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E-JOURNALS AND E-PUBLISHERS: A RESEARCH STUDY OF USE PATTERNS AMONG AEROSPACE SCIENTISTS AND ENGINEERS OF BANGALORE

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ABSTRACT

With the coming of e-resources, there has been a significant transformation by which scholarly information is disseminated throughout the world. There is no doubt that the arrival of e-journals has greatly affected the way a scientist or an engineer seeks this information, acquires it and then uses it effectively for scholarly scientific pursuits. Today, scientists and engineers use electronic resources because of quick, easy access, and convenience. Also, very little effort is required to retrieve information from these e-resources. Over the last half a century, numerous studies have indicated that journals are extensively read, the information they contain is extremely useful for research, teaching and life-long learning, and the information is valuable in terms of the favorable outcomes from its use. A large number of e-journals from reputed e-publishers are frequently referred by the aerospace scientists and engineers of Bangalore for their day to day research work, for keeping updated in their subject, for increasing scholarly productivity and to be current with global R&D. A research survey was undertaken to ascertain the 'Use Patterns of e-Journals from reputed e-Publishers' amongst the aerospace scientists and engineers of selected aerospace organizations of Bangalore. The study is restricted to the geographic boundary of the city of Bangalore and the selected e-Publishers listed below. From the survey questionnaire distributed to these scientists and engineers it was found that, the total percentage of responses usable from all the 16 aerospace organizations amounted to 89.7 percent. The analysis is based on the responses received from the aerospace scientists and engineers representing these selected aerospace organizations. The responses from the participants towards the use of 'e-Journals from e-Publishers were graded on a scale of 4 to 0, 4 representing 'Daily' and '0' representing 'Never Use'. The major findings that the authors would like to report in this paper are: (a) *Analysis of Variance (ANOVA)* was applied for testing the significant difference among the mean scores attained from 16 aerospace organizations towards the Use Patterns of 'e-Journals from reputed e-Publishers'. It is observed that all the 16 aerospace organizations show a significant difference ($P < 0.05$) in their mean scores viz., 'Elsevier', 'Springer Link', 'Taylor and Francis', 'Emerald', 'John Wiley (Inter – Science)', 'Blackwell', 'Cambridge University Press (CUP)', 'Oxford University Press (OUP)', 'Elsevier – Science Direct', 'Journal of Atmospheric Sciences', 'Air force – Airman' and 'Aircraft Engineering and Aerospace Technologies'.

Key Words: Patterns of Use, Aerospace Scientists and Engineers, Core Aerospace Engineering E-Databases, Gateways and Standards

INTRODUCTION

In this information explosion age, it is practically impossible for an aerospace scientist or engineer to carry out his research work without embracing the network and internet technologies. They greatly depend upon these electronic innovation tools for accessing electronic information resources in the form e-journals related to aerospace engineering right at their desktops. In fact, many of the scientists in today's R&D organizations, Universities and research centers have the unique privilege of downloading full-text e-journals right at their desktops through their Organization's e-Conglomerate.

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It is absolutely clear that the use of electronic media to support scientific communication has undoubtedly been one of the paradigm shifts in the practice of science in this era. For a research scientist today, with access to the Internet, working across continents and in different time zones and keeping in touch with his peers has indeed become a reality due to the exponential growth of the telecommunication infrastructure that the world has witnessed.

Need For Electronic Information Resources and Services among the Scientists and Engineers

During the late 1980's and early 1990's many new information technologies arose that revolutionized the way in which people searched for and gathered information. More and more publications began to profile the impact that new electronic resources had on different populations. The coming of the Internet itself was the most fundamental shift since Gutenberg's invention of the printing press, (Gleeson, 2001).

Somewhere between 1994 and 1996 there was a profound shift in electronic resource usage by scientists. The shift could be attributed to the increase in popularity and usability of the Internet itself as well as the resources it contained. Curtis *et al.*, (1997) opine that the increase in the use of the electronic information resources was attributed to the availability of more and better electronic resources, desktop access through networked workstations, and user-friendly interface design.

