National Virtual Library (NVL) is an idea conceived by Prof. Deepak Pental during the course of meetings of the members of National Mission for Libraries. The National Virtual Library has many facets and many roles in order to achieve the goal of providing every conceivable information about India and to cater to the information needs of everybody whether educationally, socially, economically, physically advantaged or disadvantaged and without any bias or discrimination in any form.

The NVL can only be successful with back-end research and development activities. To build a semantic search engine, it is essential to develop not only the software but also other tools like ontologies. To ensure quality it is highly desirable to develop benchmarks and guidelines for best practices. Such an enormous and ambitious programme calls for varied skills and expertise, negotiations and MoUs with various governmental and non-governmental organisations, and above all a permanent organisation to carry out the work and periodically update the information with regard to validity, verifiability, compliance to international standards and a feedback mechanism to ensure quality and comprehensiveness.

The National Virtual Library requires constant new input and updating information for it various facets, lest it will contain obsolescent information and will be relegated to oblivion. The logical and practical solution for long term sustenance of NVL is for it to be maintained by Indian Institute of Library and Information Science, which anyway, is one of the recommendations of the National Knowledge Commission (NKC). The institute can undertake the work of National Virtual Library, LIS education and training, setting up benchmarks for public library services and overall coordination of the various aspects of National Mission for Libraries.
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Appendix-A
1. Premise

India is a vast country with a great number of languages, cultures, history, folklore and cuisine. Though it is considered as a sub-continent, it has almost all the characteristics of a continent. Perhaps Ancient and Medieval India produced more literature in many a discipline than any other civilization. India has lost considerable quantity of literature due to many and varied reasons and we cannot afford to lose further.

Modern India can boast of having the third largest scientific community in the world. However, the impact of India is considerably less compared to that of the so-called developed countries. Literacy rates, economic growth and general standards of living are the greatest challenges to reckon with by the people and the Government of India. One of the dreams of the present Prime Minister is to transform India into a knowledge society. It goes without saying that the libraries have a major role to play in realizing the goals of Knowledge Commission. The National Knowledge Commission's working Group on Libraries has recommended setting up of the National Mission for Libraries (NML).

The National Mission for Libraries has many tasks. During the course of its deliberations, the idea of setting up a National Virtual Libraries has come up. It is envisaged that NVL would form the focal point of varied activities of the National Mission for Libraries.

The advent of Internet and its ubiquitous nature has led to conceive the idea of National Virtual Library where in all the information generated in India and about India will be brought together and be made accessible through a powerful search engine. In addition, a number of web based information services are conceived to make best use of information technology.

The predominance of English and the knowledge of English by the literate section of India, has resulted in making less efforts information retrieval techniques in various Indian languages. The language issue is a major challenge of the National Mission for Libraries. Information Technology related organizations like C-DAC, NIC, NML etc. really have to address the language issue through Research and Development efforts. Digitization of documents in Indian languages, Optical Character Recognition, Information Retrieval, Search Engines are some the areas where in much more efforts are essential.
2. National Virtual Library (NVL)

In view of the increasing demand and need for organized digital information catering to all sectors of the society, the present proposal is for initiation of 'NATIONAL VIRTUAL LIBRARY' (NVL). NVL will provide a platform for users from all sectors to seek information through well researched services implemented in user-friendly interfaces. NVL has to be broad based in terms of its content, services and its reach, given the diversity of the populace it is intended to serve. Hence it is imperative to lay down the vision and objectives of the National Vision Library.

3. Vision

To empower people with right information in order to create a knowledge society and ensure preservation of digital content for the posterity.

4. Objectives

- Provide access to information for everyone in an Open Access Environment
- Content development – all existing digital resources to be identified and sourced
- Organization of information resource base using standard tools and techniques
- Plan, design and implement digital information services and searching
- Facilitate Multilingual Information Resource collection
- Implement robust and secure computing infrastructure
- Provide usage and impact indicators through user, resources and service use statistics
- Incorporate procedures for feedback and upgradation of the system

5. Target Groups/Sectors

- Scientists and Researchers (Including Physical, Natural, Social Sciences, Humanities, Engineering, Medicine, Agriculture)
- Students and Faculty
• Children
• Disadvantaged Groups
• Skilled professionals
• Industry
• Business
• Agricultural Sector and Farmers
• Health Sector
• Legal Sector
• Tourism Sector
• Culture and History
• Common people
• Publishing Industry

6. Implementation Phases
The project is divided into 2 phases. Much of the work in first phase comprises of identification of the existing resources in India and offering services based on the available content. For example, News Aggregation Services is a technology solution, which tries to aggregate Indian Newspapers feeds. However, Phase-2 attempts digitize and help digitizing information available with various organization

Phase – 1:
• News Aggregator of Indian Newspapers in English and Indian Languages
• Initiation of software development for crawling and collecting content about India from foreign papers
• Aggregator of E-Journals in various disciplines
• Digital Repository Harvester
• Federated Search Engine for E-Journals, Online Databases
• MoUs with Organizations to setup Institutional and Data Repositories
• OpenCat – a Union Catalogue of Indian Libraries (Shared cataloguing)
• Awareness and Marketing NVL
• Development efforts to build search engine of Indian Languages
Phase – 2

- News aggregator of foreign newspapers.
- More MoUs with governmental and non-governmental agencies
- Digital Curation, archival and preservation
- Refining the Search Engine
- Outreach and Feedback
- Updating the content

7. Content organization and Development

An unofficial estimate of web sites in India is about 50,000, which include various governmental and non-governmental organizations, business and industry, education and R & D Labs. The content is varied, some are quite useful and some ephemeral. In addition, one can easily guess there is lot more information in print format than that appears on the web. Even the governmental organization hardly have complete information they hold. An idea of these organizations and information that is available on various government agencies in given in the Appendix-A.

