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INDEST-AICTE Consortium: A decade of service for engineering, science and technology community of the country

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The article discusses various consortia operating in India, the inception of INDEST-AICTE Consortium, objectives, administrative structure, membership, services, and activities of INDEST-AICTE Consortium. It also discusses the selection of e-resources, review of e-resources, license agreement with publishers, fair use, usage analysis of various e-resources, economics of expenditure, research output of core members, archival access of e-resources for the core as well as other member of the consortium and future plan for the consortium.

Key words: E-resources, Consortia, INDEST-AICTE Consortium

Introduction

Since the Alexandrian library, the expectation of librarians and scholars has been to amass all the resources in a single library in various branches of knowledge. Due to the exponential growth and the increasing cost of information resources especially the journals, it is difficult for a library to acquire all documents, which may be required by the user of a library. Due to the financial crunch, it is also difficult for a single library to acquire everything to satisfy the core interests of the institution to which the library belongs. The peripheral interest was being satisfied by using inter-library loan/document delivery. Therefore in a collective development situation, it is logical for a library to look up to the other institutions for meeting its peripheral interest. Even in this situation, a library can drop a core item if availability to the same is ensured by another library in the neighborhood. To achieve aforesaid objectives, various library and information center networks emerged. A number of resource sharing networks that have evolved in India include CALIBNET (1986), DELNET (1988), BONET, MALIBNET (1993), BALNET (1997), INFLIBNET (1988 - For University libraries) and sectoral networks like BTISNET, ENVIS, FOSTIS etc in late 1980's[1].

The concept of Library consortia is not new. Library cooperation in America has existed for over a century. However, library consortia first began to purchase electronic journals from publishers in the mid-nineties in USA. In India the library consortia became operational after 2000 with advent of e-resources. The Library consortia play an active role in the collection development. The accessibility to international journals in Indian universities and technical institutions has improved many folds 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 several 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. In India more than half a dozen Library consortia were established by various government bodies as given in Table 1.

The article covers major functions, activities, and services of the INDEST-AICTE Consortium. It describes its genesis, membership, resources, services offered and its future plans.

INDEST-AICTE Consortium

The idea of the creation of the library consortia, took shape at the "National Seminar on Knowledge Networking in Engineering & Technology Education and Research" held at IIT Delhi in December 2000 under the aegis of Ministry of Human Resource Development. The seminar was coordinated by Dr. Jagdish Arora and it was attended by more than 150 participants from engineering and technological institutions from all over the country. Based on the feedback, ministry decided to set-up the expert group in April 2002 for the consortia–based subscription to

electronic resources for Technical Education System in India under the chairmanship of Prof. N. Balakrishnan from IISc, Bangalore. 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[2]. The Consortium was re-named as INDEST-AICTE Consortium in December 2005 with the 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 Consortium enrolls engineering and technological institutions as its members and subscribe to electronic resources for them at discounted rates of subscription and favorable terms and conditions.

The consortium website at 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.

Objectives of the INDEST-AICTE Consortium

- To provide electronic resources for the centrally funded and other academic institutions in Engineering, Science and Technology of India at highly discounted rates.
- To support and impart training to the users and librarians in the member institutions on subscribed electronic resources with an aim to maximize the usage of subscribed electronic resources.
- To improve scientific productivity of member institutions in terms of quality and quantity of publications.

Administrative structure of INDEST-AICTE Consortium

The Consortium operates through its headquarters set up at IIT Delhi under a National Steering Committee (NSC) notified by the Ministry of Human Resources and Development (MHRD). It consists of Director, IIT Delhi as its ex-officio Chairman and Chairman, AICTE as its Co-Chair. Members are drawn from its beneficiary core and self supported

Table 1—Library consortia in India

Name of Consortium	Branch	Sponsoring body	No. of Resources	Year of Establishment	Members
INDEST-AICTE	Engineering Science and Technology	Ministry of HRD	30	2003	1222 (62 core, 60 AICTE supported and 1100 other members)
UGC-INFONET DL	Higher Education	UGC, MHRD	29	2004	319 (201 universities and 118 self supported)
National Library and Information Services Infrastructure for Scholarly Content (N-LIST)	Higher Education	MHRD	25	2010	2513 colleges, 100 universities and 35 technical institutions (for cross subscription)
National Knowledge Resource	Science and Technology	CSIR and DST	30	2002	68 (44 CSIR and 24 DST)
DelCon	Biotechnology	Department of Biotechnology, Ministry of Science and Technology,	18	2009	33 (15 DBT and 18 North Eastern Region (NER) Institutions
MCIT	Communication and Information Technology	Ministry of Communication and Information Technology (MCIT)	4	2005	13
DAE	Atomic Energy	Department of Atomic Energy (DAE) Consortium	4	2001	36 institutions including BARC, TIFR and SAMEER
Electronic Resources in Medicine (ERMED)	Medicine	Director General of Heath Services (DGHS)	9	2008	98
Consortium for e-Resources in Agriculture (CeRA)	Agriculture	ICAR	4	2007	126

