University Press, Cambridge University Press, Cell Press, Springer Link, JSTOR, Project Muse, etc. All full-text resources subscribed by the Consortium contain electronic journals.

Bibliographic Databases Bibliographic databases contain references to articles published in journals, conference proceedings or chapters in books. Most bibliographic databases contain abstracts of the articles along with links to their full-text. The Consortium subscribes to 19 full-text e-resources and 10 bibliographic databases. The member institutions are provided differential access to these resources based on their needs and activity profile as per the recommendation of the National Steering Committee.

Resources Accessible to the Member Institutions

Resources accessible to the universities under the UGC-INFONET Digital Library Consortium are mentioned in the table given below.

Electronic Resources Subscribed by the UGC-Infonet Digital Library Consortium			
Full-Text E-Resources			
1.	American Chemical Society (ACS)	17.	Royal Society of Chemistry (RSC)
2.	American Institute of Physics (AIP)	18.	SIAM Journals
3.	American Physical Society (APS)	19.	Springer Link
4.	Annual Reviews	20.	Taylor & Francis
5.	Blackwell Publishing (Wiley InterScience)	Bibliographic Databases	
6.	Cambridge Univ. Press–STM		
7.	Cambridge Univ. Press–HSS	1.	J-Gate Custom Content for Consortia (JCCC)
8.	Cell Press (Elsevier)	2.	MathSciNet
9.	Emerald - Library Science Collection	3.	SciFinder Scholar
10.	Institute of Physics (IoP)	4.	ISID
11.	Jstor	5.	Analytical Abstracts
12.	Nature	6.	Catalysts & Catalysed Reactions
13.	Oxford University Press (OUP)	7.	Methods in Organic Synthesis
14.	Portland Press	8.	Natural Product Updates
15.	Project Euclid	9.	Chemical Hazards in Industry
16.	Project Muse	10.	Laboratory Hazards Bulletin

Economics of INDEST-AICTE Consortium and UGC-INFONET Digital Library Consortium

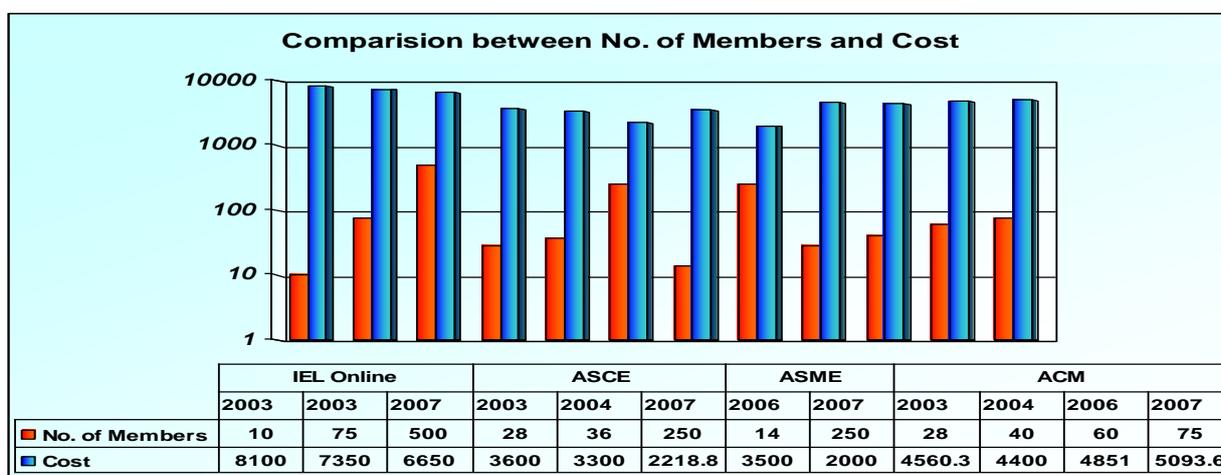
The factors that determine economic viability and cost-effectiveness of consortia-based subscription to e-resources are: its membership, intensity of usage, successful migration from print to electronic version (with discontinuation of print) and cost avoidance. These factors, measured in case of the INDEST-AICTE and the UGC-INFONET Digital Library Consortium, are elaborated below.

Number of Members : A consortium is more meaningful and effective if it has larger number of members. The collective strength of members of the consortium provides it the power to bargain with the publishers for better rates of subscription and terms of licenses. The number of member institutions in a consortium is inversely proportionate to the rates of electronic resources.