National Virtual Library is all about the content acquisition, organization, retrieval and dissemination. Though it is not envisaged to create the content, it is essential to identify the content that is available on and off the web. Of the numerous web sites, it is important to identify the web sites that are pertinent. The NVL should develop some criteria in evaluating, filtering and choosing the web content. In some cases, we have to have negotiations and initiate MoUs with various governmental and non-governmental organizations.

7.1 Cooperation with Gos, NGOs and Publishing Industry

A list of potential governmental organizations to have MoU for content organization are given like ICSSR, CSIR, ICHR, Ministry of Culture, National Library, Asiatic Society, Kudhabakh etc.

NVL proposes to support directly or indirectly some of these organizations to digitize the data they hold. In February, 2012, the Cabinet has taken a decision to make openly available the data that is available with various government organization. Similarly, the government of India should mandate making the publications that are results of research funded by various government departments. In addition, NVL should explore the possibility of having MoUs with various non-governmental organizations and Publishing industry.
7.2 Standards

To address the interoperability issues, both the content and services should follow national and international standards, preferably open standards. One of the major challenges is preservation of digital information. The present day computer systems, storage media, file formats, software may not be pertinent in future. Obsolescence of technology is a major issue and is of concern as it can make information inaccessible to future generations. One solution to make the content future-proof is to follow open standards, as open standards are not proprietary and do not entangle in legal rights. Migration of data/information to future technology would be much easier, though not without loss.

The following are some of the standards and protocols recommended for data, services.

- Text Encoding Standard
  - UNICODE, ASCII

- Metadata Standards and Protocols
  - Dublin Core, MARC21, Z39.50

- Metadata and Digital Objects related Protocols
  - OAI-PMH, OAI-ORE

- Standards related Web Feeds
  - RSS, Atom

- Multimedia Formats: Open Standards
  - JPEG, MPEG

7.3 Digitization and Preservation

Digital documents are of two kinds viz. Born digital, digitized documents. In case of born digital documents the only effort that is needed is to convert the document to an open standard (if required) and upload the documents into a digital library and prepare metadata using either Dublin Core or MARC21 standard. However, in case of printed documents retro-conversion of print material to digital format is required. Depending on the volume of material to be be digitized, the respective organizations have to acquire scanners and software for Optional Character Recognition (OCR). Though for English language documents, a good number of OCR software are available to convert the scanned images into text, for Indian languages C-DAC is making efforts to build OCR software.
Until the OCR software for Indian scripts that are mature, it is strongly recommended to have the scanned copies in 600 dpi TIFF format. The normal best ‘practices of digitization’ recommends the scanned pages to be 600 dpi TIFF format and for uploading such images to 300 dpi JPEG format. Normally the 600 dpi TIFF images require larger files than 300 dpi JPEG files and are not suitable to transferring over the Internet as larger files take more time and bandwidth for transferring the file to the end user

In brief, the following guidelines are recommended with regard to digitization

- Digitization should preferably be outsourced, as the equipment and software may get outdated soon.
- Should follow open standards with regard to encoding (UNICODE) and file format to be in open standards – JPEG for images/photographs, MPEG for movies, AIFF or FLAC for audio
- In case of text that cannot be OCRred, use TIFF with 600 dpi for archival purpose, JPEG with 300 dpi for hosting on web pages/digital repositories

7.4 Search Engine

A simple mechanism to search the web sites of India is to provide Google search mechanism on NVL site by limiting the search results to Indian sites. However, it should be noted that Google or any other web search engines indexes only the static web pages of web sites, and cannot search the databases, which requires a mechanism to index Deep Web also called Invisible Web. For instance, deep web encompasses databases, digital repositories,

Deep Web Resources include a) dynamic web pages that are displayed through search mechanism of a site, b) information that would be accessible after authentication by providing login and password c) the pages and web directories that are excluded from indexing by crawlers of search engines d) scripted content that is normally accessible using JavaScripts. Etc. NVL proposes to index some content on the deep web with an understanding with the host organizations in India.

One of the major challenges is to develop search algorithms for Indian languages, which includes plural resolution, vibhakti, sandhi resolution etc. Otherwise, it would only be exact search, which may not be quite useful for the end user.
In addition, NVL proposes to conduct research and development activities in relation to semantic web search in various domains and disciplines using Research Description Framework (RDF) triples.

7.5 Web Directories: Similar to that Google and Yahoo! directories, NVL proposes to provide manually identified links to various Indian web sites. However, such links are based on ontologies which are to be developed in all the constitutionally recognized Indian languages, which would be the purview of R & D unit of the NVL.