institutions. Other members are Director (Technical Education), MHRD; representatives from the National Knowledge Resource Consortium (CSIR and DST) and DESIDOC; and Member Secretary, AICTE. The committee is responsible for taking major policy decision as well as their execution.

In the year 2010, National Advisory Committee(NAC) was established by the National Steering Committee(NSC) to advice the NSC about various issues faced by the consortium. Some of the major issues handled were the rationalization of Elsevier subscription based on the usage for core I member institutions, subscription model of Elsevier for NITs, new IITs, IISERs and other core institutions. NAC also helps in e-resources selection, review of e-resources, and subscription of e-resources for engineering colleges. The advisory committee played a key role in the decision making of the NSC for new model for NITs. In order to make a participatory culture, Consortium invited participating institutions from time to time to discuss various issues faced by the consortium for individual institution. Meetings were held at the consortium headquarters with respect to NITs, IITs, new NITs and IISERs. The feedback of individual institutions played a key role in decision making and helped in negotiating the terms with the publishers.

A negotiation committee was also established by the National Steering Committee(NSC), to negotiate the terms, conditions and price of e-resources. The consortium involved the coordinators of all other major national consortia for the negotiation as well as the NSC meetings to have a common understanding of terms, conditions and price of e-resources.

A National Review Committee was 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. However the committee has been in dormancy for over last 5 years.

The National Coordinator for the consortium was appointed by the Technical Bureau of MHRD in the year 2003. He was responsible for operation of the consortium. The National coordinator is member secretary of the National Steering Committee, National Advisory Committee and the Negotiation Committee. Since the inception of the consortium, Dr. Jagdish Arora was the National Coordinator and continued in this role up to August 2007. Prof. G.P. Agarwal took charge as National Coordinator of the consortium from Dr. Arora and served this post for five years beginning September 2007 to end of August 2012. Since September 1, 2012, Prof. B.D. Gupta has taken charge as the National Coordinator.

Membership

The INDEST-AICTE Consortium has three types of members based on funding.

Type I: Core members supported by MHRD
Type II: AICTE supported members
Type III: Self-supported members

However, some of the core and AICTE supported members can join as self-supported members. The membership fee for joining the consortium was Rs. 2000 for Types II & III members. The consortium did not charge membership fees from the MHRD supported academic institutions. The basic objective of the consortium is to provide the e-resources to the academic institutions of the country. Table 2 gives the number of members from 2003 to 2012 under three types of funding.

Core members

All centrally funded technical institutions including IITs, IISc, ISM, IISERs, NITs, SLIET, NERIST, IIMs, NITIE, NITTTRs, IIITs and NIFFT were the core members of the Consortium. The Ministry granted funds for providing differential access to electronic resources for its core members through the Consortium Headquarters at IIT Delhi. As per Table 2, in 2003, the number of core members was 37. In 2009, the number increased to 42 with addition of IISERs. In 2012 the total number of members increased to 62 with addition of new IITs, new NITs, and new IIMs. The consortium has always made

Table 2—Number of members since 2003 in different type funding

Category of Members	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Core Members MHRD supported	37	37	37	37	37	37	42	48	55	62
AICTE Supported members	60	64	63	60	60	60	60	60	60	60
Self supported	18	74	110	334	527	535	597	895	1007	116
Total	116	176	211	432	625	637	699	1003	1122	238

continuous effort to include all the centrally funded technical institutions in the INDEST-AICTE consortium.