The UGC-INFONET Digital Library Consortium subscribes to e-resources for 100-125 universities. The rates of subscription to e-resources decrease with increase in number of universities. The rates of subscription to e-resources for most publishers are comparatively higher for first 50 universities covered in phase I. However, the rates of subscription are

much lower for the same resources for universities in phase II and lowest for universities in phase III in comparison to the rates charged for the universities in phase I.

The INDEST-AICTE Consortium has substantially large number of subscribers for IEL Online, ASCE, ASME and ACM Digital Library. As depicted in Figure given below, there is a substantial decrease in cost of subscription of e-resources with corresponding increase in number of subscribing institutions. Besides, rates of subscription to e-resources for NITs, IITs, ISM, SLIET, etc. are much lower than the rates of subscription for IITs.



Decrease in Rates of Subscription with Increase in Numbers of Subscribers in case of INDEST-AICTE Consortium

Cost Avoidance

Both the Consortium, with their collective strength of participating institutions, has attracted highly discounted rates of subscription coupled with most favourable terms of agreement. The publishers selected for offering resources to the INDEST-AICTE Consortium and the UGC-INFONET Digital Library Consortium have lowered their rates of subscription by 50% to 98% for member institutions of the Consortium. The rates are further lowered as additional institutions join the Consortium.

Cost avoidance is calculated in terms of difference in cost paid by a Consortium for member institutions and list price of e-resources. The table given below shows that the INDEST-AICTE and the UGC-INFONET Digital Library Consortium made a notional saving of Rs. 1067.93 crores and Rs. 312.88 crores respectively considering the fact that the same resources on list price would have cost Rs. 1089.13 crores and Rs. 338.51 crores respectively as against Rs. 21.20 crores and Rs. 25.63 crores spent by the two Consortia respectively for the year 2007. Bar diagram depicts cost avoidance graphically.

Year - 2007	INDEST	INFONET
	Rupees in Crores	
List Price	1089.13	338.51
Consortia Price	21.20	25.63
Savings	1067.93	312.88

Cost Avoidance



Cost Avoidance: List Price V/s Consortium Price

Annual Increase in Rates of Subscription

Annual increase in rates of subscription is restricted to 0 to 6% as against the usual increase in price of e-resources from 10 to 15% for both the consortia.

Average Cost of Journals Subscribed in the Consortium

The UGC-INFONET Digital Library Consortium subscribes to a total number of 4922 journals for 50 to 125 member universities at a total cost of Rs. 36.00 crores. As such, average cost of a single journal computes to Rs. 740.62.

The INDEST-AICTE Consortium subscribes to more than 10,000 journals for member institutions at a total cost of Rs. 20 crores. The average cost of a single journal computes to less than Rs. 400.00.

Intensity of Usage: Average Cost of Articles and Cost Recovery

Intensity of usage of e-resources can essentially be judged in terms of number of articles downloaded by users in member universities. It can essentially be described in terms of average cost of articles and cost recovered as elaborated below.

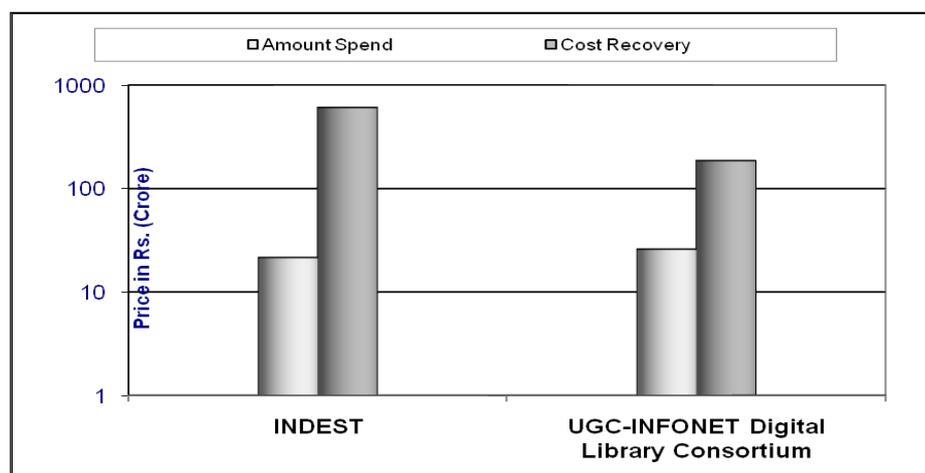
Average Cost of an Article: Average cost of an article is calculated by dividing total amount paid by the consortium for all member institutions by total number of articles downloaded by the users in all member universities / institutions. The average cost of articles, in case of UGC-INFONET Digital Library Consortium, varies from Rs. 4.30 in case of JSTOR to Rs. 353.91 in case of Project Muse. The average cost of articles for all resources in the Consortium is Rs. 77.26

