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DRDO E-Journal Consortium in Defence Science and Technology

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ABSTRACT

Defence Research and Development Organisation (DRDO) E-Journal Consortium is one of the important consortiums among other consortia existing in India. It covers multi-disciplinary subject areas to fulfill the information needs of DRDO scientific community. This paper tries to evaluate the implementation of DRDO e-journals, coverage of publishers and titles, subject-wise distribution of titles among DRDO laboratories, need of e-journal consortium among the labs, and expenditure details along with yearly growth. This is one of the unique consortiums implemented that is based on subscription model.The study also highlights the usage of e- journals publisher-wise in the consortium and would be helpful in efficient collection development policy of e-journals.

Keywords: DRDO; DESIDOC; Resource sharing; E-journal consortium; E-journals; Usage, India

1. INTRODUCTION

The growth of e-publishing world around has completely metamorphosed the scholarly journal publication including its subscription, access and the way they are delivered to users. The important features offered by electronic journals (e-journals) to library users can be summed up as instant and easy access, link to other resources; multimedia capabilities, remote access; search ability, independent of space and time. This variety of information available in various resources has made the information handling process more complex and cumbersome. It is quite difficult for an individual library having limited budgets to procure and subscribe each and every information resources demanded by its potential users as per their diversified information needs. Research and development organisations in India are spending a lion's share in the subscription of e-journals yearly[1]. Despite this, they are not in a state to sustain the subscription of key journals related to their areas of interest. So the libraries felt the need to share their resources with other libraries to overcome budgetary constraints[2].

The popular e-journal Consortia established in India are The National Knowledge Resource Consortium (NKRC), Indian National Digital Library in Engineering Sciences and Technology (INDEST), UGC-Infonet Digital Library Consortium (now E-ShodhSindhu), National Medical Library's Electronic Resources in Medicine Consortium (ERMED), DBT e-Library Consortium (DeLCON) and DRDO E-Journal Consortium[3]. They have mainly focused on e-resources sharing through e-journal consortium among the institutions/ organisations.

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2. LITERATURE REVIEW

Much of the literature in this area is devoted to the use and impact of e-resources specifically in academic libraries, as well as the selection, acquisition, issues, and access of e-resources in general. Some notable work by Bhardwaj[4] highlighted the benefits of e-resources use such as saving time, quick access, and access to e-archives. Chirra and Madhusudhan[5] explored that e-journals have become vital part of information for research work. Another study by Madhusudhan[6] shows that e-journals perform an increasingly important role in research. In addition to current e-journals, research scholars and students need to be provided with electronic back issues as well. Madhusudhan[7] also unveiled that electronic resources have become an integral part of the information needs of research scholars.

Jotwani[8] analysed that IIT libraries spent a significantly large proportion of their budgets to acquire e-resources. There is a clear shift in the collection development policies of these libraries where e-resources have become a vital part of their core collections. Natalee[9] found that the provision of e-library resources has increased overall usage of library materials as patrons continue to use print resources in tandem with electronic versions. The study also found that the electronic library resources play an important role in enhancing access to library resources necessary for quality research papers and academic excellence on a whole.

Nisha & Ali[10] examined the use of e-journals by the users of IIT Delhi and Delhi University and established that users were consulting e-journals for retrieving information regarding research, publishing research papers and largely to update their own knowledge. Varaprasad & Madhusudhan[11] discussed the advantage of consortium that saves the time of the user since instant access will be available after every updating unlike

the shipping time, missing issues, and mutilations. etc., which prevail in respect of print media.

Mukherjee & Kumar[12] discussed about the use of e-journals subscribed under UGC Infonet Digital Library Consortia and identified that there is a demand for more e-journal titles although a substantial number of users (61.90 percent) are satisfied with the existing model of UGC-Infonet Consortium.

Haridas & Khan[13] discovered that NASSDOC library users are aware of e-resources and large number of research scholars and faculty members use them for their research work. Observations of Krishnamurthy & Kumbar[14] revealed that e-resources are becoming more popular and considered as a better substitute of print journals. Swain[15] divulges that libraries should take active participation in various e-journal consortia for maximising procurement of e-journals at minimal cost on sharing basis by which institutes can afford to balanced e-subscriptions without much financial burden. Kaur & Verma[16] found that usage of e-journals is increasing due to awareness of the library e-resources and services among the users. Owing to an easy access available at various places in the institute, users are accessing these resources at hostels and departments more as compared to the library. The users coming to library have decreased.