Each core members had varied teaching programmes, therefore, core members were grouped in different categories to extend differential access to e-resources based on their requirements and specializations. Initially the category of institutions were basically used to denote the level of usage of e-resources, conceived to be highest amongst institutions in Category I, modest in Category II and lowest amongst the Category III. The rates of subscription, number of simultaneous users and number of resources offered to various categories of institutions were worked out based on their usage/suitability to the respective categories of institutions. With the establishment of IISERs, new IITs, new NITs and new IIMs, the number of categories were increased to V (with subcategories IIIA and IIIB in Categories III, IVA and IVB in Category IV) as described below:

- Category I comprises eight institutions including IITs and IISc;
- Category II comprises 23 institutions including 20 NITs, Indian School of Mines (ISM), Sant Longowal Institute of Engineering and Technology (SLIET), and North East Regional Institute of Science and Technology (NERIST);
- Category III comprises 13 institutions including (category III A comprises 5 IISERs and Category IIIB comprises 8 New IITs);
- Category IV comprises 13 institutions including IIMs, new IIMs, IIITs and National Institute of Industrial Engineering (NITIE) includes IVA – IIMs, IVB - IIITs and NITIE, IVC - New IIMs;
- Group V comprises 4 institutions including 3 NITTTRs and NIFFT.

Category I institutes had a long history of teaching and many research programmes and these were seven IITs (in Chennai, Delhi, Guwahati, Kanpur, Kharagpur, Mumbai and Roorkee) and IISc, Bangalore. Category I institutes subscribe to 25 e-resources through the Consortium which is the largest as given in Table 3. Category II to V institutes through the Consortium subscribe to e-resources as low as 3 to as high of 9. Table 3 gives the e-resources distribution among different core members for 2012.

Table3—Grouping and E-Resources distribution of the Core Member Institutions for 2012

S. No.	Electronic Resource	No. of journals	Accessible to Category	No of Institutes
	Full-Text E-Resources			
1	ABI/INFORM Complete	4975	I & IVA	15
2	ACM Digital Library	44	I-IV	45
3	AIP/APS Journals	23	I, IIIA	13
4	Annual Reviews	35	I, II, III	34
5	ASCE Journals	33	I, II & V	28
6	ASME Journals	24	I, II & V	28
7	EBSCO Business Source Complete	11350	I & GIV-A	13
8	Emerald Insight	150	I & IVA	13
9	IEC Standards	6929	I	8
10	IEL Online	241	All except III	45
11	Nature	1/27	I, II & III	44/34
12	OSA (Optics Infobase)	21	I	8
13	Project Muse	537	I, II, III	34
14	Science Direct	2500	I&II & IVA	50
15	Springer Link	1499/1300	I, II, IVB & V	32
16	Taylor & Francis	1200/600	I, IIIB, IIIA	21
	Factual/Statistical databases			
17	Capitaline		I & IVA	13
18	CRIS INFAC Ind. Inf.		IVA	6
19	Euromonitor GMID		I & IVA	13
20	Insight Bibliographic Databases		IVA	6
21	INSPEC		I	8
22	MathSciNet		I & III	21
23	SciFinderScholar		I	8
24	Scopus		I	8
25	Web of Science		I	8

Source: INDEST Consortium Annual Report, April 2011 to March 2012.

AICTE supported members

Since March 2003, AICTE provided financial support to the Government/Government aided institutions and Technical Universities/University Departments having programmes in engineering and technology. The Consortium provided IEL, ASCE, ASME and/orASTP to 60 institutions with AICTE support based on the courses they offer from 2003 to 2011. These included 37 engineering and technology colleges and 23 universities having engineering departments/faculty. All 60 Institutions offer postgraduate course in engineering and technology.

Self-supported members

The Consortium also helped the technical institution of the country by offering the e-resources on self-support mode. It invited AICTE approved and UGC-affiliated institutions of India to share the benefits of the Consortium. It offered low subscription rates and attractive terms of agreement with the publishers. Prior to the consortium, it was very difficult to afford such high quality e-resources through their own negotiation. The consortium brought a sea change in the whole technical education. The small engineering colleges could afford e-resources which ultimately helped their education and research. Year-wise number of members of the consortium is given in Table 2 since the establishment of the consortium. The self-supported membership started with 18 members in 2003. In 2005 AICTE joined hand with 'INDEST Consortium and got renamed as 'INDEST-AICTE Consortium'. AICTE played a pivotal role in enrolling its approved engineering colleges and institutes as member of the Consortium with 6 e-resources (IEL Online, ASCE, ASME, Springer Link, DEL, and ESDU).

There was a huge jump in the membership from 2006 onwards. AICTE promoted the provision of e-resources with their existing rule for subscription of print journals for individual institutions. In 2007 over 23 e-resources were negotiated by INDEST-AICTE Consortium for the self-supported institutes. The rates of subscription each year are posted at INDEST-AICTE Consortium web site for subscription renewal. There was a constant increase in the number of institutions up to 2011. Over six years the number of engineering colleges serviced were about 1000.