In case of INDEST-AICTE Consortium, the average cost of a bibliographic record or a full-text article varies from Rs. 0.39 in case of IIMs to Rs. 70.98 in case of NITs as depicted in the table given below. In case of IITs / IISc, the cost of full-text article is Rs. 2.53 and for a bibliographic record it is Rs. 26.62. The trend clearly shows that bibliographic databases are

less cost-effective since full-text databases are preferred over bibliographic databases and are used more extensively in comparison to bibliographic databases.

Average Cost of Articles	
Category of Institutions	Cost in Rs.
IITs / IISc (Full-Text)	2.53
IITs / IISc (Bibliographic)	26.62
NITs	70.98
IITs	51.63
IIMs	0.39
AICTE Supported Members	23.93

Intensity of Usage: Cost Recovery: The recovery of cost incurred on e-resources subscribed through the Consortium can be judged in terms of intensity of usage of resources. Most publishers maintain detailed usage statistics for resources offered by them to the Consortium. Both the Consortium obtains comparative usage statistics for member institutions from the publishers. The cost recovery is calculated on the presumption that if the electronic resources were not available through the Consortium, articles downloaded from these resources by the member institutions would have been sourced on inter-library loan / document delivery at a cost of US \$ 15.00 per article. (Average cost of article taken from a study conducted by the American Research Libraries (ARL). As is evident from the Figure given below, both the Consortia have recovered the cost incurred on subscription for all e-resources. The total cost that has been recovered, in case of UGC-INFONET Digital Library Consortium amounts to Rs. 184.45 crores as against the total expenditure of Rs. 25.64 crores with Rs. 158.82 crores as the cost of articles downloaded in excess. The total recovered cost, in case of INDEST-AICTE Consortium amounts to Rs. 607.03 crores as against the total expenditure of Rs. 21.50 crores with Rs. 585.53 crores as the cost of articles downloaded in excess.



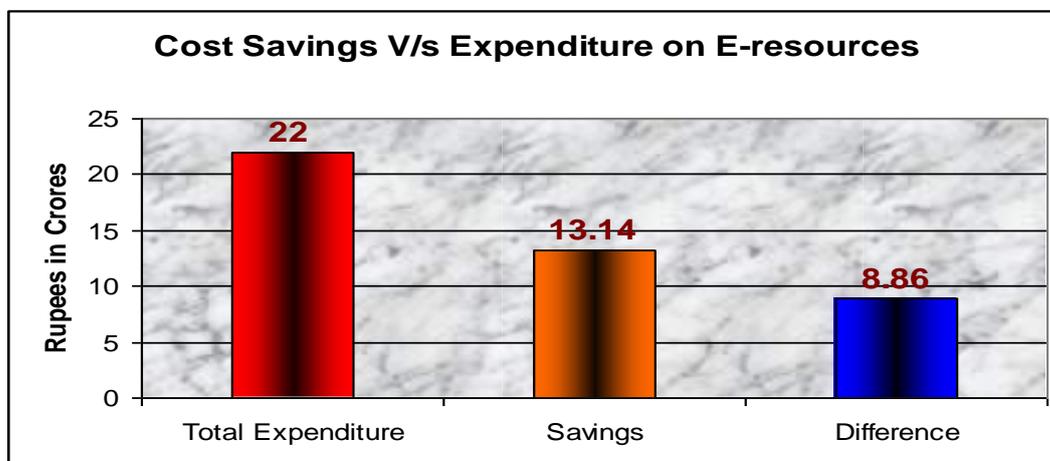
Cost recovery V/s Cost Incurred for the Year 2007

Cost Savings

The UGC-INFONET Digital Library Consortium, as a policy, has subscribed to print-independent e-resources, which essentially means that member universities are free to drop subscription to journals that are made accessible to them through the consortia arrangement. Moreover, beneficiary universities are free to delete print subscription to e-resources for which electronic access is available through the Consortium. Although figures for saving on account of drop in print subscription are not available readily, it is presumed that the total

savings made on this account would be equivalent to the expenditure incurred on subscription to e-resources through the Consortium.