8. Research and Development

In order to provide various services, a few major research and development activities that are to be undertaken by NVL are:

- Handling Indian Languages and Scripts
- Software development or customization of available open source software
- Developing ontologies to facilitate web directories

9. NVL Services

9.1 News Aggregator

Purpose: To display headlines from All the Newspapers in one Place

Web Feeds (RSS/Atom Feeds): Web feeds allow software programs to check for updates published on a website. To provide a web feed, a site owner may use specialized software of recent articles or content in a standardized, machine-readable format. The feed can then be downloaded by programs that use it, like websites that syndicate content from the feed, or by feed reader programs that allow Internet users to subscribe to feeds and view their content. A feed contains entries, which may be headlines, full-text articles, excerpts, summaries, and/or links to content on a website, along with various metadata. (Ref: http://en.wikipedia.org/wiki/Atom_(standard)

The web feeds can be either RSS (Really Simple Syndication) or Atom. Some sites offer either in RSS form or Atom or both.

A feed contains a list of *items* or *entries*, each of which is identified by a link. Each item can have
any amount of other metadata associated with it as well. RSS stands for “Really Simple Syndication,” and simplicity is its focus.

Items have the standard link, title and description metadata, as well as other, more experimental facilities like enclosure, which allows attachments to be automatically downloaded (note: these features may not be supported by all aggregators, however). Finally, items can have a guide element that identifies the item uniquely; this allows some advanced functionality in some aggregators.

**Dublin Core Module**

The most well-known example of an RSS 1.0 Module is the Dublin Core Module. The *Dublin Core* is a set of metadata developed by librarians and information scientists that standardizes a set of common metadata that is useful for describing documents, among other things. The Dublin Core Module uses these metadata to attach information to both feeds (in the channel metadata) and to individual items.

This module includes useful elements like dc:date, for associating dates with items, dc:subject, which can be useful for categorizing items or feeds, and dc:rights, for dictating the intellectual property rights associated with an item or a feed.

** Atom**

Atom is functionally similar to both branches of RSS, and is also an XML-based format.

Using RSS or Atom feeds of Newspapers published in English and Indian languages, NVL can offer Aggregated News Service in the first phase. However, to collect the news related to India from foreign newspapers, a kind of middleware is to be developed by the NVL team and this could be implemented in the second phase of the project.

If the NVL site has http://www.nvl.in, each language New Aggregator can be named as follows

- News in Hindi: http://hindinews.nvl.in
- News in Telugu: http://telugunews.nvl.in
- News in Marathi: http://marathinews.nvl.in
- News in Bengali: http://bengalinews.nvl.in
- News in Tamil: http://tamilnews.nvl.in and so on
However, it should be noted that though many newspapers in India have online versions, they may not have either RSS or Atom feeds. In such cases NVL should provide free consultancy to encourage them to create RSS/Atom feed generator.

9.2 News Aggregator of Foreign Newspapers

Purpose: To collect News published about India in Foreign News Papers

Some of the important newspapers published abroad can be aggregated, especially the news on India, so that we can have an idea of what the other countries publish about India. However, such a service requires tweaking the existing software to filter information and collect only the selected content about India. As this service requires software development, such a service can be offered in the second phase of the project.

9.3 Aggregated E-Journal Content pages

Purpose: To display contents pages & abstracts of Journals in one place

The electronic journals in various disciplines provide RSS/Atom feeds. Using web feeds, NVL proposes to build feed aggregator for various disciplines. Such aggregated service can be accessed using the following URLs:

- http://physicsfeeds.nvl.in
- http://biochemistryfeeds.nvl.in
- http://economicsfeeds.nvl.in
- etc
An example of RSS/Atom aggregator by DRTC, meant for collecting Library Science related news, content pages of open access and subscription based journals, software releases etc. in given below
9.4 Digital Repository Harvester Service

There are more than 2000 digital repositories both institutional and thematic (discipline base). However, if one has to search for a particular topic one has to go to each of those repositories and make a search, which is cumbersome if not impractical. However, to overcome this problem OAI-PMH protocol has been developed.

Digital repository harvester collects metadata from digital repositories/ libraries and provides a single stop search engine to access the content of digital repositories which in turn make the user access the full text of publications, images, videos etc. Using the Open Access Initiative – Protocol for Metadata Harvesting (OAI-PMH) and Open Access Initiative – Object Reuse and Exchange (OAI-ORE), NVL can provide two kinds of Harvesting Services – a) covering all digital repositories of India b) Providing discipline based harvesting services in subject like Physics, Chemistry, Anthropology etc.

9.4.a Indian Digital Repository Harvester

Purpose: A search facility to search all the digital repositories of India

The list of digital repositories of India are given on OpenDOAR site. Many of these repositories normally allow metadata to be harvested (using OAI-PMH protocol) by other service providers, in our case NVL. Some repositories even allow digital objects/ documents to be harvester using OAI-ORE protocol.