With the coming of the twenty-first century, successful storage and retrieval of the exponentially growing body of scientific information quickly became dependent upon the Internet and World Wide Web. The way in which scientists seek information to support teaching, research and creative activities is changing as new technologies and information delivery systems emerge, (Brown, 1999). Consequently, the traditional model of scientific communication proposed by Garvey, (1972), states that information is primarily disseminated through, and subsequently becomes most highly valued when printed in, refereed journals, is being challenged. Any early model of electronic communication proposed by Lancaster (1978), and modernized by Hurd, (1998), bypasses printed journals, indexes, and abstracting tools and suggests that scientific information dissemination will eventually be purely electronic. In the light of the escalating cost to libraries for purchasing and archiving printed scholarly journals, electronic journals may prove to become the only alternative for maintaining an active platform for scientific scholarly communication (Tenopir, 1997; King, 2001; Odlyzko, 1998; Walker, 1998).

Electronic information services are obviously an upcoming and endearing activity among all the scientists and engineers irrespective of their disciplines and work environment. The on-line access services and the Internet services are the two of the most popular library services in electronic formats today.

Use Patterns of Electronic Information Resources

Several studies on the influence of the use of electronic information resources on scholarly work have indicated that the use of electronic literature has improved their work considerably in several ways.

Today Governments, R&D institutions and Universities invest substantial sums of money for providing scholars with the digital literature they need for their research work with the intention that improved access to electronic information resources will lead to increasing scholarly productivity. The transformation of the physical library to the virtual library probably saves time, since one can access publications from one's desktop. The extent of publications available online combined with easier access has tremendously improved scholars' ability to keep abreast in their field, and perhaps inspire new ideas and ultimately enhance the quality of their work.

Several studies on the perceived influence of e-resources use on scholarly productivity have indicated that factors like: (a) Easier to find material, (b) Easier to get hold of material, (c) Extended range of material available electronically, (d) Easier to keep updated in one's field of research, (e) Improved quality of work, (f) Inspired new ideas, (g) Greatly saved working time, (h) Reduced time browsing in libraries, (i) multi-user access, fast access, (j) 24 hour access, (k) Available before print, (l) Multiple file formats for downloading and storing (PDF, RTF, DOC, HTML etc.), (m) enhanced access and visibility to scientific papers, (n) Keeps current about global R&D etc. has indicated that the use of electronic resources has considerably influenced the quality of work of the scholars and inspired new ideas to some extent.

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The Electronic Journals and the Changing Patterns of Use

It is absolutely clear that traditional print journals, even those available electronically are slowly changing. There is a paradigm shift in their usage and they are moving towards electronic formats. Many studies have revealed that the electronic versions of papers are being read about as often as the printed journal versions. The growth rates in usage of electronic information resources are sufficiently high and if this trend continues for a few more years, a time may come soon when the print versions will get 'totally eclipsed'. The coming of the World Wide Web has propelled this vigorous growth of the electronic forms of communication which simply do not fit into the traditional publishing format. With the coming of age of the electronic journals, it has totally altered the way scholarly information is disseminated throughout the world. There is no doubt that this particular innovation has changed the information usage of scientists. Invariably, the role of the librarian has dramatically changed to meet the 'vibrant electronic needs' of the scientists and engineers. Electronic journals has greatly affected not only the way information has spread, but also the way in which electronic information acquired and how scientists, engineers, scholars and researchers seek this needed information.

The National Knowledge Resource Consortium (NKRC) and Its Role Scholarly Scientific Information Dissemination

The National Knowledge Resource Consortium (NKRC), established in year 2009, is a network of libraries and information centres of 39 CSIR and 24 DST institutes. NKRC's origin goes back to the year 2001, when CSIR set up the Electronic Journals Consortium to provide access to 1200 odd journals of Elsevier Science to all its users. Over a period of time, the Consortium not only grew in terms of the number of resources but also in terms of the number of users as more like-minded institutes evinced interest to join the Consortium. Today, NKRC facilitates access to 5,000+ e-journals of all major publishers, patents, standards, citation and bibliographic databases. Apart from licensed resources, NKRC is also a single point entity that provides its users with access to a multitude of open access resources. The Consortium envisions emerging as a leader to serve the R&D sector with much needed information to strengthen the research and development system in the country.