In 2012, AICTE proposed mandatory e-resources for the AICTE affiliated engineering colleges. AICTE negotiated the price with the publishers and asked each institutes to subscribe the e-resources directly through publisher's websites. The total number of institutions subscribing to e-resources increased to 1500, whereas the consortium provided e-resources to 102 institutes.

Services and activities

The INDEST-AICTE Consortium not only helps in the purchase of electronic resources but also carried out several other activities to achieve optimal utilization of electronic resources. Some of the important services and activities of the Consortium include the followings:

Selection of electronic resources

The Expert Group appointed by the Ministry initially selected and evaluated the e-resources being subscribed by the Consortium. The National Advisory Committee constituted by NSC in 2010, regularly met and reviewed the e-resource subscription of all members of the Consortium. Some new electronic resources were added and some others removed based on the demands from the member institutes after due evaluation and approval by the National Steering Committee.

Resource sharing

As INDEST-AICTE Consortium did not subscribe to all resources for all its members, the document delivery and inter-library loan was, therefore, crucial to the success of the Consortium. The J-Gate Custom Content for Consortium (JCCC), designed especially for the Consortium, provided 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, beginning from 2003 up to the year 2011. Besides IITs, IISc and IIMs, the JCCC was made accessible to all other core members of the Consortium including new IITs, IISERs, NITs, SLIET, ISM, NERIST, IIITs and NITIE. The service facilitated 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 were routed to IIT Delhi (Consortium Headquarters), requests for e-resources subscribed by individual IITs, IISc and IIMs were routed to the respective institute(s).

The Consortium was looking for a centralized product for creating a union catalogue of all the consortia run by Government of India. The consortium is in contact with other consortium like NKRC, UGC-Infonet DL consortium etc to have a common document delivery from 2013 onward.

Promoting use of e-resources

The Consortium took several steps to ensure utilization of resources in all member institutes to justify the amount of money spent for the e-resources. The Consortium continuously monitors the usage of e-resources. Each year various committees of the Consortium study the usage statistics before taking decisions. The Consortium maintains a Website on its activities, services and resources. A template webpage was developed and distributed to all members institutions. The soft copies of the tutorials were made available through the Consortium Website. The Website also provides links to web based online tutorials available for these resources. The consortium informed the members to utilize the e-resources in case of there was poor usage of any e-resources.

Training of users

Training programmes were a crucial requirement that the Consortium had to fulfill to facilitate optimum use of subscribed e-resources. Training programmes acted as a bridge to facilitate better communication amongst members of the Consortium and to find answers to common problems. Such programmes made users competent to conduct their own searches effectively. Proper training made library staff competent enabling them to provide quality services. "On the job" training programmes were preferable not only because they benefited large number of users but also solved localized technological problems by the experts available at the time of imparting training.

Training to members of the INDEST-AICTE Consortium was a decentralized activity. All IITs, NITs and IIMs conducted training programmes in their respective regions with financial support from the Consortium. Moreover, all members of Consortium were also required to conduct training programmes in their respective institutes for the benefit of their users. The Consortium signed a tripartite agreement with the publishers of e-resources with a local vendor as third party responsible for providing training on resources at campuses of various member institutes. All institutes were requested to take benefit of this arrangement and organize training programmes on various resources within their institutes.

The INDEST-AICTE Consortium kept a close liaison with all its members. All technical and administrative contacts of each member institutes are regularly updated on the consortium website. Besides, the Consortium has held Annual Meetings and Workshops since 2003 for the benefit of its member.

NLIST: The Joint Project of INDEST-AICTE Consortium & UGC-INFONET Digital Library Consortium

The Programme of subscription to e-resources through Centrally Sponsored Scheme of National Mission on Education through Information and Communication Technology (NME-ICT) of Ministry of Human Resource Development (MHRD) was being jointly executed by the INDEST-AICTE Consortium, IIT Delhi and UGC-INFONET Digital Library Consortium, INFLIBNET Centre (NME-ICT/N-LIST) and provided for:

- Cross subscription to e-resources subscribed by the two Consortia, i.e. subscription to INDEST-AICTE Consortium resources for universities and UGC-INFONET resources for INDEST-AICTE institutes, and
- Access to selected e-resources to colleges.