National Centre of Science Information (NCSI) of Indian Institute of Science had grant from National Information System for Science and Technology (NISSAT), DSIR to build a harvester for all the Indian Repositories. The service harvests metadata from about 33 repositories of India. Though the service is still running, it should be noted that both NCSI and NISSAT are dissolved.
9.4.b. Discipline based Digital Repository Harvester

**Purpose:** Search facility for all discipline based digital repositories

Using the same OAI-PMH protocol, a harvester service can be built for various disciplines like agriculture, sociology, philosophy etc. Appendix gives a screen shots of the harvester service run by DRTC, Indian Statistical Institute ([http://drtc.isibang.ac.in/sdl](http://drtc.isibang.ac.in/sdl)). However, it should be noted that the OAI-PMH protocol allows selective harvesting based on collection-ID and date. As each repository provides collections under various subject headings, sometimes more granular and sometimes less granular, (for example, some repositories may not create collection for Physics, Chemistry separately rather they may be lumped together under Physical Sciences. In such cases existing open source software like PKP-Harvester or similar software has to be tweaked to categorize the metadata under various disciplines.

Appendix gives a screen shots of the harvester service run by DRTC, Indian Statistical Institute ([http://drtc.isibang.ac.in/sdl](http://drtc.isibang.ac.in/sdl)).
Documentation Research and Training Centre

Home > Browse Archives

Select an archive to browse...

- All Archives (5942 records)
- Australian Library and Information Science Association (ALIA) (18 records)
- CaltechLib: Caltech Library System Papers and Publications, USA (30 records)
- CCSDL: Sciences de l'Information et de la Communication, France (292 records)
- CNR Bologna Research Library, Italy (8 records)
- D-Lib Magazine (319 records)
- DLIST, University of Arizona, USA (423 records)
- E-LIS E-Prints in Library and Information Science (2409 records)
- LDL: Librarians' Digital Library, DRTC, India (182 records)
- OCLC (340 records)
- University of North Carolina, USA (178 records)
- WWW Conference Archive EPrint servers (594 records)

Home | Search | Archives | Submit Archive | Links | About

Documentation Research and Training Centre (DRTC)
9.5 Federated Search Engine for E-Journals, Online Databases

**Purpose:** To search across E-Journals and Online databases, Library OPACs, and Digital Repositories

Federated search is an information retrieval technology that allows the simultaneous search of multiple searchable resources. A user makes a single query request which is distributed to the search engines participating in the federation. The federated search then aggregates the results that are received from the search engines for presentation to the user.

(http://en.wikipedia.org/wiki/Federated_search)

In the context of e-journals, various aggregators like Springer, EBSCO, ProQuest etc. normally provide search engines to search the contents of e-journals they provide. In such case, the end-user has to go to each site and make a search. However, federated search engines like dbWiz (an open source software from Simon Fraser University, Canada) would facilitate a common search engine for all the aggregators. The dbWiz software can, additionally, include library OPACs, online databases. Another advantage of dbWiz is that one can even provide information about which are the libraries subscribing a to particular journal, so that the end-user can request the related library to supply hard copy or electronic copy of the journal articles.

Screenshots of dbWiz search engines and the search results are given below.
9.6 Institutional and Data Repositories

With the advent of Open Access to Information movement, many institutions have come forward to make their faculty/scientists' publications openly available through their institutional repositories. Fortunately, many open sources software (OSS) are available to setup such repositories. One of the best software for setting up digital repositories is DSpace, an effort of MIT and HP.

The Directory of Open Access Repositories (OpenDOAR http://www.opendoar.org) lists about 54 Indian digital repositories, which includes some of the IITs, IIMs, Universities and R & D Labs. The digital repository software, however, can be used in setting up thematic or discipline based repositories (e.g. LDL of DRTC) or they can be repositories of Electronic Theses and Dissertations (e.g. Shodhganga of INFLIBNET).

However, a large number of universities and various labs under various councils like ICAR, CSIR do not have repositories of their publications. NVL, in such case can encourage and provide expertise various organizations in setting up institutional repositories or even can repositories on their behalf.

Following are the screen shots of LDL and Shodhganga.
Librarian's Digital Library – LDL
https://drtc.isibang.ac.in

ShodhGanga
Repository of Indian Electronic Theses and Dissertations
(http://shodhganga.inflibnet.ac.in)
Open Data Repositories

One major development, in case of full-text repositories, is that of data repositories. Thus far institutional repositories mostly have been hosting the publications such as ETDs of institutions. However, the data repositories intend to provide the raw data on which these publications are based. This would be a great advantage to organizations that do not have expensive laboratory infrastructure. If the raw data is available anybody can analyse the data. This is typically the case with Human Genome data. The same idea can be extended to accelerator data, statistical data. NVL proposes to encourage large organizations with good infrastructural facilities to make the raw data available openly on the web. The standards and best practices of hosting such data can be provided by NVL to any interested organizations.

9.7 Open Platform for Home Pages, Conferences, e-Journals

Purpose: To host home pages of organizations not having their own web servers

Many organizations have Internet connectivity, by which they can access Internet. However, to host information about their own organization i.e having their own pages hosted on the Net, either they should have dedicated connection with Public IP, or have to hire disk space on third party servers. Either of the options may not affordable to many organizations. In addition, they require hire skilled persons to create home page and maintain it. In such cases, NVL should offer Open Platform to host home pages based on certain criteria of eligibility.

It is envisaged that NVL will have cloud servers and with the availability of Open Source Software (OSS) like Drupal and Joomla, the NVL team can provide such a facility. Documentation Research and Training Centre (DRTC), Indian Statistical Institute (ISI) has done an NGO Gateway for UN-AIDs program, to facilitate home pages for many Non-Governmental organizations to host their home pages.