CSIR-National Aerospace Laboratories

NAL is a constituent Institution under the Council of Scientific and Industrial Research of India. NAL is a high technology oriented institution concentrating on advanced topics in the aerospace and related disciplines. Among the aerospace organizations of Bangalore, NAL occupies a very special place. NAL is India's premier civil aviation R&D aerospace organization in the country. Originally started as National Aeronautical Laboratory, it was renamed National Aerospace Laboratories to reflect its major involvement in the Indian space programme, its multidisciplinary activities and global positioning. It is India's only civilian aerospace laboratory with a high level of competence. The expertise of its scientists is globally acknowledged. NAL has some very sophisticated test facilities which are the best in the country and comparable to those abroad. The 1.2 m Trisonic Tunnel Complex, Full Scale Fatigue Facility, Acoustic Test Facility, Engineer-in-Loop Facility, Composite Structure Facilities, Advanced Turbomachinery and Combustion Laboratories, Failure Analysis Laboratory and Electromagnetic Laboratory are among these. All these manned by specialized teams provide value added inputs to various Indian aerospace programmes. Its main Mandate and Mission are: (a) Development of aerospace technologies with a strong science content and with a view to their practical application to the design and construction of flight vehicles, (b) NAL is also required to use its aerospace technology base for general industrial applications. NAL is the harbinger of civil aviation design and development activities in India. NAL-designed HANSA trainer aircraft is flying in different flying clubs in India and is all set to reach overseas market. The light transport aircraft, SARAS, is undergoing flight testing and is designed to meet a critical need in the civil aviation segment. In a nutshell, 'Technology' would be NAL's core engine for the future. NAL will make special efforts to identify, develop and market spin-off technologies. NAL is also required to use is aerospace technology base for general industrial applications. NAL, today

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in its 50th year of existence and over these years has made remarkable contributions to a variety of Indian aerospace programmes. It also has well-established aerospace related collaborative projects with reputed international agencies. NAL is the harbinger of civil aviation design and development activities in India. NAL is also best known for its main sophisticated aerospace R&D testing facilities which are not only unique for this country but also comparable to similar facilities elsewhere in the world.

Role CSIR-NAL in Promoting E-Resources Usage amongst Its Scientists and Engineers and Technologists as Part of the CSIR-NISCAIR-DST-NKRC Consortia

Today, every NAL scientist has access to online electronic scholarly information right at their desktops. This has been possible with the help of setting up of the 'The National Knowledge Resource Consortium (NKRC)' jointly established by CSIR and DST with the 'National Institute of Science Communication and Information Resources (NISCAIR)', a sister CSIR Laboratories as its apex body. With the setting up of the 'National Knowledge Resource Consortium', it has been possible for every NAL scientist and engineer to access almost 5,000+ e-journals by typing up with almost 23 reputed international journal publishers. This facility enables any CSIR scientist to access, browse and search and download 'full-text' journal articles from any computer system connected to the campus wide network. This clearly indicates that 'Electronic Information Resources', more so e-Journals are extremely important to an aerospace scientist or engineer to keep pace with global R&D. The names of various e-Publishers covered under this NKRC are given in Figure 1 below.



Figure 1: List of Publishers under the NKRC Umbrella

Review of Literature

Vijayakumar *et al.*, (2001), in their paper try to describe the Advantages of E-journals in terms of Accessibility, Speed distribution and production, Subscription Cost, Multimedia Capabilities, Internal and External Links etc and also tries to find out the Technological, Socio-cultural and Economic Barriers. The issues like Refereeing, Copyright and Licensing, Longevity and Storage and recent trends in E-journal publication and its implication on Academic Libraries in selection and acquisition, Cataloguing, archiving, user's access, training and support to staff and users are discussed in this paper. Furthermore, the authors add that Electronic journals, and what they evolve into, will be at the heart of scholarly communities that are created tomorrow.