Under this programme (i) above, INDEST-AICTE Consortium subscribed the following e-resources for 2012:

- 27 Nature titles for 34 Institutions (8 IITs/IISc, 5 IISERs, 8 New IITs, 13 selected NITs)
- Project Muse for 34 Institutions (8 IITs/IISc, 5 IISERs, 8 New IITs, 13 selected NITs)
- Annual Reviews for 34 Institutions (8 IITs/IISc, 5 IISERs, 8 New IITs, 13 selected NITs)
- Taylor & Francis for 21 Institutions (8 IITs/IISc, 5 IISERs, 8 New IITs)
- IEEE ASPP for 73 Government Engineering Colleges/department of Universities
- Web of Science for 100 Universities
- JSTOR for 62 core institutions from 2013 onwards

License agreement and fair use

All electronic resources available through the Consortium are governed by license agreements. All the terms and conditions for subscribing these resources are spelled out in license agreements that are signed with each publisher by the Consortium on behalf of its member institutes. The Consortium takes utmost care to protect the rights of the users as well as the member Institutes before signing an agreement. It is observed that the terms and conditions of e-resources varies amongst various publishers. Some of the publishers initially were asking the members and the Consortium to sign on a contract, which was not agreeable to the Consortium. In fact, some of e-resources were not considered because of unfavorable license agreement.

License Agreements and Guidelines for Fair Use

The INDEST-AICTE Consortium 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. The consortium website made available the sample license agreements of publishers in order to educate its users as well as the library administrators.

Print-independent subscription

Subscription to e-resources were print-independent in most of the cases except Elsevier's Science Direct, AIP/APS, Taylor and Francis, Springer and Emerald Xtra. In the year 2010, advisory committee devised a usage based model for Elsevier's Science Direct to rationalize the notional subscription amount among old IITs and IISc Bangalore(8 institutes). Under this agreement the print subscription was replaced by e-subscription. As per the decision, the subscription amount of Elsevier for all core category I institutes remained constant and the subscription amount was distributed among the participating institutions based on the usage statistics. Each institute could swap title to make the subscriptions amongst the category members as unique. By changing from print to e-resources only, each institute also got appreciable discount.

Governing laws and jurisdiction

The consortium made concerted effort that all the contract agreement with publishers were governed by the laws of India.The consortium also made effort to get the following arbitration clause signed by each publisher:

"Any dispute or difference whatsoever arising between the parties out of or relating to the construction, meaning, scope, operation or effect of this contract or the validity or the breach thereof shall be settled by arbitration in accordance with the Rules of Arbitration of the Indian Council of Arbitration/or any other Indian organisation and the award made in pursuance thereof shall be binding on the parties." The place of the arbitration shall be in New Delhi (India) and carried out in the English Language.

Usage analysis

Librarians are using statistics to meet user needs and make every rupees count. Usage statistics are necessary to know the use of an e-resource. In the print world, it was difficult to know the usage of the printed journals. Since the Consortium invests in the acquisition of electronic resources for the individual institute, it is necessary to know the utility of e-resources. The Consortium is responsible for analyzing and demonstrating their cost-effectiveness. Usage statistics also play an important role in decision making for selection/continuation of e-resources. Most publishers maintain detailed usage statistics compliant to an international standard called "COUNTER" or "SUSHI" for resources offered by them to the Consortium. The usage statistics for member institutes are regularly obtained from the publishers and are made accessible amongst its members on the Consortium Web Site through an interface called e-RAMS (Electronic Resource Access Management System). Institutions with low usage are requested to optimise their usage. Based on the usage statistics, the committee reviews the continuation/ discontinuation of e-resources. In last few years, consortium has discontinued few resources due to their poor usage among members. The usage statistics were also used in the negotiation of e-resources. The consortium is now planning to harvest the usage statistics from the publisher website directly to the E-RAMS to remove the human intervention of data manipulation if any. The usage statistics of e-resources by member institute has generally shown an increasing trend for most e-resources from 2003 to 2011 and further analysis of usage data is given below.

