

OCCASIONAL PUBLICATION 111

IIC

ONE NATION ONE SUBSCRIPTION

by
Usha Mujoo Munshi
and
Jagdish Arora

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The views expressed in this publication are solely those of the author and not of the India International Centre.

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Acknowledgements

The National Conclave (NLCC) 2021 was organised with a focus on three issues of national importance: (i) One Nation One Subscription (ONOS); (ii) Copyright Provisions for Library: Guidelines for Librarians; and (iii) Copyright Challenges in the Digital Era.

A galaxy of experts shared their erudite viewpoints on these issues. Shri N.N. Vohra, former President IIC, and former Hon'ble Governor, J&K, inaugurated the conclave. The special address was delivered by Prof. M. Jagadesh Kumar, Vice Chancellor, Jawaharlal Nehru University. The panellists for the session on 'One Nation One Subscription (ONOS)' were Prof. K. Vijay Raghavan, PSA to the Government of India, who also delivered the Keynote Address; Prof Anil Sahasrabudhe, Chairman, AICTE (who chaired the session); Dr. Usha Mujoo Munshi, Chief Librarian, IIC; and Dr. Jagdish Arora, Advisor, National Board of Accreditation (NBA). The panellists for the two sessions on 'Copyright' were Shri K. N. Shrivastava, Director, IIC (who chaired the session); Prof. Prabuddha Ganguli, Advisor, IIT Jodhpur; Prof. P. K. Bhowmick, IIT Kharagpur; Shri N. V. Sathyanarayana, CMD, Informatics (India) Ltd.; Smt. Prathiba M. Singh, Hon'ble Judge, Delhi High Court; Dr. R. K. Chadha, Former Additional Secretary, Lok Sabha; Shri Atul Kothari, National Secretary, SSUN. The Valedictory Address was delivered by Dr. Vinay Sahasrabudhe, Chairman, ICCR and Member of Parliament (Rajya Sabha). Prof. Rajnish Jain, Secretary, UGC and Prof. Unnat Pandit, JNU, also spoke at the valedictory session.

The essence of the deliberations at the Conclave, including the important inputs of the Session Coordinator from the India International Centre and panellists are presented in this Report.

1. Introduction

One Nation, One Subscription (ONOS), an initiative proposed by the Government of India (GoI), aims to provide country-wide access to national and international scientific and academic content. ONOS is expected to sign national

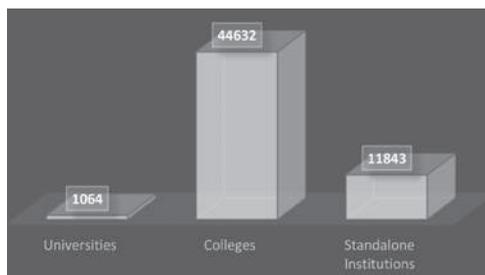


Figure 1: Number of Educational Institutions in India

licenses with most of the prominent STEM publishers and database producers across the world in order to encourage easy access to high-quality academic information, thus stimulating scientific research and innovation in the country. This initiative is expected to benefit research and educational institutions including universities, colleges, research organisations, as well as every citizen of the country through public libraries.

It is reported that an estimated amount of ₹ 1,500 crore is spent annually (Chakraborty, 2020¹) by more than 10 government-funded consortia, and all Institutions of Higher Education in India² (see Figure 1) on subscriptions to electronic resources, including e-journals, e-books and online databases. It is interesting to note that there has been a substantial increase in enrolment in higher education from 3.97 lakhs in 1950–51 to 203.27 lakhs in 2011–2012³ and to 374 lakhs in 2019–2020, with more than 14.16 lakh teachers.⁴

Given the fact that the resource requirements of a large number of institutions are common, negotiation at the national level with the combined negotiating power of a nation consisting of all institutions and 130 crore people would not only be economical, but also beneficial to

the country in terms of extended access to a larger number of e-resources to the entire population of India.

2. Necessity

Access to electronic resources is considered more important than its physical possession, especially if access is perpetual in nature. ONOS can get the benefit of country-wide access to a larger number of electronic resources at an affordable cost and at better terms of licenses.

A very high degree of correlation has been observed between the number of resources available to researchers in a given organisation and their scientific productivity in terms of the number of research articles produced by them. India has witnessed a sharp and persistent decline in the number of research journals subscribed by the educational and research institutions across the country during the 1980s and 1990s due to increase in the cost of journals, devaluation of the Rupee against major foreign currencies, static library budgets, etc. As a result, the total research productivity of our country, in terms of number of research articles produced by our faculty, scientists and researchers, declined by more than 2 per cent during this period. On the other hand, research productivity of other Asian countries like China and South Korea increased by 2–3 per cent⁵ during the same period (see Figure 2). It can be ascertained that these countries have increased their subscription base substantially in the past two decades.

The total research output of 219 universities covered under the UGC-INFONET Digital Library Consortium, in terms of the number of research articles published in scholarly journals from 1976 to 2015 is shown in Figure 2 in blocks of five years. Over the last 40 years (1976–2015), member universities covered under UGC-INFONET Digital

Library Consortium published 3,57,876 research articles, representing 34.90 per cent of total research output from India during the same period.

The study⁶ reveals an increase in the number of research articles from 24,067 in the block 1976–1980 to 1,12,987 in the last block of five years, i.e., 2011–2015. Data reveal a rather drastic increase of 84.71 per cent and 52.92 per cent in the cumulative number of research articles in the last two blocks of five years (2006–2010 and 2011–2015), respectively, in comparison to the previous two blocks (2001–2005 and 2006–2010). The rate of increase in the last two blocks is much greater than any of the previous blocks of five years over the past 40 years. Average growth rate over a period of 40 years from 1976 to 2015 is 27.85 per cent. The corresponding compound annual growth rate is 24.72 per cent, as depicted in Figure 2.