Similarly, various organizations can request to host information about their forth-coming conferences. Software like Open Conference System (OCS) could be used in such case. NVL can offer free hosting of e-journals using Open Journal System (OJS) software.
9.8 OpenCat: Shared Catalogue based on Z39.50

**Purpose: To share cataloguing data across Indian Libraries**

Cataloguing of books and other documents is a time-consuming and costlier effort by any libraries. Catalogue records of Indian Language books are even costlier. Evidently, many libraries duplicate the work process for a given document. One way of avoiding duplication is to have shared cataloguing, so that if a library prepares catalogue records for a book, the other libraries can simply download the catalogue record rather than creating the same afresh. Unfortunately, this is one of the least attempted areas of the Indian libraries. Many American and European Universities run Z39.50 servers to share their library catalogues. OCLC offers a subscription-based service called WorldCat, for which one has to pay annually. The INFLIBNET has made a similar effort with regard to Universities. However, the public libraries which contain a substantial number of books in Indian Languages have no shared cataloguing mechanism.

National Virtual Library proposes an Open Shared Cataloguing System, where not only the public libraries but also libraries belonging to various disciplines can download the cataloguing records of their holdings. Parallelly, such a system can serve as a Union Catalogue of Indian Libraries. Using Open source software like Zebra server, NVL can host such a facility on the lines of Library of Congress (http://www.loc.gov/z3950/)

OpenCat aims to provide a Union Catalogue of holdings by various Indian Libraries. In addition, OpenCat will allow libraries to upload or download MARC21 catalogue records, thereby setting shared cataloguing for the first time in India. OpenCat will follow standards for interoperability like MARC21 and Z39.50 protocol.


These directories are different from web directories mentioned along with search engines. The directories mean the common use of directories like directory of libraries, directory of schools, colleges and universities. Similarly, the NVL should attempt to build directories of Experts in different areas/disciplines, directories of small, medium and large scale industries and various directories that are useful to the public.
9.10 Virtual Library for Children

As per the Fifth All India Education Survey (1992) there are 7,35,771 schools in all, out of which only 2,93,427 (i.e. 39.88%) have libraries. Level wise analysis indicates that 26.18% primary schools, 66.97% upper primary schools, 90.12% secondary schools and 94.08% higher secondary schools have libraries. In the same survey, it was reported that only 0.15% of rural schools and 8.28% of urban schools have full-time librarians at the secondary school level. At the Higher Secondary school level only 29.58% rural schools and 46.10% urban schools have full-time librarians.

In 2008 a collaborative venture has been initiated by The Centre for Science Education and Communication (CSEC) Delhi University & Vidya Bhawan Society (VBS) Udaipur. They started a School Library Project. The aim of this project is networking of school libraries, public libraries, community libraries and involving people in setting up of children libraries, that will trigger library movement in India.

The Virtual Children’s Resource Centre (VCRC) is an important component of the School Library Project. The idea is that the VCRC will have resources for children, which would include digitised versions of children’s literature from open sources having no copyright issues involved. It will also have a multimedia component and scope for content development. The whole work would be collaborative in nature.

Association of Writers and Illustrators for Children (AWIC) provides a forum within India for those interested in the development of children's literature, it encourages writers, illustrators, translators, librarians, editors and publishers, and co-operates with individuals and associations abroad with similar objectives

The NVL should coordinate with efforts of VCRC, AWIC and others like Khan Academy, which comprises of over 3000 videos covering everything from arithmetic to physics, finance, and history.

In case of virtual library for children, NVL should not limit itself to Indian sites alone. Interesting items to children like cartoons, puzzles, quizzes should also be linked.
9.11 Virtual Library for Differently-abled

Though hearing impaired can read the content of NVL, a major challenge is to provide information to the visually challenged persons. NVL should convert all the open content to talking books.

10. Staff Structure

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<td>37,400-67,000</td>
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11. Budget

Capital Expenditure: 2.92 crores

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Recurring Expenditure: 81.60 crores

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<td>Consultancy</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Digitisation</td>
<td>10.00</td>
<td>10.00</td>
<td>10.00</td>
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<tr>
<td>Office expenditure</td>
<td>.10</td>
<td>.20</td>
<td>.20</td>
</tr>
<tr>
<td>Computer Maintenance &amp; Upgrade</td>
<td>.30</td>
<td>.30</td>
<td>.30</td>
</tr>
<tr>
<td>Library</td>
<td>.10</td>
<td>.10</td>
<td>.10</td>
</tr>
<tr>
<td>Miscellaneous &amp; Travel</td>
<td>.30</td>
<td>.20</td>
<td>.20</td>
</tr>
<tr>
<td>Total</td>
<td>26.00</td>
<td>27.30</td>
<td>28.30</td>
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</table>

Yearly Breakup of Total Budget

<table>
<thead>
<tr>
<th></th>
<th>1st year</th>
<th>2nd Year</th>
<th>3rd year</th>
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<tbody>
<tr>
<td>Capital</td>
<td>1.54</td>
<td>.69</td>
<td>.69</td>
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<tr>
<td>Recurring</td>
<td>26.00</td>
<td>27.30</td>
<td>28.30</td>
</tr>
<tr>
<td>Total</td>
<td>27.54</td>
<td>27.99</td>
<td>28.99</td>
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</table>