3. DRDO E-JOURNAL CONSORTIUM

Defence Research & Development Organisation (DRDO) works under Department of Defence Research and Development of Ministry of Defence. It works towards enhancing self-reliance in Defence Systems and undertakes design & development leading to production of world-class weapon systems and equipment in accordance with the expressed needs and the qualitative requirements laid down by the Indian Armed Forces. DRDO 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. DRDO while striving to meet the cutting edge weapons technology requirements provides ample spinoff benefits to the society at large thereby contributing to the nation building[1].

The present study provides an analytical overview of DRDO e-journals consortium and provides subject-wise and lab-wise availability of e-journals. In addition, it also analyses the budgetary details and use of different e-journals available in DRDO e-journals consortium.

4. OBJECTIVES

(i) To know the number of publishers covered for each DRDO.
(ii) Ascertain the number of e-journals covered for each DRDO.
(iii) Study subject-wise distribution of titles in the DRDO.
(iv) Find out year wise expenditure incurred for each publisher since its inception.
(v) Examine addition and deletion of publishers and titles in the consortium since 2009, and;
(vi) To analyse the usage of journals on each publisher in the consortium.

5. METHODOLOGY

The Case study method was used to get an in-depth idea about DRDO E-Journals Consortium. The present study is confined to DRDO e-journals consortium during the period of 2009 to 2016.

6. DATA ANALYSIS AND DISCUSSION

Electronic journals represent a significant and growing part of the special library's offerings. E-journals are changing rapidly and leading to new generation of libraries. On one side, there is an increasing demand for good quality library collections in terms of large amount of information and on the other hand, the publishing media is striving hard to support the demand at lightning speed by way of e-journals as well as online access.

6.1 E-Journals covered under DRDO e-journals Consortium

Selection of e-journals is very important step in e-journals consortium process. If the right e-journal is selected, the usage of such e-journal will certainly be high. Looking at the developments at the national and international level and the success of INDEST-AICTE and CSIR-DST consortia in meeting the multifarious information requirements[2], the DRDO e-Journal consortium was implemented by DESIDOC on 01 January 2009 covering 446 titles from 7 publishers. Over the period of eight years, few publishers have also been added to the consortium. The following publishers are covered under the DRDO E-Journal consortium for the benefit of DRDO scientific community. Association of Computing Machinery (ACM), American Chemical Society (ACS), American Institute of Aeronautics and Astronautics (AIAA), American Society of Mechanical Engineers (ASME), Elsevier, Institute of Electrical and Electronics Engineers (IEEE), Jane's, Nature, Science, and Taylor and Francis (T&F). Summary of Table 1 is depicted in Fig. 1.

Table 1. E-Journals covered in DRDO e-journals consortium

Publisher	2009	2010	2011	2012	2013	2014	2015	2016
ACM	47	47	47	49	52	51	59	51
ACS	34	34	37	40	+	+	+	+
AIAA	7	7	7	7	7	7	7	+
ASME	*	*	*	10	10	10	+	+
Elsevier	195	204	205	205	205	197	194	+
IEEE	157	163	170	181	196	192	212	219
Jane's	5	5	5	5	5	5	5	5
Nature	*	1	1	1	1	15	18	14
Science	1	1	1	1	1	1	+	+
Taylor & Francis	*	*	*	52	51	51	29	+
Total	446	462	473	551	528	529	524	289

Notes: + Discontinued, * Not Started

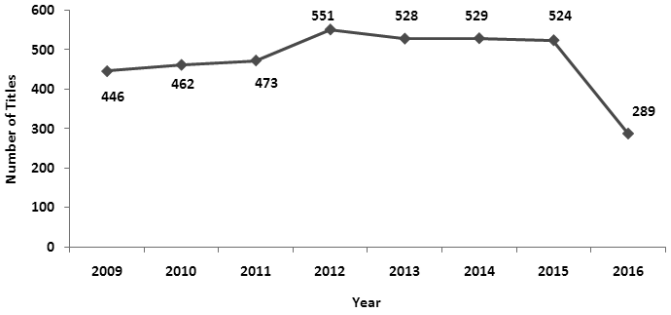

Figure 1. E-Journals covered in DRDO e-journals consortium.

It has been observed from Table 1and Fig. 1, among all publishers IEEE occupies top position covering 219 titles followed by Elsevier contributing 194 titles. In terms of number of titles subscribed during the study it was found that 551 titles were subscribed in 2012 followed by 529 titles in 2014. It is also evident from the table that only in the year 2012, all the publishers provided e-journal access without discontinuation to their services. It is also observed from the table that the services of publishers ACS, AIAA, ASME, Elsevier, Science and T&F have been discontinued due to various reasons resulted in less number of titles in the consortia by 2016. Summing up the data, it was observed that Elsevier & IEEE have covered the maximum number of titles although Elsevier was discontinued in the year 2016.