In case of the INDEST-AICTE Consortium, all member institutions have dropped print versions of resources (wherever permissible) for which electronic access is available through the Consortium. The member institutions of the Consortium have recorded a saving of Rs. 13.14 Crores for the year 2007 as depicted in Fig. given below.



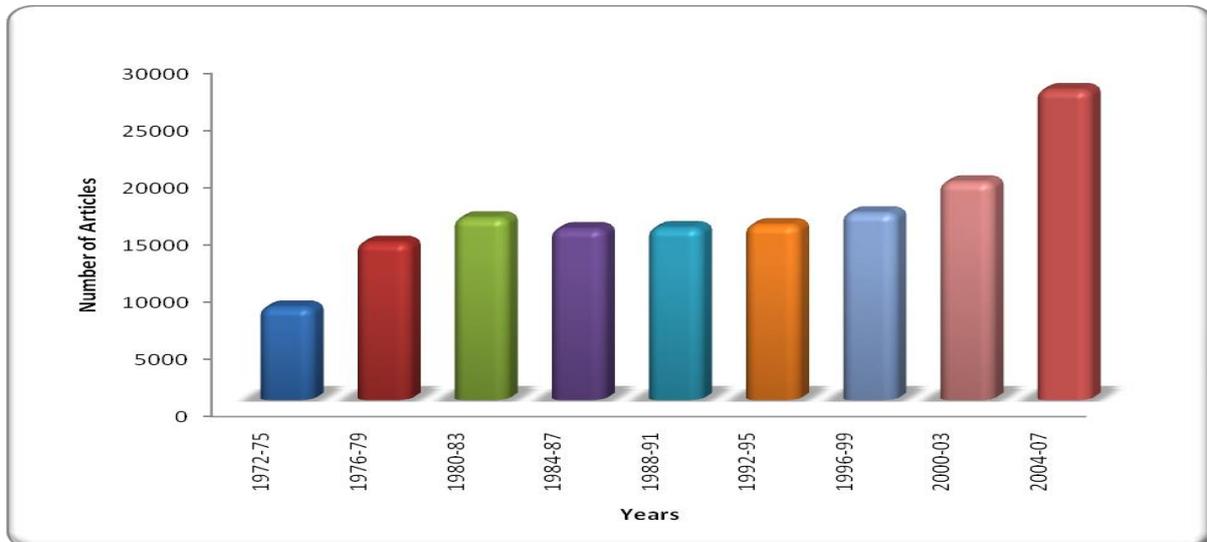
Cost Savings V/s Expenditure on E-resources in case of INDEST-AICTE Consortium

Measuring Research Output: Impact of Access to E-Resources on Research Output of Technical Institutions and Universities

Access to print as well as electronic resources is known to make qualitative difference to research, learning, staff development, scholarly and R & D activities of an institute. While it is not possible to measure qualitative improvements in research and education, in quantitative terms, the research output of an institution can be measured in terms of number of research articles, citations received by them, patents, research grants, consultancies, research reports, honours and awards, number of research students, placement of students, etc. The number of publications and citations received by them can be used most effectively to measure research output of an institution, which, in turn, reflects impact of resources available to an institution. The Science Citation Index (SCI), Social Science Citation Index (SSCI) and Arts and Humanities Citation Index (A&HCI) are internationally recognized databases that work as a filtering mechanism as it index qualitative research output based on citations received by them. These indices, therefore, can also be searched to find-out qualitative productivity of an institution. The research productivity was measured in terms of number of publications for core members of the both the Consortia during the period when e-resources was offered to these institutions in comparison to past years.

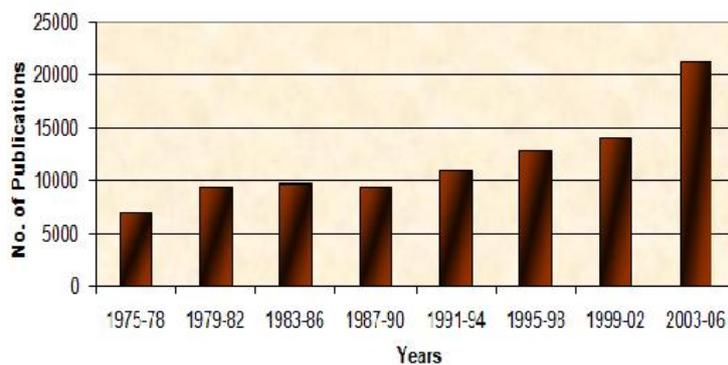
In case of UGC-INFONET Digital Library Consortium, the SCI, SSCI and A&HCI were searched to find research productivity of 50 Phase I universities that were getting access to e-resources in terms of research papers published by them in high-impact qualitative journals. The source articles appeared in these three indices for 50 universities in phase I were searched in blocks of four years from 1972 to 2007 and research output in the last block year, i.e. 2004 – 2007 was compared with previous block of four years when universities did not have the benefit of access to e-resources through Consortium. The increase in cumulative