Grand Total: 84.52 crores
### 12. National Virtual Library: Contents and Components

<table>
<thead>
<tr>
<th>CONTENT</th>
<th>Newspaper Section (RSS feeds)</th>
<th>Government of India Publications</th>
<th>Cultural and Historic Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Interest</td>
<td>National International Indian Languages</td>
<td>Gazettes, Census data, NBT, Election data, demographic analysis and diaspora Competitive exams</td>
<td>ASI History and archives</td>
</tr>
<tr>
<td>Bibliographic resources</td>
<td><a href="#">Children Section</a></td>
<td><a href="#">Repository of Publications</a></td>
<td>Disaster Management Data on natural calamities relief and safety measures related information resources</td>
</tr>
<tr>
<td>Bibliographic Database (Z39.50 server)/Union Catalogue</td>
<td>Story Books Classics Puzzles &amp; Mind Games Resources from useful sites such as Khan Academy</td>
<td>National and International repositories E-Journals Popular Magazines Technical Journals – OA journals</td>
<td>Multilingual Resources Resources in different languages, reference works, literary works and others</td>
</tr>
<tr>
<td>Digitization and Digital Library</td>
<td><a href="#">Sports</a></td>
<td>Section for (in technology driven help environment)</td>
<td>List of Publishers Guidelines to Authors of various kinds</td>
</tr>
<tr>
<td>Tools and Training</td>
<td><a href="#">Multimedia Resources</a></td>
<td>Exceptional Personalities and Awards of excellence Nobel Laureates Literary figures and awards of India</td>
<td>Poets Novels Technical Books</td>
</tr>
<tr>
<td>Standards</td>
<td><a href="#">Eg:</a> Indian National Bibliography</td>
<td><a href="#">Public Libraries</a> Agricultural Libraries Medical Libraries Law Libraries Engineering Libraries Universities Colleges Research Labs</td>
<td>In-house work</td>
</tr>
<tr>
<td>Technology</td>
<td><a href="#">Repository of Publications</a></td>
<td><a href="#">Exceptional Personalities and Awards of excellence</a></td>
<td><a href="#">List of Publishers</a> Guidelines to Authors of various kinds</td>
</tr>
<tr>
<td></td>
<td></td>
<td><a href="#">Technology</a></td>
<td><a href="#">Poets</a> Novels Technical Books</td>
</tr>
</tbody>
</table>

**Newspaper Section (RSS feeds)**
- Employment News
- Competitive Exams
- Train, Air and Bus services
- Telephone Directories of Major Cities
- Radio
- TV (Ubuntu Studio)
- Messaging System

**Bibliographic resources**
- Eg: Indian National Bibliography

**Bibliographic Database (Z39.50 server)/Union Catalogue**
- Public Libraries
- Agricultural Libraries
- Medical Libraries
- Law Libraries
- Engineering Libraries
- Universities
- Colleges
- Research Labs

**Digitization and Digital Library**
- Data Repositories
- Theses and Dissertations
- National Mission for Manuscripts
- E-books (Digital Repository of Books)
<table>
<thead>
<tr>
<th>Test Beds</th>
<th>Open Source Software Implementation</th>
<th>Thesauri &amp; Ontologies Software Development &amp; Customization</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Training</td>
<td></td>
</tr>
<tr>
<td></td>
<td>UNICODE</td>
<td></td>
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<tr>
<td></td>
<td>MARC21</td>
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<tr>
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<td>Dublin Core</td>
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<tr>
<td></td>
<td>OAI-PMH</td>
<td></td>
</tr>
<tr>
<td></td>
<td>OAI-ORE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Z38.50</td>
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</tr>
<tr>
<td></td>
<td><strong>SERVICES</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Coordination and Liaison Activities</strong></td>
<td>National Library INFLIBNET IFLA Library Associations and other international agencies such as UN</td>
</tr>
<tr>
<td></td>
<td><strong>Retrieval: Search and Browse</strong></td>
<td>Recommender systems Annotations</td>
</tr>
<tr>
<td></td>
<td><strong>Advertisements and promos</strong></td>
<td>Promote activities of INVL and attract all sectors of users</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>This can also be used for income generation if required.</em></td>
</tr>
</tbody>
</table>

*for General Public Industry and Business Education and Research Employment related*
Appendix - A

Information available from Research and Development sector and Government Sector

The virtual library of India should cover all information and information services offered by different sectors government as well as sectors closely related to government. Government of India is supporting research and development by establishing several institutions and also providing different grants. Research and development is aimed to develop the country in various sectors. It is important to include different information about as well as various information services provided by all organizations involved in R&D.

The organizations involved in R&D can be categorised according to their area of specialization

1. Science and Technology
   - CSIR, ISRO, ICMR etc.
2. Social Sciences and Developmental Studies
   - ICSSR etc.
3. Language and Culture
   - IGNCA, Central Institute of Indian Languages etc.
4. General Authorities of Education
   - UGC, AICTE etc.

Science and technology cover both pure science research, more specialized field and also its applications. Social Science and development studies include, research in the areas such as Politics, Economics, Sociology etc. Language and cultural sector aimed to promote and support different Languages, Art form etc. The general bodies of higher education act as an apex body to support different infrastructure facilities of various educational and R&D institutions.