Usage of e-resources for various group core Members from 2003 to 2011

It is observed from Table 4 that the number of downloads ranges from 56 thousand (Group V institutes) to 1.80 crore (Group I institutes) for the year 2011. The lower usage was in case of NITTTR/NIFFT because of their lower number of users. In case of Group IV (i.e. IIMs), the usage was very high because of the usage of factual databases like Capitaline, Euromonitors, CRIS INFACetc as described in the Table 3. It is also clear from the Table 5 that the usage of various core institutes varied widely i.e. Group I, II & III though these institutes have similar teaching and research programmes. It may be inferred that the usage of e-resource for old core members are getting saturated. The usage of bibliographic data for example Compendex and INSPEC in EIvillage were gradually decreasing. As a result the Consortium removed the Compendex and replaced it by Scopus. Due to the poor usage some of the e-resources were discontinued. The Consortium used the usage statistics to negotiate the price of some e-resources. The usage of e-resources for IIMs were calculated from 2004 to 2008 since most of

the management resources were added in 2004. The usage of Group III were considered from 2009 as IISERs got access through the consortium in 2009. IISERs were provided MathScinet in 2009, from 2010 onwards they got access to MathScinet, AIP/APS, JCCC, Science Direct, and Springer link (as self-supported). The usage of e-resources for IISERS and new IITs are increasing rapidly.

The Science Direct, IEL Online and Springer link are highly used e-resources as compared to other resources like ASCE and ASME. The usage of Capitaline was highest for the management e-resources as it is news like database. The e-resources like ABI INFORM Complete, EBSCO and Emerald are highly used. The usage for Bibliographic databases increasing except the Ei Village. The usage of specialised bibliographic databases like Mathscinet and Scifinders are also increasing. Following the introduction of Scopus in the Consortium, usage of Web of Science has decreased in comparison to the initial year of subscription like 2005 and 2006[7].

Usage of E-Resources for AICTE Supported Institutions

The AICTE institutions have registered an increase in usage of most of the e-resources subscribed for them in terms of number of research articles downloaded from 2004 to 2011. There is a comparative decrease in usage of ASCE and ASME as compared to IEL Online.

Usage of e-resources for self-supported institutes

The usage of self-supported institutes for the year 2011 were analyzed and presented in Table 6. It is evident from the Table 6 that the maximum number of downloads were for IEL Online followed by Science Direct. But the average number of downloads per institution of Science Direct were more than the IEL Online. Number of downloads for Springer link, Emerald and ACM Digital Library were 2304, 1085 and 1362 respectively. Other journals were downloaded less than 1000 per year.

Table 4—No. of Downloads (in thousands) from 2003 to 2011
(for All Core Members and All E-Resources)

	2003	2004	2005	2006	2007	2008	2009	2010	2011
Group I (IITs / IISc)	4355	8968	19051	26144	24276	25720	20921	22338	18060
Group II (NITs)	374	739	918	1019	1572	1782	2026	2243	2539
Group III (IISERs & New IITs)							109	224	515
Group IV (IIMs)	36	4916	20091	31925	28577	29569	24580	19032	14233
Group V NITTR/NIFFT	NS	NS	NS	NS	NS	20	20	34	56
JCCC	38	41	55	69	84	61	138	196	69

Source: INDEST Consortium Annual Report, April 2011 to March 2012.

Table 5—Number of downloads of E-Resources for
AICTE Supported Institutions for 2003-2011

E-Resources	No. of Downloads								
	2003	2004	2005	2006	2007	2008	2009	2010	2011
ASCE	4,031	23,924	38,946	22,188	74,140	20,816	42,026	67,713	27,659
ASME	2,225	16,230	27,212	22,053	72,154	32,432	56,181	15,635	17,695
IEL Online	1,69,722	3,52,861	5,49,306	8,84,993	8,89,646	7,89,757	8,93,571	13,90,518	15,03,600
Proquest	415	915	1,568	1,371	1,652	1,679	NS	NS	NS

Source: INDEST Consortium Annual Report, April 2011 to March 2012.

Table 6—Usage of E-Resources for Self-Supported Institutes for 2011

E-resources	No of Downloads	No of journals	No of downloads per Institute
Science Direct	2131188	240	10986
IEL Online	6495932	241	10230
Springer link	352443	580	2304
Emerald	29299	150	1085
ACM DL	113021	46	1362
ASCE	89397	30	771
ASME	109711	22	490
ABI Inform Complete	7269	5503	727
Access Engineering	7400	articles from 150 book	322
Infotrac Engineering Collection	18017	2285	212
IET Digital Library	1354	24	123

Economics of INDEST-AICTE 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 are discussed below in detail.