6.2 Labs Covered under DRDO E-Journal Consortium

Each lab in DRDO has its requirements of e-journals which highlights lab's focus on R&D. As a result, every lab has access to specific number of e-journals through DRDO e-journal consortium. Table 2 provides data about the respective publishers and their access to titles in each lab.

Table 2 communicates that currently publishers namely ACM, IEEE, Jane's, and Nature have continued their service for the past eight years without discontinuation. However, the publisher ASME sustained for three years followed by ACS and T&F which equally share four years. Data also revealed that ASME and T&F were late entrant in the consortia which facilitated least number of titles and less number of labs covered lead to discontinuation of their services in the consortium by DRDO.

Table 2. Labs covered in the consortium

Publisher	2009	2010	2011	2012	2013	2014	2015	2016
ACM	5	5	5	5	6	5	8	5
ACS	50	50	50	50	+	+	+	+
AIAA	10	10	10	10	8	10	12	+
ASME	*	*	*	11	11	10	+	+
Elsevier	42+6	42+6	42+6	42+6	42+6	42+6	42+6	+
IEEE	50	50	50	50	50	50	50	50
Jane's	30	22	22	6	10	10	10	5
Nature	*	17	17	17	18	27	17	9
Science	13	11	11	11	11	11	+	+
Taylor & Francis	*	*	*	24	23	23	23	+

Notes: + Discontinued, * Not Started

The publisher ACM has the minimal covering labs (five) where as IEEE covers all DRDO labs even though IEEE consisting of the subjects' electronics and computer science. The data highlights that IEEE was subscribed only for those labs which are mainly working in the field electronics but the publisher extended its service to all DRDO labs so that other DRDO scientists may make use of this facility while working in other labs. ACS had also extended its e-journals access to all DRDO labs, however it has been discontinued after 2012. Elsevier provides e-journals access to 42 labs on subscription basis and extended all subscribed e-journals to 06 labs. The publisher Nature covered 27 labs in 2014 which has been reduced to 9 labs in 2016, this was due to less usage of the e-journals. The same situation has applied to Jane's which earlier covered 30 labs in 2009 and ended with 5 labs in 2016. As evident from the data in Table 2 that the number of labs covered in DRDO e-journals consortia is reducing for most of the publishers.

6.3 Year-wise Expenditure

Figure 2 presents the year-wise total expenditure incurred for subscription of DRDO e-journals Consortium.

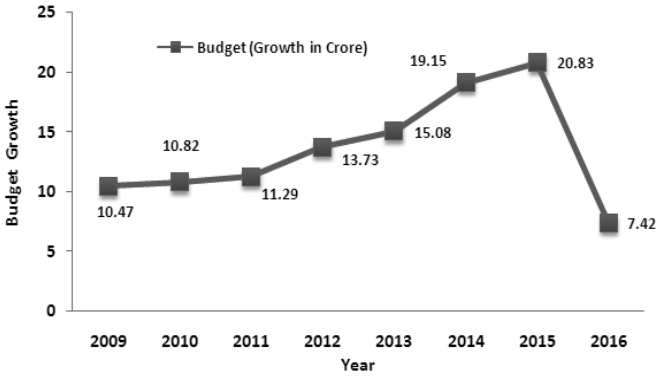

Figure 2. Year-wise expenditure detail (amount in Crore).

The Fig. 2 reflects that a total of Rs. 20.83 crore has been spent on subscription of journals in 2015, which was maximum during all eight years followed by 2014 where Rs 19.15 crore were spent on the subscription of journals. It was also found that there is a price escalation every year minimum by 5 per cent. 2016 has reported an expenditure of Rs 7.42 crore only which was due to discontinuation of Elsevier publisher, a major shareholder in the consortia along with T&F.

6.4 Subject-wise Distribution of E-journal Titles

The mission of the DRDO e-journals consortium is to provide scientists with information and access to information in support of scholarly activity and research. Subject-wise distribution of e-journals among DRDO labs is presented in Fig. 3.