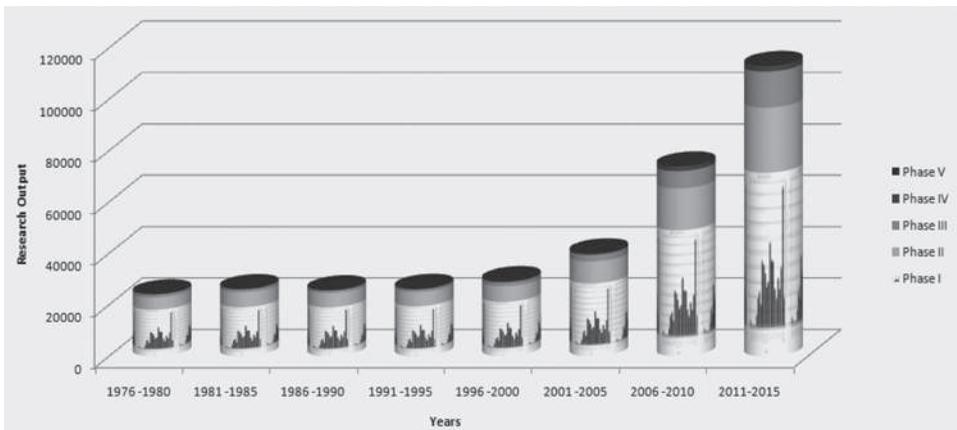


Figure 2: Number of Research Articles Published by 219 Member Universities under the UGC-INFONET Digital Library Consortium in Blocks of Five Years

It may also be observed from Figure 2 that the number of publications by 219 universities decreased from 26,040 in the block years 1981–1985, to 25,594 in the block year 1986–1990, registering a decrease of 1.71 per cent.

Table 1: Government-funded Library Consortia: Number of Participating Institutions and Resources Licensed

Sl. No.	Name of the Consortium	Year (Est.)	Core Members	No. of Resources	Anchoring Institution	Funding Agency
1	NKRC	2002	65	33	CSIR-NISCAIR	CSIR & DST
2	UGC-INFONET	2003	201	27	INFLIBNET	UGC
3	INDEST-AICTE	2003	*3125	27	IIT Delhi	MHRD/AICTE
4 ^{*1}	DAE Consortium	2003	36		On Rotation	DAE
5	MCIT	2005	12	4	NIC	MCIT
6	CeRA	2008	142	10	IARI	ICAR
7 ^{*1}	ERMED	2008	98		NML	MH&FW
8	DeLCON	2009	33	19	NBRC	BDT
9	DRDO	2009	50	11	DESIDOC	DRDO, MoD
10	NLIST	2010	3140	11	INFLIBNET	MHRD
11 ^{*2}	e-Shodh Sindhu	2015			INFLIBNET	MHRD
12 ^{*2}	DERCON	2015	10	10	Min. Earth Sci.	Min. Earth Sci.

*1 Did not Participate in the Survey; *2 Formed after the Survey;

*3 Including 60 Government Engineering Colleges funded by the AICTE

3. Major Government-funded Library Consortia in India: A Mini Survey

More than 10 library consortia were launched with funding from different ministries of the GoI to address the issue of limited access to e-resources in institutions under their respective ministries. These consortia initiatives include e-Shodh Sindhu (formed with the merger of INDEST-AICTE Consortium, UGC-Infonet Digital Library Consortium and NLIST with funding from the Ministry of Education); National Knowledge Resource Consortium (CSIR and DST); DAE Consortium;

MCIT Consortium; Consortium for e-resources in Agriculture (CERA); e-resources in Medicine (ERMED); DBT's e-resources Consortium (DelCoN); DRDO Consortium; and DERCON (Ministry of Earth Sciences).

In a survey of 10 government-funded library consortia (see Table 1) conducted at the behest of the Ministry of Education,⁷ it was found that eight out of 10 consortia subscribed to 92 unique electronic resources with varying degrees of commonality, at a total estimated annual cost of ₹ 350 crore. All resources subscribed by MCIT Library Consortium were common (100 per cent) with other consortia. Ten resources out of 11 (90.91 per cent) subscribed under the NLIST Project were common with other consortia. In the case of DRDO e-journal Consortium, nine out of 11 resources (81.82 per cent) subscribed by them were common with other consortia. DeLCoN had the minimum number of resources (33.33 per cent) that are common with other consortia. It may be noted that e-journals archives, e-books and other e-resources that do not have ongoing subscription were removed from the common list.

Moreover, in a national survey of e-resource requirements of all institutions of higher education conducted by the INFLIBNET Centre in the year 2015 for e-Shodh Sindhu, it was found that 604 institutions registered their requirement for over 100 e-resources. The key outcomes of the survey were:

- All Government-funded consortia are being operated by one of the beneficiary institutions that acts as coordinating and monitoring agency;
- Almost all government-aided library consortia in India work in a project mode with the support of temporary staff, except UGC-

INFONET Digital Library Consortium and NLIST (merged with e-Shodh Sindhu) and National Knowledge Resource Consortium (NKRC) that are executed by the INFLIBNET Centre and erstwhile NISCAIR, respectively. Both these organisations are fully dedicated to providing information support to universities and CSIR laboratories, respectively.