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Arora, (2004) in his paper highlights that the emergence of the Internet, particularly the WWW as a new medium of information delivery, coupled with the availability of powerful hardware, software and networking technology, triggered large-scale commercial and non-commercial digitization programmes the world over. More publishers are using the Internet as a global way to offer their publications to the international community of scientists and technologists, resulting in the large-scale appearance of STM electronic journals on the web. The author also mentions that the number of electronic journals has grown to dramatic proportions, from fewer than 10 in 1989 to more than 8500 in April, 2000. Goudar *et al.*, (2004) in their paper mentioned that most of the CSIR laboratories have well established library or documentation centers. Apart from document sources like books, standards, technical reports, conference proceedings and patents, the scholarly journals are a major sources of R & D information. Put together, all the 38 labs of CSIR subscribe to as many as 3,356 foreign research and scholarly journal titles annually at a cost of about Rs. 25 crores. They also add that, Most of the library and information centers of CSIR are well equipped with good IT infrastructure with network facility and high speed Internet connectivity. Guruprasad *et al.*, (2009) opine that most scientists today have access to full-text e-journals. In most cases, this facility is provided right at the desktop. In this paper, the authors present a case study of full-text e-journal patterns amongst the scientists and engineers at the National Aerospace Laboratories (NAL), a constituent of the Council of Scientific and Industrial Research (CSIR). The facility at NAL is provided right to the desktop through the NAL-CSIR-NISCAIR e-conglomerate. Today, National Institute of Science Communication and Information Research (NISCAIR) provides e-access to more than 4042 world-class e-journals to all S&T personnel of the CSIR fraternity. This CSIR-NISCAIR initiative allows any scientist in any CSIR Laboratory to access this electronic information to keep abreast of the latest technological developments in his area of specialization. Their study on the full-text e-journal patterns for the period 2005-2007 revealed that: (a) the mean number (per-month) of full-text downloads for the above three years was found to be different through Kruskal Wallis test of 'One Way Analysis of Variance' at 1% level of significance and (b) Chi-Square test was applied to test whether there is independence between the years and the publishers. The Chi-Square value was found to be 510.6, which is highly significant. Hence we conclude that for the full-text downloads data, the years and the publishers are not independent. The Chi-Square test was carried out for only those publishers (4 in number) for which the data was available for all the three years (2005-2007). Kumbar, (2004), in his paper brings to the attention of the readers that now with the increase in the electronic publishing and reduced cost of electronic access to resources paved the ways for libraries to embark upon fulfilling the requirements of its clientele within their budget. Libraries have realized or have to realize that working together can accomplish far more than they can do individually. The Advent of e-publishing has brought a revolution in journals publication, subscription and access to scholarly literature and the age of library consortia is at the doorsteps to prove cooperation locally, regionally, nationally and internationally. (Armstrong *et al.*, 2006) in his book chapter on the overview of the e-resource industry today, begins with a discussion of some of the major societal influences that are shaping the creation and reception of electronic information products. The author then highlights the developments in e-resource publishing, focusing on key formats including databases, open access resources, e-journals, e-books, e-theses, geospatial and multimedia and moving image e-resources, as well as some emerging formats. Brief consideration is given to the problems of defining e-resource types, and to the issues surrounding their management in the information and library sector. The article concludes with an exploration of some of the future trends in e-resource publishing. Bhat *et al.*, (2004) in his paper goes about defining the term e-journals, illustrates the advantages of e-journals in the light of the financial problems, issues and implications, some acquisition considerations of e-journals and highlights the benefits of consortia based subscription of electronic resources.

Natarajan, (2007) in his paper address the issue of application of Information and Communication Technology (ICT) to the publishing industry and the new approaches in library and information centres for collecting, accessing, browsing and retrieving the e-resources. The change happened in the production

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of learning objects like e-books, different types of e-Journals and e-Databases. The reading habits of the users are changed from borrowing the documents to accessing and browsing the required pages from the E-resources. The challenges faced for accessing the learning objects, viz. the E-resources and the pricing models are discussed with the publishers forgetting the maximum benefit from the minimal expenditure. The consortia model of procuring the E-resources is discussed and the mode of agreements and the services provided by them are discussed. The two different types of consortia namely CSIR-E-Consortia (CSIR, India) and the Indian National Digital Library in Engineering Science and Technology (INDEST) from Indian Institute of Technology, New Delhi are discussed. Also, the paper touches upon the advantages of E-publishing and the standards.