Figure 3 reveals that the subject Electronics has been subscribed extensively with 220 titles followed by computer science contained 167 titles. Engineering possess 75 titles and

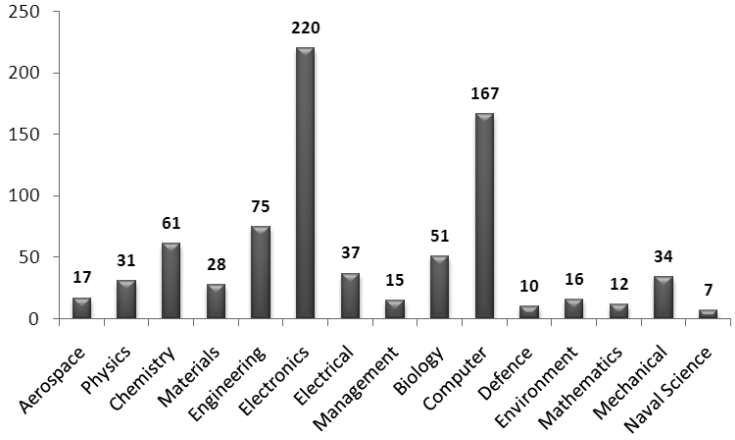

Figure 3. Subject-wise distribution of e-journal titles.

chemistry having 61 titles shared the third and fourth place accordingly. It is evident to mention here that DRDO has been involved in many S&T activities covering aerospace, physics, materials, electrical, biology, environment, mechanical and naval science which are directly related to defence R&D. The reason for holding more titles in electronics and computer science is due to subscription of full package of IEEE and ACM journals which are nearly half the strength of the total number of e-journals subscribed in DRDO e-journals consortium.

6.5 Usage Statistics

Year-wise usage statistics of e-journals used by labs from each publisher can be discerned from the data given in Table 3. It is evident that the publisher Elsevier has been used heavily by the DRDO scientific community and occupied top position with 30 lakh downloads followed by IEEE with 11.80 lakhs downloads. T&F was placed at the last position with 46,000+ downloads; because of its sustenance only for four years. The publishers ACS and IEEE have maintained the consistency in terms of usage throughout these eight years. However, high and low usage has been noticed from the remaining publishers over these years. Remarkable usage has been reported from the publishers ACM, ASME, Elsevier, Nature and Science during 2014.

7. FINDINGS

- Maximum number of e-journal titles were subscribed during 2012 where as minimum number of titles were reported from 2016.
- IEEE contains maximum number of titles, which are available to all 50 DRDO labs where as ACM is being provided to only 5 labs.
- In subject-wise distribution of titles, Electronics has the highest number of e-journals subscribed being at the top position where as Naval Sciences contain only 7 titles and comes in last position.
- During 2012, all publishers have been existed in the DRDO e-journal consortium without discontinuation of their services.
- During 2015, DRDO e-journal consortium spent 20.83 crores which was maximum in terms of expenditure. It is evident that double of the amount has increased within seven years of period since its inspection i.e. from 2009. But on the other side, when we compare the increase in the number of e-journals, it has been observed that 78 titles have been added to the consortium, this was also one of the reasons for price escalation.
- The exorbitant prices of major stock holding publishers namely ACM, AIAA, Elsevier, and IEEE have increased nearly double of the price during last eight years but their titles are also almost the same in number except IEEE.
- The exchange of foreign currency (conversion rate) into Indian currency was also the other factor for hike in the prices.
- The publishers Elsevier and IEEE are highly used in the consortium whereas ASME and T&F are less used publishers. The usage of e-journals is not upto the mark as expected. Some labs are using them to the maximum but others are not.

8. CONCLUSIONS

The DRDO e-journals consortium is one of the important resources for the scientific community to carry out the research activities. It has very significant publishers that publish scientific journals and magazines directly relevant to the R&D

Table 3. Year-wise usage of journals with each publisher

Year	Publisher									
	ACM	ACS	AIAA	ASME	Elsevier	IEEE	Janes	Nature	Science	T&F
2009	2339	24103	5087	*	598902	123234	21451	*	1353	*
2010	4227	27422	11890	*	216064	162066	6127	1675	1050	*
2011	1731	26727	36281	*	208620	151709	5378	1906	1388	*
2012	1559	26950	14505	2549	201338	171588	6439	2537	2053	5200
2013	1492	+	4678	41283	197248	172740	11097	4518	922	24092
2014	107403	+	9230	18160	1258551	169345	11856	296246	70338	11743
2015	2159	+	9110	+	381921	136767	4152	10103		5063
2016	9426	+	+	+	+	92976	6855	7545	+	+
Total	130336	105202	90781	65640	3062644	1180425	73355	324530	77104	46098

Notes: + Discontinued, * Not Started

community of DRDO. DRDO spends nearly 20 crore per annum for the subscription of these e-journals. The discontinuation of publishers in the consortium due to various reasons is not encouraging since the scientific community always thrust for the information. The journal articles mainly bring out the latest developments in a particular field, discontinuation of the e-journals may directly affect the research output of the organisation. Scientists and staff should be motivated and trained to use e-journals for their research, development and academic pursuit. It is suggested that training and orientation programmes should be made available in each DRDO lab for optimum use of available e-journals.

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Contribution in the current study, is guidance and supervision while writing this manuscript.