- Services provided by government-funded consortia are generally restricted to carrying out negotiations on behalf of member institutions, processing of subscriptions to e-resources, maintenance of websites, imparting training programmes, trouble shooting, etc. The UGC-INFONET Digital Library Consortium and NKRC, because of the nature of their hosting institutions, also provide services like journal holdings, union databases, open access institutional repositories, open access⁸ journals, etc.
- None of the consortia could develop infrastructure required for local archiving of e-resources that are owned by the Consortium, including e-books and backfiles purchased. All government-funded consortia depend on publishers' hosting facilities for archival access.
- All the 10 consortia put together subscribe to 96 e-resources, including full-text e-journals from 50 publishers including aggregators, 16 bibliographic databases, five factual databases, e-books from 12 publishers including aggregators, and 9 e-journal archives.
- Formation of e-Shodh Sindhu with the merger of UGC-INFONET Digital Library Consortium, INDEST-AICTE Consortium and NLIST was proposed based on the fact that there was a 14.81 per cent duplication in the number of resources that are being subscribed

by three MHRD-funded consortia, and 33.33 per cent among two MHRD-funded consortia, i.e., UGC-INFONET and INDEST-AICTE Consortium. Moreover, resources that were not duplicated were being cross-subscribed through the NLIST Project.

4. Economics and Cost-effectiveness: Selective Case Studies of e-Shodh Sindhu, NLIST, UGC-INFONET Digital Library Consortium and INDEST–AICTE Consortium

The economics of a consortium are determined by factors such as number of beneficiary institutions, full-time potential users in these institutions, cost of e-resources subscribed, and expenditure on e-resources per institution and per potential user. Cost recovery, cost avoidance, cost savings, average cost per article and rates of subscription are factors that determine economic viability and cost-effectiveness of consortia-based subscription to e-resources. These factors worked out for e-Shodh Sindhu and reported in the Annual Report of the INFLIBNET Centre for the year 2017–2018⁹ are given below:

4.1. Cost Recovery

The recovery of cost incurred on e-resources subscribed through a consortium can be judged in terms of the intensity of use of resources. 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 or through document delivery services at a cost of US \$ 15.00 per article (average cost of an article taken

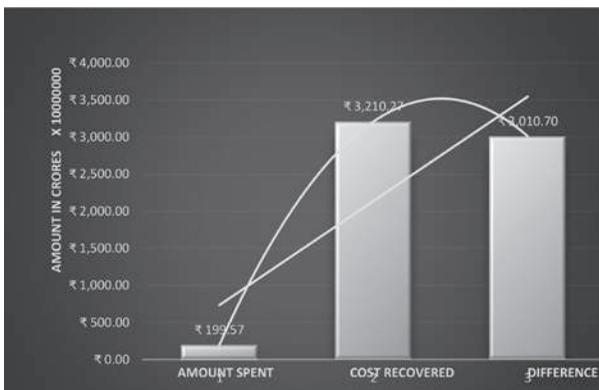


Figure 3: Cost Recovered for e-Journals Subscribed under the e-Shodh Sindhu for the Year 2018-2019

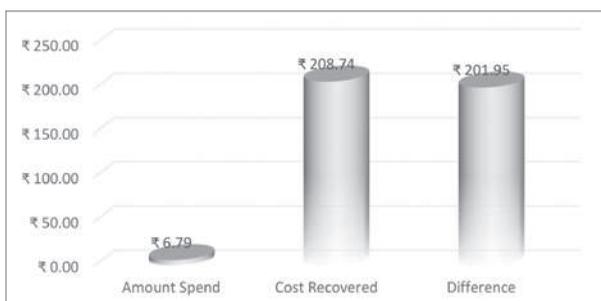


Figure 4: Cost Recovered for e-Journals Subscribed under the NLIST Programme for the Year 2019

from a study conducted by the American Research Libraries [ARL]). The cost per download of an article for different resources varies from ₹ 8.96 to ₹ 827.38, whereas the consortium average is ₹ 85.94. Figure 3 shows that e-Shodh Sindhu has recovered the cost incurred on subscription for all e-resources.

Similarly, in the case of NLIST (College Model), the total cost recovered for the year 2019 amounts to ₹ 208.74 crore as against the total expenditure of ₹ 6.79 crore, with ₹ 201.95 crore as the cost of articles downloaded in excess (Figure 4).

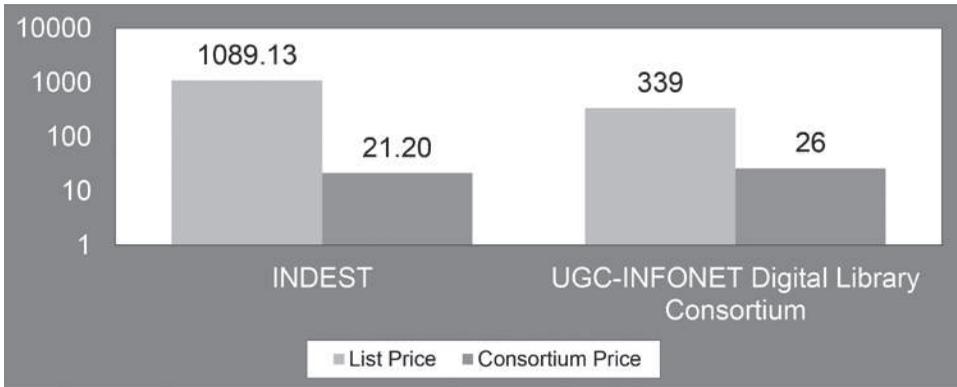


Figure 5: Cost Avoidance for e-Resources Subscribed under the e-Shodh Sindhu for the Year 2019.

4.2. Cost Avoidance

Cost avoidance is calculated in terms of difference in amount paid for HEIs by a consortium and list price of e-resources including e-journals and e-databases. Figure 5 provides comparative cost avoidance data for UGC-INFONET Digital Library Consortium and INDEST-AICTE Consortium for the year 2008. It may be noted that the two consortia spent ₹ 21.20 crore and ₹ 26.00 crore and registered a notional saving of ₹ 1067.93 and ₹ 313.00 crore, respectively, considering the fact that the same sets of e-resources on list price would have cost ₹ 339.00 crore and ₹ 1089.13 crore, respectively.¹⁰

4.3. Cost Saving

Member institutions of a consortium are required to drop print versions of resources whose electronic versions are subscribed by the consortium, which results in substantial savings.