I. The information and information services from R&D Sector

As the virtual library is to serve users of varied backgrounds and interests, we have to incorporate different kinds of information which can satisfy disparate information needs of users. The information which can be included can be broadly categorize in to two: Information for general public and Information for Academic Community

1. Information for General Public

General public will be more interested in more general information such information about tenders,
career and opportunities. Few of the R&D institutions run specific information services aimed to support public. Apart from these, people are also interested in Press releases and notification for varied purposes.

- **Directory of Experts**: This is a directory of experts available in specific area, whom the public can contact for various services. For example ICAR has introduced Krishi Vigyan Kendra in all over India to support framers in various agricultural issues, farmers can contact concerned experts using the directory provided by the given centres.

- **Information Service for Public**: Some of the organizations provide some sort of information services for public (It can be accessed either free of cost or with charges). Public means individuals, private industries, organizations etc. For example, Centre for Cellular and Molecular Biology (A CSIR lab), has services such as Genetic Counselling, DNA Fingerprinting etc.

- **Career and Development**: Information about career opportunities in the organization. Information regarding openings etc.

- **Tenders**: Tender advertisements are often seen in all news papers. There are people who need to get information about tenders.

- **Press Releases**: Press releases can be of various nature, it can be about academic related information like exams, results etc., it can also be about openings, training programs etc.

- **Notifications**: Notifications are about current and important events, openings, information about dates related to applications, results announcement etc.

2. **Information for Academic Community**:

- **Professional directory**: The directory of professionals working in various area of specialization, it can be faculties, scientists etc. These kinds of directory will be helpful for those who are interested in research; they can get information who is working in which area.

- **Courses**: It will be helpful for students to know about various academic programs available in different institutes. Information about admission procedure, specialization etc. will be useful for them to take decisions regarding higher education.

- **Research areas**: Most of the R&D institutes have specialized areas of research. If the information about specific area of research is available, it would be helpful for those who want to pursue research.

- **Scholarships and Grants**: There are several scholarships and other grants are available for
various levels of education. There is no single platform, where students can get information about various financial aids available to them. It is important to include these information in order to reach it to a bigger population.

- **Projects:** Several R&D intuitions will have short-term as well as long term projects. Projects are good starting points for students for research or a career related to that. Now students have to visit websites of different institutions to know about the project opportunities.

- **Publications:** The publications include monographs on different projects, journals and publications of different institute members.

- **Patents:** Getting information about patents of various field is a bit difficult, (even though we have a patent information system). Various institutions already have data of patents that they hold, if we can link up these data this can serve the purpose of various communities such as academic or independent researchers, industries, etc.

- **Lectures and Presentations:** Few of the institutes publish their class lectures and special presentations on their websites. Some of them have special faculties only for these services, for example: YouTube channels, Webinars etc. India has a well established system for open education, according to the Madhava Menon Committee report, 36 lakh learners are enrolled for Open and Distance Learning(ODL) in India. The educational resources, discussed above available from India’s prominent institutes can also be useful for the students of ODL.

- **Events:** The events organized by institutions can include workshops, training programs, conferences etc. These can be academic, special or for people working for society, or for general public, (for example workshops conducted for NGO, teacher training programs, information awareness camps etc.)

- **Information about qualifying examinations:** The authorities of education will have different qualifying examinations, for example UGC Net. Information about these examinations, including application procedures and result publishing will be useful for the academic community.

- **List of affiliated institutes:** List of affiliated institutes will be helpful for the students to know about the qualified institutes, which they can opt for.

- **Library and related services:** Libraries of R&D institutions are rich with information sources related to their area of specialization. It would be great if their OPAC and other resources are available to scholars all over India.

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http://learnos.files.wordpress.com/2012/04/madhava_menon_committee_on_odl.pdf
A List of Prominent R&D Organizations

1. Science and Technology

- **Council of Scientific and Industrial Research – CSIR**
  The Council of Scientific & Industrial Research (CSIR) --the premier industrial R&D organization in India was constituted in 1942 by a resolution of the then Central Legislative Assembly. CSIR aims to provide industrial competitiveness, social welfare, strong S&T base for strategic sectors and advancement of fundamental knowledge. CSIR is one of the largest publicly funded R&D organisations having linkages to academia, R&D organisations and industry. CSIR has 37 labs all over India specialized in varied field of sciences.

- **Indian Council of Agricultural Research**
  The Indian Council of Agricultural Research (ICAR) is an autonomous organisation under the Department of Agricultural Research and Education (DARE), Ministry of Agriculture, Government of India. The Council is the apex body for co-ordinating, guiding and managing research and education in agriculture including horticulture, fisheries and animal sciences in the entire country. With 99 ICAR institutes and 53 agricultural universities spread across the country this is one of the largest national agricultural systems in the world.