Annual increase in rates of subscription: print journals vs e-journals

Members of the Consortium have the benefit of price cap for the print as well as the e-journals on the annual increase in the rates of subscription from 3% to 5%. While the usual increase in price of e-resources vary from 10 to 15% for an institute but the increase for the Consortium ranges from 3-5%. Due to global economic crisis, some of the publishers like ASTM and AMS froze their price for the year 2010 and 2011. Members of the Consortium have the cap on increase in print journal price from 5% to 6% from various publishers, namely, Elsevier Science, Emerald group Publishing etc. As per the agreement with the publishers, some publishers refund the extra amount above the specified percentage (5-6% price cap) to the member institutes. Since now most of the institutions are going for the e-subscription, the price cap remains constant.

Average cost of an article/record

The Consortium has analyzed the cost of an article/download or record since its inception as an economic parameter. This parameter has been used to take decision in reviewing the continuation/ discontinuation/negotiation of pricing of existing e-resources. The detailed analysis was published in the Annual Report 2011-12[7]. Using the usage parameters some of the e-resources were discontinued from the Consortium in 2011 and 2012. The average cost of a download varied among different types of institutes. It also varied from types of e-resources (i.e. full text, factual and bibliographicdatabases). The Category I institutes(IITs and IISc) were getting access to bibliographic database from 2003 onwards. In 2005 the average cost per downloads for INSPEC and COMPENDEX was Rs. 2.71, whereas it reached Rs. 2090 in 2009. Based on this information, Compendex was replaced by Scopus in 2010. Some of other bibliographic databases are subject specific like MatSciNet and Scifinder Scholar where cost increased from Rs. 7.30 to Rs. 67.75 in last 5 years. The trend clearly showed that bibliographic databases were less cost effective since full-text databases were preferred over bibliographic databases and were used more extensively in comparison to bibliographic databases. It may be noted that the bibliographic databases never gives the fulltext articles. It only gives the number of hits and number of sessions etc. It was also observed that the per download cost was encouraging for the level I institutes due to its higher usage across the e-resources subscribed for them. The average per download cost for Group II institutions (NITs/NERIST/SLIET/ISM) was Rs. 58.79 in 2005 where in 2011 it was Rs. 25.11. This showed that there was increase in downloads in the group II institutes. The IISERs started with few resources in 2009 with average cost per download Rs. 344.64. In 2011 it was about Rs. 29.27. Since these Institutes were growing in its faculty strengths and research scholars, there was an increase in usage of e-resources. The IIMs have the lowest average per download cost. In 2005, it was Rs. 0.59. In 2011, the average per download cost was Rs.1.64.

The average per download cost for AICTE supported institutions for 2005 was Rs. 23.93, whereas in 2011, it was Rs. 23.44. The cost per download for various e-resources for self-supported institutes was Rs.23.13 to Rs. 408 for the year 2011.

Cost avoidance and cost recovery

Cost avoidance on account of lower rates of subscription for the members of the Consortium was calculated in terms of difference between cost paid by the Consortium for member institutions for e-resources and cost payable by individual institutions in case the resources were subscribed by them on their own. Figure 1 depicts that there was a notional saving of Rs. 1018.04 crore considering the fact that the same resources on list price would have cost Rs. 1045.3 crore as against Rs. 27.25 crore paid by the INDEST-AICTE Consortium for 2011 for its core members.

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 institutes 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)). The cost recovery by member Institutes with Rs. 2974.09 crores as cost of articles downloaded by them as against Rs. 27.25

crores spent for subscription to e-resources recording a gain of Rs. 2946.84 crores in terms of cost of research articles downloaded in excess.

The cost avoidance in case of AICTE supported institutions was Rs. 59.06 Crores where consortium spent 3.47crores and Rs. 56.24 has been recovered as cost of an article downloaded. The cost recovery in case of AICTE supported institutions was Rs. 130.11 Crores where consortium spent Rs. 3.47 crores and Rs. 126.64 was recovered as cost of an article downloaded for the year 2011.

The cost recovery in case of self-supported institutes was Rs. 785.82 crores where consortium spent Rs. 51.01crores and Rs.734.80 was recovered as cost of an article downloaded for the self-supported Institutes for the year 2011.