The 48-member institutions of INDEST-AICTE Consortium had recorded a saving of ₹ 16.39 crore on account of deletion of print subscription to resources, as against the total expenditure of ₹ 31.69 crore in the year 2008–2009. Figure 6 is a comparison between cost savings and total expenditure on e-resources for INDEST-AICTE Consortium. It may be noted that access to full-text resources in most of the institutions has been raised from negligible to more than 12,000 journals and six bibliographic databases.¹¹

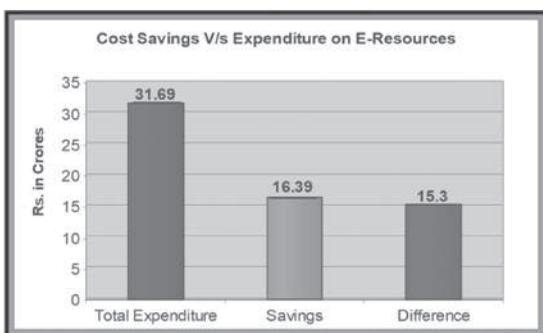


Figure 6: Cost Savings vs. Expenditure on E-resources

4.4 Average Cost of an Article

The average cost per download represents the average cost of each access event to a full-text article and is calculated by dividing subscription cost of a resource by the number of articles downloaded. The average cost per download for e-Shodh Sindhu Consortium in the year in 2019 was ₹ 85.94 as against ₹ 82.88 in 2018–2019 and ₹ 65.96 in 2017.¹²

5. Benchmarking Outcome, Return on Investment and Impact Analysis

Providing access to e-resources to faculty, scientists, researchers and the public at large cannot just be a purpose in itself. It is primarily a means to trigger an ecosystem of well-informed citizens, and a stronger research and academic culture in the institutions through access to authentic sources of information. Web of Science, consisting of three sets of citation indices, namely Science Citation Index (SCI), Social Science Citation Index (SSCI) and Arts and Humanities Citation Index (A & HCI), are considered to be a filtering mechanism that indexes qualitative research output based on citations received by it. These citation indices may be searched for information on qualitative productivity of institutions.

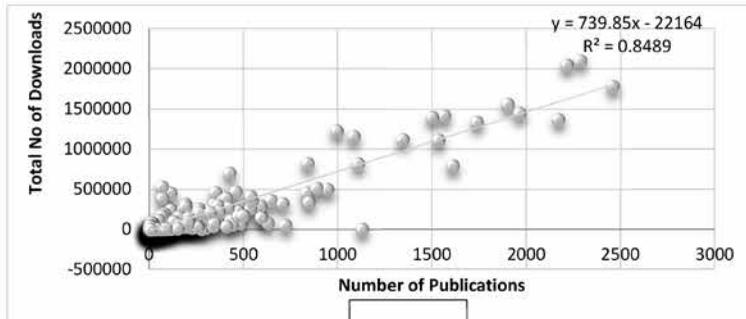
The source articles that are indexed in these three citation indices for India prior to launching ONOS can serve as a yardstick to measure current research output in India. The research output prior to launching ONOS can then be compared with research output of the country after five years to measure the impact of e-resources provided through this initiative on the research productivity of beneficiary institutions and individuals over a period of five years.

The exercise conducted to measure the research output of member institutions of INDEST-AICTE Consortium and UGC-INFONET Digital Library Consortium after five years of providing access to e-resources revealed that the research output of member institutions of both the Consortia had increased exponentially.¹³

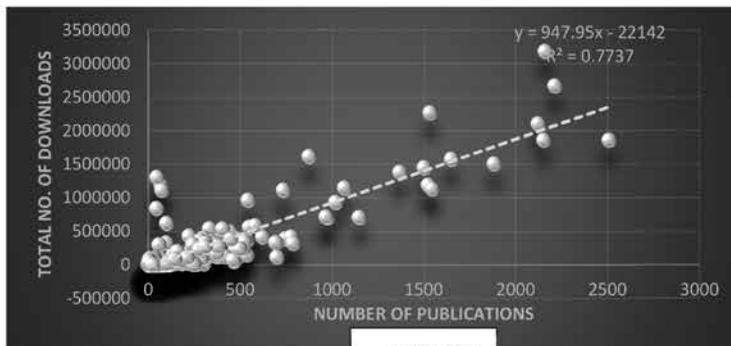
5.1. Correlation between Number of Downloads and Publication Pattern of Institutions: A Case Study of e-Shodh Sindhu (e-SS)

An analysis of the correlation between the number of full-text downloads and the corresponding increase in number of publications of member institutions of e-Shodh Sindhu as reported in INFLIBNET's Annual Report¹⁴ is given here as an example. The objective of measuring the correlation between number of research articles and number of downloads is to ascertain whether increase in research output is influenced by the ease of access to scholarly publications that the consortium has made available to their member institutions.