- **Indian Space Research Organisation**
  ISRO is a research organization active in the area of space technology and its applications. ISRO has around 20 sister organizations which works on various aspect of space science and technology

- **Indira Gandhi Centre for Atomic Research**
  Indira Gandhi Centre for Atomic Research (IGCAR) is a premier atomic research centre of India. The centre is engaged in broad based multidisciplinary programme of scientific research and advanced engineering directed towards the development of Fast Breeder Reactor technology

- **Bhabha Atomic Research Centre**
  A premier multi-disciplinary Nuclear Research Centre of India having excellent infrastructure for advanced Research and Development with expertise covering the entire spectrum of Nuclear Science and Engineering and related areas.
• **Indian Council for Medical Research**

ICMR is the apex body in India for formulation, coordination and promotion of biomedical research. The Council's research priorities coincide with the National health priorities such as control and management of communicable diseases, fertility control, maternal and child health, control of nutritional disorders, developing alternative strategies for health care delivery, containment within safety limits of environmental and occupational health problems; research on major non-communicable diseases like cancer, cardiovascular diseases, blindness, diabetes and other metabolic and haematological disorders; mental health research and drug research (including traditional remedies). Research activities are carried out currently through the Council's 32 Research Institutes, Regional Medical Centres and Units/centres dealing with specific area such as viral diseases.

• **Defence Research and Development Organisation**

DRDO works under Department of Defence Research and Development of Ministry of Defence. It is working in various areas of military technology which include aeronautics, armaments, combat vehicles, electronics, instrumentation engineering systems, missiles, materials, naval systems, advanced computing, simulation and life sciences. Non-sensitive, (non-classified) information useful for students and public can be exposed.

Apart from these, there are several institutions dedicated to different branches of Science and Technology that come under different state governments, such as Rajiv Gandhi Institute of Bio-Technology ([http://www.rgcb.res.in/](http://www.rgcb.res.in/)), All India Institute of Public Health and Hygiene ([http://www.aiihph.gov.in/](http://www.aiihph.gov.in/)), TIFR ([www.tifr.res.in](http://www.tifr.res.in)) IISC ([www.iiscernet.in](http://www.iiscernet.in)), IISERs to name a few

2. **Social Sciences and Development Studies**

• **Indian Council of Social Science Research (ICSSR)**

It was established in the year of 1969 by the Government of India to promote research in social sciences in the country. It supports a network of 27 ICSSR research institutes, all over India. The research areas of CSSIR are: Economics and related areas, Sociology and Social Anthropology etc. Political Science, International Relations etc. Psychology, education Linguistics, Law etc.
3. Language and Culture

- **Indira Gandhi National Centre for the Arts (IGNCA)**
  It is an autonomous institution under the Ministry of Culture. Arts encompass a wide range of subjects - from archaeology and anthropology to the visual and performing arts, enveloping them in a complementary and non-demarcated vision. The IGNCA has six functional units – Kala Nidhi, the multi-form library; Kala Kosa, devoted mainly to the study and publication of fundamental texts in Indian languages; Janapada Sampada, engaged in lifestyle studies; Kaladarsana, the executive unit which transforms researches and studies emanating from the IGNCA into visible forms through exhibitions; Cultural Informatics Lab, which applies technology tools for cultural preservation and propagation; and Sutradhara, the administrative section that acts as a spine supporting and coordinating all the activities.

- **Central Institute of Indian Languages**
  It is government of India funded institute to promote the research in the field of Indian languages.

4. General Authorities of Higher Education

- **University Grants Commission (UGC)**
  It as a statutory body of the Government of India for the coordination and maintenance of standards of university education in India. UGC has decentralised its operations by setting up six regional centres at Pune, Hyderabad, Kolkata, Bhopal, Guwahati and Bangalore.

- **The All India Council for Technical Education**
  This is another statutory body for proper planning and co-ordinating development of the technical education system throughout the country, the promotion of qualitative improvements of such education in relation to planned quantitative growth and the regulation and proper maintenance of norms and standards in the technical education system.

II. Ministries, Departments, Councils

**Parliament, Ministries, Departments and Councils**

The parliament of India includes Council of States (Rajyasabha) and Council of People (Loksabha).
Apart from events, press releases, publications, career and development options, tenders, parliament websites give specific information about routine parliament functions such as sessions (Questions, discussions etc.), these are available as live sessions (http://rajyasabha.nic.in/rsnew/webcast/rstvlive.html or http://www.youtube.com/rajyasabhatv) as well as archived ones. Parliament websites give information about different committees, contact information about members and also different helpline numbers.

We have a National Portal of India – This in a single platform for Information about government and government services, e-governance etc. http://india.gov.in/. It contains information about different ministries, departments, councils etc. The Government of India Web directory (http://goidirectory.nic.in/index.php) is a single point to access all Indian government webistes of different levels.

Departments and councils will have specific information about different help lines, policies and information services to the public. For example ENVIS (http://www.envis.nic.in/) – ENVironmental Information System, it is a distributed database for environmental information related to different fields, it is a service by Ministry of Environment and Forests in collaboration with other government departments and various research organizations. Another example, is Kissan Kerala (http://www.kissankerala.net/home.jsp), it is a project of department of Agriculture, Government of Kerala and few research organizations in the field of Agriculture. Ministry of Road Transport and Highways have e-vehicle and License service portal called Vahan. We also have specific information on government publications such as Budgets, Commission reports, Census reports etc.

- **State level Government**

The state level government included more granular information about the states, such as districts and panchayat levels. Information which we can include from these websites are state specific information, contact, help lines, policies, contacts, and information services to the public. They also contain information such as tender, career, publications, press releases etc.