research output for all the 50 phase I universities from 1972 to 2007 varies from -6.01% in block years 1984 – 87 to 42.42% in the block years from 2000-2003 to 2004-2007. This is the period when all the 50 phase I universities were getting the benefit of access to e-resources through the Consortium. A significant increase in research productivity in terms of number of research articles is evident during 2004-2007 for universities in phase I as shown in Figure given below as compared to previous eight blocks of four years.



Increase in Number of Research Articles Published by Universities in I Phase

In case of INDEST-AICTE Consortium, the SCI, SSCI and A&HCI were searched to find research productivity of 37 centrally-funded technical institutions in terms of research papers published in high-impact qualitative journals that were getting access to e-resources from 2003 onwards. The source articles appeared in these three indices for 37 centrally-funded technical institutions were searched in blocks of four years from 1975 to 2006 and the research output in the last block year, i.e. 2003 – 2006, was compared with previous blocks of four years when these technical institutions did not have the benefit of access to e-resources through Consortium. The increase in cumulative research output of all the 37 centrally-funded technical institutions from 1975 to 2006 shows increase in number of publications that varies from -1.90% to the maximum of 51.54% registered in the block years 1999-2002 to 2003-2006. This is the period when these institutions were getting the benefit of access to e-resources through the INDEST-AICTE Consortium. An unprecedented increase in research productivity in terms of number of research articles is evident during 2003-2006 for these technical institutions as shown in Figure given below as compared to previous seven blocks of four years.



Increase in No. of Research Publications during 2003 - 2006

Future developments in Academic Consortia in India

In a country like India, where 75% of education and research is being funded by the Govt. of India, setting-up of a National Library and Information Services Infrastructure (NLII) built around existing LIS infrastructure with augmentation, wherever required, is being planned. All central universities (as well some of the state universities), IITs, IISc and a few NITs in India have fairly well developed central libraries. These institutions have fairly large collections including books, back volumes of journals and other resources in physical as well as in electronic format. Besides subscribing to a good number of international scholarly journals, these institutions also get access to scholarly content in electronic form from national and international publishers under the consortia arrangements, ie. INDEST-AICTE Consortium, in case IITs, IISc, IIScERs, NITs and IIITs and UGC-INFONET Digital Library Consortium, in case of universities. The two consortia put together cover almost all the e-resources subscribed by remaining three Government-funded consortia. Keeping in view the background mentioned above, INDEST-AICTE Consortium and UGC-INFONET Digital Library Consortium are jointly discussing a “National Mission on Education through ICT” and opportunity of extending the access to e-resources to all colleges. As a first step, it has been decided to finalise the Action Plan for cross-subscription to e-resources subscribed by the two consortia for their respective members and for extending access to e-resources to colleges in a most cost-effective way.

The National Library and Information Services Infrastructure (N-LIST) is proposed to be built around central universities, IITs and IISc with e-resources accessible to these institutions through INDEST-AICTE and UGC-INFONET Digital Library Consortium respectively. While universities (central and state), IITs and IISc will serve as a nucleus around which a NLII would be built, more than 6,000 colleges and R & D institutions would be networked with the nuclei so as to explore, exploit and use resources accessible from these nuclei institutions. Major steps involved in implementation of National Library and Information Services Infrastructure (NLII) are: i) Identification and cross-subscription to e-resources for member institutions of INDEST-AICTE Consortium and UGC-INFONET Digital Library Consortium; ii) Identification and setting-up of NLII Resource Centres (NRCs); iii) Identification and setting-up of Satellite Resource Centres (SRCs); iii) Identification and selection of e-resources; iv) Reaching out to Govt. / Govt-aided Colleges; and v) Reaching out to private / self-supported colleges and universities.

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