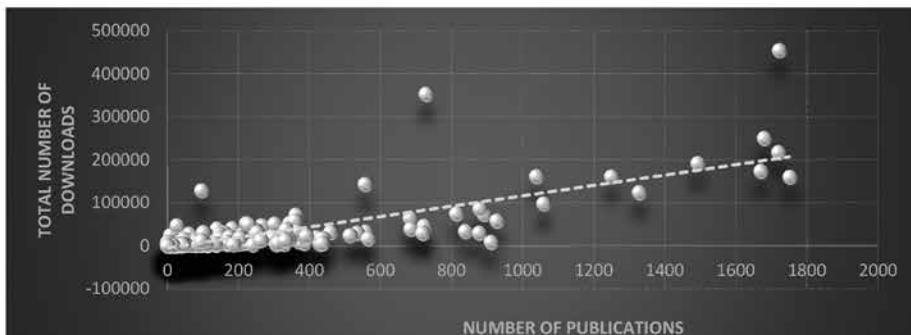
Figure 7 (a, b, c) depict scatter diagrams showing the correlation between number of full-text downloads and number of publications by member institutions getting access to e-resources under e-Shodh Sindhu for the years 2016, 2017 and 2019, respectively. The correlation between number of publications and the number of articles downloaded by the member institutions of e-Shodh Sindhu in 2016 and 2017 was calculated to get a measure of statistical correlation between the two variables, without assuming any parametric relation between them. Pearson's Linear Correlation (r) has been measured as data points shown in Figure 7 (a, b, c). Pearson's correlation coefficient is a measure of the linear correlation between two variables. It has a value between +1 and -1, where +1 is total positive linear correlation, 0 is no linear correlation, and -1 is total negative linear correlation. The Pearson Correlation Coefficient between number of articles downloaded and number of articles published ranges from 0.78 to 0.92 between 2016 and 2020 (June) for the members of e-Shodh Sindhu Consortium. This indicates that there is a strong and positive correlation between these two variables.



7 (a) 2016



7 (b) 2017



7 (c) 2019

Figure 7 : Correlation between no. of Full-Text Downloads and Publication of eShodh Sindhu Consortium

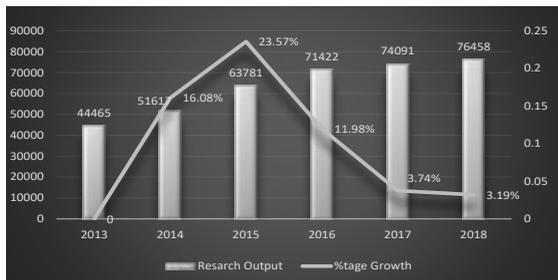


Figure 8: Research Output of all Member Institutions of e-Shodh Sindhu from 2013 to 2018

The impact of access to e-resources to institutes on their research productivity is portrayed in Figure 8. Thus, with the launch of ONOS, a further spurt in research output can be presumed.

6. Implementing ONOS: Planning and Execution

6.1. Resource Identification

Identify core electronic resources that are of general interest and are useful across all organisations and general public, as well as specialised e-resources across subject domains for organisations and individuals. Current subscription to e-resources that are common to all consortia and e-resources of general appeal for public libraries can potentially be a starting point for identifying e-resources that have wider appeal across cross-sections of society, as well as across subject domains for organisations and individuals.

6.2. Categories and Types of Resources

The country may subscribe to the following two categories of resources:

- National licenses to e-resources that are of general interest and are

useful across all organisations and the general public. Example: JSTOR, World Electronic E-Book Library, National Geographic, etc.

- Nation-wide access to specialised e-resources across subject domains for organisations and individuals (retired faculty, scientists and individual researchers). For example: IEL Online, ACS, ASME, ASCE, Elsevier's Science Direct, Wiley, Springer-Nature, Taylor and Francis, etc.

Types of e-resources may include full-text resources (including e-journals, e-books, annual reviews, newspapers, reference works, patents, standards, encyclopaedia, etc.), bibliographic databases (including citation databases) or factual databases.

Terms of licenses by publishers vary from types and categories of resources to be subscribed. As such, a common licensing agreement should be developed to address the peculiarities of different types and categories of resources.

6.3. Negotiations by Professional Negotiators

A consortium is essentially a function of numbers—the larger the number of members, the greater is the negotiating power and benefits that can be passed on to the members of the consortium. Consortium, in a distributed mode as it exists now, does not get the benefit of numbers and, as such, corresponding negotiating powers and benefits. It is best for consortia to work together so that the benefit of a larger number of members is suitably used and passed on to the members of the consortium in the larger national interest. 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. Negotiation at the national level with the combined negotiating power

of a nation like India consisting of over 50,000 institutions and 130 crore people involving the best minds in the country, backed with unlimited resources, is not merely economically beneficial, but it can also extend access to a larger number of e-resources to the entire population.

Moreover, negotiations for subscription to e-resources, terms and conditions of purchase and legalities involved are done by negotiation committees appointed by the consortia consisting of experts in their respective subject fields who are not essentially acquainted with the art of negotiation or the nitty gritty issues involved. These committees do not have professional negotiators. Moreover, most often, committees negotiate rates of annual subscription offered by the publisher and annual increase in rates of subscription. Other terms and conditions of subscription are not discussed in detail. Most consortia sign agreements prepared by the publishers without having the terms and conditions vetted legally.

It is important that ONOS should hire the services of professional negotiators, and negotiate not only the rates of subscription but also terms and conditions of subscription and legal issues involved. Besides, institutions and individuals who have gained expertise in negotiation and management of e-resources should also be co-opted in the process of negotiation and management of ONOS.

6.4. Common Model Licensing Agreement

Most institutions and library consortia sign agreements that are designed by publishers and the clauses of the agreement are mostly favourable to the publishers themselves. Furthermore, some of these clauses may seem favourable to the consortium, however, their legal interpretation may actually turn out to be otherwise. It is, therefore, essential to evolve a model license agreement that is common across

all type of resources, i.e., full-text resources, bibliographic or factual databases, and across all publishers. The model license should address all key issues to guard the interests of member institutions, consortia and the nation at large. Some of the most important key issues that should constitute part of the model licensing agreement are ownership of IP, limits to annual price increase, authorised users and authorised use, access and access management, performance obligations, usage statistics and compliance to standards related to usage statistics, terms of renewal and termination, perpetual license and archives, dispute resolution and jurisdiction, indemnities, etc.