Chan (2006), in her article says that Electronic journals open up many exciting opportunities and potentials for academic libraries. They possess many advantages and also disadvantages. Librarians need to be able to identify and balance the factors that would make electronic journals a success or failure in their libraries. Developing a common vision of the future of information technology can consolidate efforts to tap into the evolving telecommunication infrastructure. There is a general consensus that electronic journals would not replace but coexist with the print format. Flexible and multi-faceted services for patrons would be the way to accommodate the diverse formats of scholarly journals. This paper provides readers with basic information about electronic journals as a starting point. More challenging and complex philosophical and technological issues will need to be dealt with as the future unfolds.

Ramaiah, (2006) in his paper aims to study the electronic publishing (e-publishing) trends in India, to compare the results with another study conducted in Singapore, and to identify the challenges, opportunities and problem areas faced by the publishing industry in Asia. Findings of the survey show that about one-third (35%) of the Indian and about three-quarters (74%) of the Singaporean publishers are engaged in e-publishing, with a further 20% of Indian publishers likely to start e-publishing in the next three years. A slightly higher percentage of Singaporean respondents over Indian feel that e-publishing has a bright future, but with marketing problems in the region being cited as a barrier to entering into the business. The main reasons for not introducing e-publishing in the Indian publishing houses have been lack of awareness about the new technology on the part of publishers and poor acceptability of e-publications among users. Khatri, (2009) while highlighting a case study of Sankhya, an Indian Journal of Statistics from ISI mentions that that the visibility of this journal has increased considerably among the research scholars both within and outside the country. It is expected that in the coming years with the joint publishing of the journal with Springer Science, the journals' visibility and usage will further increase. McDonald, (2000) mentions that the digital revolution is changing how scholars conduct their business. But technology should in no way abrogate the Library's purpose: to build and organize enduring, accessible collections while providing expert services that promote scholarship, learning, and discovery. The Library believes that expanding access to journal literature via the web accomplishes this purpose. Many issues remain, but we believe that the expansion of our journal holdings in the electronic environment is key to our future success. The University must move toward wider access to electronic journals because the benefits far Out-weigh the disadvantages in a trend that is gaining momentum among peer institutions. Alvi, (2004), in his paper on electronic scholarly publishing mentions that Electronic publishing, is a phenomenon of the later part of the twentieth century and came in the wake of the advances in computer and telecommunications technologies. The journal continues to be at the centre of scholarly communication, no doubt, now in a different format. The new electronic journal(e-journal hereafter) is of two types: one, electronic full text version of existing p-journal; the second, are the exclusively electronic journals available on line free or priced according to two models of payment — fixed price model and usage model. Thus the scholarly journals today can be placed under three categories: a. p-journals available in print on paper only — single format, b. p-journals with electronic versions — dual format, c. e-journals — single format. The author adds that the emergence and spread of electronic scholarly publishing is there. The library and information professionals have to gear up themselves with new and novel competencies to serve as 'linking mechanism' between the sources of

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information and its consumer. Saha *et al.*, (2010), bring to the attention of the readers in their paper that the value of information is more appreciated than ever. Information collections are no longer geographically bound. Most of the libraries have had some degree of success with web based resources and electronic journals. In these instances e-resource will integrate easily into the infrastructure. There is growing awareness and use of e-resource by academics and students. The paper also discusses the types of e-resources, general criteria for selection of e-resource, licensing factor relating the e-resource acquisition, argument in favour of collecting the e-resource, etc. Finally, the paper touches upon the strategy and present state of e-resource collection in the Visva-Bharati Library.