Research output of core members

Providing access to e-resources to the faculty and researchers was not a purpose in itself but it was only a means to trigger a stronger research and academic culture in the institutes recipient of this benefit. The source articles that appeared in Scopus for all INDEST members in 2003 could serve as a yardstick to measure current research outputof these institutes. The data was collected for all the core member institution from 1996 to 2011. The whole period was distributed in two parts. One was before 2003 i.e., 1996 to 2002 and another after 2003 i.e. from 2003 to 2011. The Compound Annual Growth Rate (CAGR) was calculated for both periods. The comparative figure of CAGR for two periods is presented in the Table 7. It is evident from the table that except IISc Bangalore and IIT Kanpur, the compounding rate of growth of publication was increasing more than 10% after the establishment of the consortium where it was about less than 10% for other institutes. The number of research publication for IISc in 2011 was 1957 where as in 2003 it was 571. Though the number of publications has increased substantially, the CAGR remained constant. Other institutes were greater beneficiaries of INDEST-AICTE Consortium. The biggest beneficiaries were NITs. After the establishment of INDEST-AICTE consortium, the number of research publications increased multifold. The growth rate after 2003 was as high as 59% in case of NIT Calicut and other institutes showed annual compounded growth more than 30%. However, the number of publications cannot be considered as sole criteria for measuring productivity of institutions. Other criteria that may also be considered include: number of faculties, number of research scholars, patents, research projects, research reports, honours and awards, etc.

Archival Access/back-up of e-resources

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:

- Perpetual access to resources for subscribed period: Publishers like Elsevier have a policy to provide perpetual access to their subscribed resources for the period of subscription. Some other publishers like Springer, Taylor and Francis, IEEE, Science Citation Index provide the perpetual access

Table 7—Compound Annual Growth Rate of number of publications of member institutes before and After the inception of INDEST – AICTE Consortium

Institute	1995-2002	2003-11	Institution	1995-2002	2003-11
(1)	(2)	(3)	(1)	(2)	(3)
IISc, Bangalore	7%	7%	NIT Kurukshetra	16%	28%
IIT Kanpur	6%	7%	NIT Warangal	17%	22%
IIT Kharagpur	9%	13%	NIT Karnataka	6%	38%
IIT Delhi	5%	10%	NIT Jaipur	3%	28%
IIT Madras	-1%	14%	NIT Nagpur	36%	17%
IIT Bombay	7%	12%	NIT Jalandhar	32%	22%
IIT Roorkee	9%	20%	NIT Calicut	-2%	59%
IIT Guwahati	76%	31%	NIT Surat	NA	56%
NIT Trichy	35%	35%	NIT Hamirpur	NA	37%
NIT Jamshedpur	NA	34%	NIT Bhopal	6%	35%
NIT Rourkela	14%	34%	NIT Durgapur	26%	24%
NIT Allahabad	0%	40%	NIT Srinagar	0%	95%

- Back-up CD-ROM made available during subscription period: Backup on CDROM is being supplied along with its web-based access for resources like ABI/Inform Complete and Proquest's Science.
- Back-up Data (raw) to be supplied on CD-ROM on Termination of Subscription: Several publishers, like EI Village and Springer agreed to provide their data on CD-ROM on discontinuation of service.

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 CDs/DVDs on our servers so that the data could be used instantaneously as the need arises.

Conclusion

The INDEST-AICTE Consortium has been providing the e-resources since 2003 with its collective strength of participating member institutes and has negotiated highly discounted rates of subscription coupled with most favorable terms of license agreements. Consortium was offered very attractive prices from the vendors not only because of combined strength of its members, but also due to the eagerness of publishers to enter the Indian market. The rates offered to the Consortium were lower by 50 per cent to 90 per cent depending upon the category of institution. Moreover, the rates have come down further with increase in the number of AICTE approved engineering colleges.The INDEST-AICTE Consortium, initiated discussion with AICTE to make e-resources more popular for the private engineering college to increasing its negotiating power and to get further discount in the rates.

Future plans of INDEST-AICTE Consortium include (i) considering a discovery solution for the INDEST-AICTE Consortium member as well as for the other member institutions of other consortium of India, (ii) establishment of National coalition of all Library Consortia to have a common e-resource policy for India, (iii) frame an archival policy of the e-resources of consortia as well as the individual library of the country, (iv) negotiate the eBooks for the member Institutions through consortia, (v) setting-up mirror servers, local hosting and (vi) to obtain national licenses for important e-resources with access spread out to as many educational institutions as required. Some of the issues like budget management, catalogs – NextGen, catalogs - union, digital initiatives, licensing – new, licensing – renegotiations, interlibraryloan, open access, print collections –cooperative collection development, print collections– shared storage, research projects, training, e-book purchase and other priorities are under constant discussion among the member institutes and other consortia.

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