It may be emphasised that e-resources are either subscribed or purchased on ‘one-time purchase and perpetual access’ basis. Most often, the country of jurisdiction is the publisher’s headquarter country. In case of legal problems, it would be impossible for a consortium in India to defend legal cases in the country of origin of the publisher. As such, the legal aspects of license agreements to be signed with the publisher should be examined by the IPR attorneys. Most consortia do not have access to legal expertise.

7. Continuing Monitoring and Auditing

Continuous monitoring and auditing of services and its delivery to the end user of an initiative is essential to ensure that it remains effective, relevant and efficient. Monitoring and auditing of ONOS may be implemented on the following parameters.

7.1. Automated Interfaces to Harvest Usage Statistics

Develop automated interfaces to harvest usage statistics for all resources for their compilation, analysis, tabular and graphic representation, and delivery to institutions using COUNTER and SUSHI standards for

member institutions and for the entire nation. The interface can be designed not only to analyse logs of usage of e-resources, but also to identify resources that are used extensively as well as those that are used sparingly.

7.2. Usage Monitoring: In-depth Usage Analysis and Trend Analysis

The usage of e-resources is one of the most important parameters to judge effectiveness of consortium and consortium-type initiatives, as well as the relevance of a subscribed resource. While usage statistics may be harvested as mentioned above, automated interfaces may also be developed for collection, collation and analysis of data on usage of e-resources through automated processes, making them available to institutions for their reference and information. ONOS should also analyse the usage statistics and correlate it with research output of institutions in terms of number of articles published by them in scholarly journals during the corresponding period. Comparison may also be made between research outputs (in terms of number of publications) of various groups of institutions in India and abroad.

Moreover, usage data can be mapped to the institutions to identify areas of studies and research being undertaken in these institutions. The data thus generated can be used to draw regional and national maps of education and research and its distribution in the country to get an insight into strengths, weaknesses, and emerging areas of research and those research areas that are fading out. The interface may also host a dashboard for ONOS administrator, indicating the summary of usage of e-resources by institutions and individuals. Moreover, bibliometric and scientometric studies may be conducted on research outputs of beneficiary universities using citation tools like Science Citation Index, National Science Indicators, Scopus and InCite.

7.3. Cost-effectivity and Return on Investment

Examples and case studies mentioned in ‘Economics and Cost-effectiveness: Selective Case Studies of e-Shodh Sindhu, NLIST, UGC-INFONET Digital Library Consortium and INDEST–AICTE Consortium’ may also be conducted on ONOS to ascertain its cost-effectivity and ROI factors.

7.4. Benchmarking Outcome and Impact Analysis

The research output prior to launching ONOS may be compared with research output of the country after five years to measure the impact of e-resources provided through this initiative on the research productivity of beneficiary institutions and individuals over a period of five years. It may be noted that the exercise conducted to measure research output of member institutions of INDEST–AICTE Consortium and UGC-INFONET Digital Library Consortium after five years of providing access to e-resources revealed that research output of member institutions of both the Consortia had increased exponentially.

8. Activities, Services and Infrastructure around One Nation One Subscription

Most institutions, including government-funded consortia, operate with limited human, financial and technological resources. As such, these consortia restrict their activities to subscription to resources. Services and infrastructure that are essential to boost utilisation and perpetual access to subscribed resources are typically missing in most of the consortia. These limitations include lack of provision for digital archives for subscribed resources, federated search and discovery services, off-campus access to resources for authorised users, harvesting

of usage data compilation and journal-level usage analysis, and trend analysis, etc. Although, these limitations are crucial for any institution or consortium, their solutions for a single organisation or a group of organisations are too expensive as well as resource-intensive (both technological and infrastructural resources).

As such, expertise and technological dexterity required to curate, promote and maximise usage of e-resources are not available at institutional and consortia-levels. Solutions for these activities and services are too expensive, as well as technology- and infrastructure-intensive for a single organisation or a group of organisations to support. However, these services and supporting infrastructure to be built around subscription to e-resources for promoting their usage and ensuring their perpetual access can be addressed at the national level.

Services and supporting infrastructure related to managing, organising and archiving electronic resources are mentioned below.

8.1. Archives and Archival Access

Access to a given e-resource gets terminated as soon as the subscription period is over and the consortium or an institute decides not to renew its subscription for the subsequent year. However, most publishers offer access to e-journals for the period for which subscription was paid for free or for a fee. Publishers, most often, demand a fee for using their platform for accessing archives of e-journals after termination of subscription. There are multiple means to get archival access to e-resources subscribed by a consortium, including (i) access from publisher's platform; (ii) local hosting of subscribed content on behalf of all consortia by a central agency; (iii) engaging the services of organisations like Portico, CLOCKSS, LOCKSS, OCLC, etc. Merits and

demerits of each of these solutions need to be examined thoroughly before a decision can be taken in this regard.

It is observed that most of the consortia do not have any archival policy or solution for their subscribed resources because of paucity of funds and technical know-how. ONOS must prefer local hosting of archives of subscribed content and develop the requisite infrastructure, including hardware and software.

8.2. Link Resolvers, Federated Search Solutions and Discovery Services

With a growing number of e-resources made accessible through consortia as well as resources subscribed by libraries individually, libraries and consortia are now looking for federated search and discovery services that provide seamless and coherent access to all resources, including resources subscribed through a consortium, individual subscription of a library, as well as open access resources through a single search interface. A number of consortia have tried/are trying commercially available federated search solutions and discovery services. It would be desirable that ONOS either get a federated search solution developed or subscribe to one of the federated search solutions or discovery services for the entire nation. The possibilities of developing discovery services can also be explored under agreement with the publishers, wherein every publisher would be required to submit metadata for subscribed e-resource at a regular interval in a defined XML format to the coordinating institution for ONOS.