UGC-INFONET, (2011), guideline on the Digital Library Consortium emphasizes that cooperation amongst institutions for sharing their library resources is being practiced for decades. Consortiums have undergone a transformation with the infusion of new information technology from print-based environment to digital environment. The emergence of Internet, particularly the WWW as a new media of information delivery triggered proliferation of Web-based full-text online resources. Increasing number of publishers are using the Internet as a global way to offer their publications to the international community of scientists. The technology provides an unparalleled media for delivery of information with greater speed and economy. The library and information centres, as heavy consumers of electronic journals and online databases, stand to benefit greatly from this technology-driven revolution. The availability of IT-based electronic information products are exerting ever-increasing pressure on librarians, which, in turn, are committing larger portions of their budgetary allocation for either procuring or accessing web-based online full-text search services, CD ROM products and online databases. The libraries with their diminishing or static financial allocations have to consider new ways to consolidate global resources amongst them in order to maximize their limited financial resources. The combination of these developments has resulted in the development of “shared subscription” or “consortia-based subscription” to journals everywhere in the world. INDEST-AICTE Consortium, UGC-INFONET Digital Library Consortium and CSIR E-Journals Consortium in India are some of the well-known library consortia. The UGC-INFONET is a national initiative for providing access to scholarly electronic resources including full-text and bibliographic databases in all subject disciplines to the academic community in India. It facilitates access to high quality e-resources to academia in the country to improve teaching, learning and research. This Consortium provides archival access to more than 5,000 crore and peer-reviewed journals and nine bibliographic databases in different disciplines from 23 publishers and aggregators.

National Aerospace Laboratories, Bangalore and Allied Aerospace Organizations in Bangalore

The Scope of the Present Study

Bangalore is considered the ‘Aerospace Hub’ of the country with the establishment of key aerospace organizations several years ago. These aerospace organizations come under the broad umbrella of (i) Council of Scientific and Industrial Research (CSIR), (ii) Defense Research and Development Organizations (DRDO), (iii) The Indian Air Force (IAF), (iv) Aerospace Educational Institutions like Indian Institute of Science, and (v) Public sector giants like HAL. These organizations over the years have contributed significantly to various aerospace development programmes in the country.

Objectives of the Study

To determine the types of electronic information resources, information requirements of the aerospace Scientists and engineers.

To ascertain the patterns of use of e-Journals from reputed e-Publishers by the aerospace scientists and Engineers of Bangalore.

To ascertain whether the percentage of preference of the Use Patterns of ‘e-Journals’ by the aerospace engineers and scientists are approximately the same.

To study whether there exists similar patterns (homogeneity) of usage of ‘e-Journals’ amongst these aerospace scientists and engineers of the 16 aerospace organizations in Bangalore.

Null Hypothesis

There is no significant difference in the mean scores of ‘e-Journals from reputed e-Publishers’ amongst

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the aerospace scientists and engineers of the selected 16 aerospace organizations of Bangalore.

MATERIALS AND METHODS

Sample Selection

The present study is restricted to the selected 16 prominent aerospace organizations in Bangalore. A survey questionnaire was distributed to conduct this research survey. Out of the 650 questionnaire distributed, 583 (89.7%) were selected which were found suitable for the study.

The total population size of this research study is restricted to the 1220 aerospace scientists and engineers in Bangalore. Random sampling technique has been used for selection of the sample size.

Various statistical tests like calculating the arithmetic mean, Co-efficient of Variation (CV), P-values and Analysis of Variance (ANOVA) were applied on the data using the SPSS package and tabulated.

Table 1: Distribution of Source Data

S.No.	Organizations	No. of Questionnaires distributed	No. of Questionnaires received	No. of usable questionnaires usable
1.	ADA	67	63	58
2.	AFTC	19	16	15
3.	ADE	14	12	12
4.	ASTE	33	30	29
5.	CABS	16	15	14
6.	CEMILAC	33	30	29
7.	C-MMACS	8	6	6
8.	DARE	11	9	9
9.	LRDE	5	3	2
10.	GTRE	24	22	21
11.	HAL	144	140	134
12.	IAM	40	36	33
13.	ISRO-ISTRAC	25	24	22
14.	IISc	38	37	34
15.	JNCASR	5	3	1
16.	NAL	168	166	164
Total		650	612	583 (89.7%)