8.3. Access Management

Access management is one of the major technical issues that need to be resolved by implementing Shibboleth-based access management system at the national level. The Shibboleth is standard-based open source middleware software that provides Web-based single sign-on (SSO) access to subscribed e-resources across the globe, enabling users to access e-resources from anywhere irrespective of their physical location. Some of the existing consortia and individual institutions have set up proxy servers or VPN services to fulfil ever increasing demands from the user to provide off-campus access to subscribed e-resources. Proxy server and VPN services can, at best, be considered a temporary solution with several inherent problems.

The Shibboleth working architecture requires each participating institution to set up their own service identity provider (IDP). However, looking at the present scenario, several member institutions do not have the requisite technical know-how and ICT infrastructure. As such, INFLIBNET Centre, as host to the largest Consortium (called e-Shodh Sindhu), has already taken up the task of acting as an IDP for all its members in an initiative called INFLIBNET Access Management Federation (INFED). The implementation of Shibboleth technology at INFLIBNET has resulted in a scenario wherein: (i) the service providers (publisher) recognise INFED as a trusted organisation for authenticating the user and give an option on their Websites to select INFED as an IDP; (ii) When a user chooses INFED as its IDP, he/she is re-directed to IDP link at INFED server; (iii) After verifying user's credentials, IDP at INFED passes 'user attributes' to the publisher that includes user's institution, department and role as faculty/student/researcher; and (iv) Once authenticated, user gets access to his/her authorised e-resources. Unauthenticated users are denied access.

ONOS may engage the services of INFLIBNET Centre to extend services of INFED to institutions and individuals that would benefit from ONOS in the entire country.

8.4. Continuity and Perpetuity

The consortium needs to subscribe to e-resources in perpetuity since journals and databases are published in perpetuity and updated regularly. It is difficult for most of the consortia to convince their concerned ministry about the continuation of an initiative indefinitely. As such, continuation of a consortium in perpetuity becomes questionable. ONOS should address this issue as a national policy to ensure continuity of subscription to e-resources in perpetuity.

8.5. Online Interactive Instructional Courseware

ONOS should fund development of online, interactive, instructional courseware on different aspects of subscribed e-resources, as well as software that support reference management and authoring tools for scientists. ONOS should also impart training programmes to librarians and faculty (train the trainers), who, in turn, would be responsible for imparting information literacy programmes on the use of these resources within their own organisations.

9. Recommendations

The generation and transmission of knowledge through research has long been recognised as an essential requirement for a country's long-term growth and competitiveness, as well as for creating capacity to solve social problems.¹⁵ Accessibility and availability of print and e-resources impact quality of teaching, research and publications. Major issues and action points that came up during the panel discussions are as follows:

(a) **Reaching the Unreached**

Extending the benefits of accessibility to the remotest institutions as well as to every citizen of the country, thereby obviating the affordability factor for institutions with meagre financial resources.

The rollout plan should, therefore, target 1,12,395 libraries, including 57,539 academic/institutional libraries, and 54,856 public libraries in the country. These libraries would work as Knowledge Dissemination Hubs for the public, and, therefore, should be equipped with Internet-enabled infrastructure for users along with supporting staff.

(b) **Institutionalisation of ONOS**

Most of the library consortia function in a project mode, coordinated by one of the member institutions, with no specific manpower, and services limited to subscription with about 70 per cent common or duplicate resources.

Establishment of an Umbrella Body for ONOS for its effective and efficient operation and execution and for proper coordination of its activities with innovative services built around the ONOS at the national level. The Government of India may consider formation of

a National Library Bureau to foster a robust research resource back-up support for furtherance of the research landscape in the country, thus giving impetus to a truly knowledge-based society and thereby to a knowledge economy.

(c) Resource Identification

Identification of core electronic resources that are of general interest and are useful across all organisations and the general public, as well as specialised e-resources across subject domains for organisations and individuals. Terms of licenses by publishers vary from type and categories of resources to be subscribed.

Resource Selection Committees consisting of experts from HEIs and the public library system may be appointed to identify e-resources to be subscribed, resources that are common to all consortia, and e-resources subscribed by public libraries can potentially be a starting point for identifying e-resources that have wider appeal across sections of society, as well as across subject domains for organisations and individuals.

Common licensing agreement should be developed to address peculiarities of different types and categories of resources.

(d) Negotiation of National Licenses

In addition to substantial reduction in subscription cost (to the tune of 90 to 95 per cent), with either no annual increase or annual increase restricted to 1 to 2 per cent as against normal annual increase of 10 to 15 per cent. Given the fact that ONOS shall bring in its ambit over 1,12,395 institutions (including HEIs and public libraries) catering to a large section of society, the terms of reference should be worked out minutely with benefit accruing to the entire nation as return on investment.

Negotiations by experts may take cognisance of the fact to ask for tangible benefits in return for the hefty subscription. For instance, waiver of APC for a pre-defined number of papers published by Indian scholars during the licensed period; or the entire collection along with its backfiles is given to the country once subscription is terminated after a pre-defined period; etc.

(e) Agreement Clauses

Most institutions and library consortia sign agreements that are designed by publishers and the clauses of the agreement are mostly favourable to the publishers themselves. Furthermore, some of these clauses may seem favourable to the consortium; however, their legal interpretation may turn out to be otherwise. Moreover, terms of licenses by publishers vary from types and categories of resources to be subscribed.

Evolve a common model license agreement across all types of resources and publishers, that should address all key issues (e.g.; ownership of IP, limits to annual price increase, terms of renewal and termination, perpetual license and archives, dispute resolution and jurisdiction, indemnities, etc.) to guard the interest of member institutions, consortia and the nation at large.

(f) Factoring Innovative Services

Due to the limited resources, the expertise and technological dexterity required to curate, promote and maximise usage of e-resources are not available with institutional and consortia-level, and solutions for these activities and services are too expensive at a single or group of organisation level to operate.

Built services and supporting infrastructure around subscription to e-resources for promoting their usage, ensuring their perpetual

access, monitoring usage, carry out trend and impact analysis, render discovery services, provide training, and facilitate instructional material and eventually carve a roadmap to a sustainable model at the national level.

(g) Promote and Support Open Access (OA), and Upholding Fair Use of Copyrighted Materials

(i) *Librarians in particular and users in general should be aware of copyright provisions and accordingly work within the framework of copyright laws for licensed content, while promoting copy left for institutional content creation.*

(ii) *Special drives and funds be made available for advocacy and campaigns on the Copyrights Issues in the Digital Environment across the country, involving advocacy groups such as the Information and Communication Society of India (ICSI), other scholarly societies and researchers' associations.*

(iii) *Issues and modalities related to the Creative Commons (CC), Open Licensing, voluntary surrendering of Copyrights for public use of scholarly materials, etc., should be brought into the Amendment of Copyright Act.*

(iv) (a) *Creative Commons licenses are the most popular open licenses among open education and open access literature around the world.*

Libraries must educate its end-users during orientation sessions to promote Creative Commons licenses for instigating publishing research outcomes based on library material for the general public on the basis of most suited CC licenses.

(b) Creative Commons licenses reduce commercial chain and proprietary blockade over research results. Libraries are the place of sources to edify publication style to researchers.

An accurate orchestration to publish work with minimal transfer of intellectual rights may be initiated from the door of a library. It will also assist in enhancing the access power of future researchers to choose the best way for quality research outcomes.

(v) India's annual publishing charges, inclusive of Article processing Charges (APC), is estimated to be ₹ 985 crore.¹⁶ The disproportionately high APC is out of reach for many researchers in the country.

Support publishing in OA journals that require APC, modalities such as provision for corpus funding, one-time licensing to journals as APC, or APC gateways may be worked out to support young researchers.

Endnotes

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About the Author

Dr. Usha Mujoo Munshi, is President, Information and Communication Society of India. A Fulbright Scholar, she has served at many prestigious organisations and is currently with India International Centre (IIC), New Delhi. Dr. Munshi has contributed substantially to digital library and digitisation projects and has been instrumental in setting the ball rolling for creating e-resources and e-research journal projects way back in 1999/2000. She is also instrumental in contributing to the Open Access (OA) movement and has initiated several initiatives in this direction that had a rippling effect on the creation of digital institutional repositories (IRs). She has substantially contributed to capacity-building programmes and for developing/offering online courses such as MOOC courses on Swayam Platform, GoI. Dr. Munshi has over 165 research and conference publications and a few books to her credit, besides a number of other publications. Her latest book *Data Science Landscape: Towards Research Standards and Protocols*, published by Springer under their book series *Studies in Big Data*, 2018 has been extensively used by the research and academic community and has since crossed over 39,000-chapter downloads, with 1000s of e-subscriptions, and is now part of the engineering world e-book collection. Recipient of several national and international awards, Dr. Munshi obtained post of DEA (directeur d` etudes associe), an academic recognition given to her by Fondation Maison des sciences de l`homme, Paris, (France) and she is the first one to receive this recognition in the area of Information Science and Technology. She is on the editorial board of a few national/international journals that includes the Data Science Journal (DSJ) brought out by the International Council for Science (ICSU), CODATA, Paris. She is Co-Chief Editor, Journal of Data Science and Research (JDSR), brought out by Sigma Academic Publisher Columbia, MD. Acting as a member of various national and international committees, she was nominated as a member of the Steering Committee of IAP (Inter Academy Panel) and Taskforce on Digital Resources–US National Academy of Sciences, USA and Co-Chair, Steering

Committee, National Digital Preservation Programme (NDPP), GoI, Member, International Data Policy Committee, Member, Governing Board, Rampur Raza Library, Ministry of Culture, Member—the Expert Committee for the establishment of IPR Chairs under the Scheme for Pedagogy and Research in IPRs for Holistic Education and Academia (SPRIHA). Travelled widely, she has delivered over 240 lectures and as part of the professional and societal activities.

Dr. Jagdish Arora, currently Advisor, National Board of Accreditation (NBA) was the Director of INFLIBNET Centre from August, 2007 to Dec. 2018. He worked as Librarian at the IIT Delhi and Librarian at IIT Bombay. He was the founder National Coordinator for e-Shodh Sindhu, the national consortium formed with merger of INDEST-AICTE Consortium, UGC-INFONET Digital Library Consortium and N-LIST. Dr. Arora is the recipient of several national and international awards including Fulbright Professional Fellowship in Library and Information Science, NDLTD Leadership Award (2017), Young Librarian of the Year (SATKAL), Librarian of the Year (IASLIC) and ILA-Kuala Best Librarian Award, etc.

Dr. Arora was awarded a citation and memento for his commendable contribution to digital initiatives for higher education by the Honourable Shri Pranab Mukherjee, the then President of India. He is the recipient of three life-time Achievement Awards. Dr. Arora has more than 100 research articles to his credit that were published in learned research journals and as chapters in books and conference proceedings. He has presented research papers in several national and international conferences and symposia in India and abroad. Dr. Arora is Course Coordinator for course on Digital Library that is being offered for fourth consecutive time on SWAYAM platform. His research interests include consortia-based subscription to e-resources, digital libraries, digitisation of old and fragile documents and their storage, database-driven Web interfaces and Web-based library services, Web-based learning and education, MOOCs, access management technologies, scientometric analysis, etc.



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