Key:ADA=Aeronautical Development Agency, AFTC=Air Force Technical College, ADE=Aeronautical Development Establishment, ASTE=Aircraft Systems Testing Establishment, CABS=Centre for Airborne Systems, CEMILAC=Centre for Military Airworthiness and Certification, C-MMACS=Centre for Mathematical Modeling and Computer Simulation, DARE=Defense Avionics Research Establishment, LRDE=Electronics and Radar Development Establishment, GTRE=Gas Turbine Research Establishment, HAL=Hindustan Aeronautics Limited, IAM=Institute of Aerospace Medicine, ISRO-ISTRAC=Indian Space Research Organization, IISc=Indian Institute of Science, JNCASR=Jawaharlal Nehru Centre for Advanced Scientific Research, NAL=National Aerospace Laboratories.

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Table 2: Reputed e-Publishers of e-Journals Analyzed on a Scale of 0 to 4

4 – daily, 3 – weekly, 2 – fortnightly, 1 – monthly, 0 – Never use					
Publishers of the Electronic Journals	4	3	2	1	0
(1) Elsevier	4	3	2	1	0
(2) Springer Link	4	3	2	1	0
(3) Taylor and Francis (T&F)	4	3	2	1	0
(4) Emerald	4	3	2	1	0
(5) John Wiley (Inter-Science)	4	3	2	1	0
(6) Blackwell	4	3	2	1	0
(7) Cambridge University Press (CUP)	4	3	2	1	0
(8) Oxford University Press (OUP)	4	3	2	1	0
(9) Elsevier – Science Direct	4	3	2	1	0
JOURNALS (Individual Titles):	4	3	2	1	0
(1) Journal of Atmospheric Sciences	4	3	2	1	0
(2) Airforce – Airman	4	3	2	1	0
(3) Aircraft Engineering and Aerospace Technologies	4	3	2	1	0

Some journals are produced by commercial publishers who do make a profit by charging subscriptions to individuals and libraries. They may also sell all of their journals in discipline-specific collections or a variety of other packages. Aerospace Scientists and Engineers of CSIR-NAL have desktop access to e-Journals from reputed e-Publishers as part of the CSIR-NISCAIR-DST-NKRC Consortia. Table 3 indicates the frequency of usage of e-Journals of selected e-publishers amongst the aerospace scientists and engineers of the 16 aerospace organizations chosen for the study. This analysis is restricted to the leading e-publishers given below in the table.

Findings

Summary of Total Scores for Frequency of use of e-Journals from reputed Journal Publishers

The summary of total mean scores obtained with regard to “Frequency of use of e-Journals from reputed publishers’ is as follows. The highest mean score of 1.34(CV=149.15) is obtained for ‘Elsevier’. This is followed by the second highest mean score of 1.11(CV=126.45) which is reflected for ‘Springer Link’. ‘Elsevier – Science Direct’ occupies the third place with a mean score of 0.92(CV=143.46). ‘John Wiley (Inter – Science)’ is represented next with the mean score of 0.86(CV=137.66). The next highest mean score of 0.80(CV=150.28) is occupied by ‘Oxford University Press (OUP’. ‘Taylor and Francis’ follow up closely with a mean score of 0.75(CV=156.73). A similar mean score of 0.75(CV=154.40) is occupied by ‘Cambridge University Press (CUP’. A very similar mean score of 0.72(CV=158.99) is portrayed by ‘Blackwell’. ‘Emerald’ represents itself next with the next highest mean score of 0.67(CV=164.78). This is closely followed by ‘Aircraft Engineering and Aerospace Technologies’ which gets a mean score of 0.62(CV=166.84). ‘Journal of Atmospheric Sciences’ represents itself with a mean score of 0.55(CV=196.74). ‘Air force – Airman’ gets the lowest mean score of 0.41(CV=255.42). \

Analysis of Variance (ANOVA) was applied for testing the significant difference among the 16 mean scores attained from the scientists and engineers of the aerospace organizations for ‘Frequency of Access and Usage e-Journals from reputed journal publishers’. It is observed that all the 16 aerospace organizations show a significant difference ($P < 0.05$) in their mean scores viz., ‘Elsevier’, ‘Springer Link’, ‘Taylor and Francis’, ‘Emerald’, ‘John Wiley (Inter – Science)’, ‘Blackwell’, ‘Cambridge University Press (CUP’, ‘Oxford University Press (OUP), ‘Elsevier – Science Direct’, ‘Journal of Atmospheric Sciences’, ‘Air force – Airman’ and ‘Aircraft Engineering and Aerospace Technologies’.

Table 3: Frequency of Usage of e-Journals from Reputed e-Publishers

SN	Organizations	Mean and CV	e-Journals Usage											
			Elsevier	Springer Link	Taylor and Francis	Emerald	John Wiley (Inter-Science)	Blackwell	Cambridge University Press (CUP)	Oxford University Press (OUP)	Elsevier – Science Direct	Individual Journal Titles		
												Journal of Atmospheric Sciences	Airforce – Airman	Aircraft Engineering and Aerospace Technologies
1	ADA	Mean	0.84	0.84	0.59	0.60	0.90	0.48	0.57	0.69	0.59	0.29	0.28	0.67
		CV	143.35	145.06	178.01	169.85	141.22	198.77	161.66	151.73	172.18	221.46	233.18	153.56
2	AFTC	Mean	0.73	0.53	0.47	0.67	0.73	0.80	0.53	0.33	0.53	0.60	0.87	0.53
		CV	158.58	185.71	137.13	176.27	158.58	135.29	139.35	185.16	156.34	186.87	150.23	156.34
3	ADE	Mean	1.50	0.83	0.92	0.92	1.08	1.17	1.08	0.83	1.00	0.92	0.42	1.17
		CV	82.88	112.49	98.22	98.22	91.96	114.61	83.11	123.58	112.82	127.04	160.45	80.35
4	ASTE	Mean	0.28	0.17	0.28	0.24	0.38	0.21	0.31	0.38	0.28	0.14	0.17	0.38
		CV	288.97	349.00	288.97	285.64	248.25	270.32	259.83	204.38	288.97	319.81	349.00	216.18
5	CABS	Mean	0.43	0.50	0.29	0.29	0.43	0.36	0.36	0.43	0.36	0.21	0.29	0.50
		CV	150.78	170.97	288.90	213.94	150.78	235.73	235.73	270.17	302.91	374.17	374.17	188.11
6	CEMILAC	Mean	1.07	0.66	0.34	0.76	0.69	0.31	0.31	0.72	0.45	0.59	0.55	0.48
		CV	136.78	159.43	209.06	171.35	178.02	273.73	259.83	164.63	184.59	179.59	197.28	180.42
7	C-MMACS	Mean	3.33	2.83	2.00	1.00	1.67	2.17	1.67	2.00	2.17	1.50	0.83	1.33
		CV	24.49	41.26	77.46	126.49	72.66	61.35	61.97	70.71	73.94	117.38	159.50	112.92
8	DARE	Mean	2.11	2.22	2.00	1.89	2.56	1.89	2.33	2.22	2.11	1.89	1.44	2.11
		CV	80.12	77.22	66.14	72.22	62.21	76.92	60.61	62.75	64.62	89.55	120.47	86.84
9	LRDE	Mean	2.50	1.00	1.00	1.50	1.50	1.00	1.00	1.50	1.50	0.00	0.00	1.50
		CV	28.28	141.42	141.42	141.42	47.14	141.42	141.42	141.42	47.14	0.00	0.00	141.42
10	GTRE	Mean	1.81	1.71	1.00	1.10	1.33	1.05	0.76	0.90	1.48	1.05	0.76	0.86
		CV	91.84	86.80	122.47	125.54	106.95	139.89	165.52	143.70	99.60	136.59	170.65	134.47
11	HAL	Mean	0.84	0.48	0.35	0.40	0.40	0.49	0.44	0.60	0.63	0.43	0.42	0.63
		CV	359.41	217.43	259.89	246.12	210.32	218.55	216.65	187.26	184.96	229.20	222.11	176.79
12	IAM	Mean	1.09	0.82	0.67	0.42	0.67	0.64	0.61	0.61	0.94	0.64	0.39	0.45
		CV	136.28	151.10	153.09	195.71	166.30	170.42	174.71	159.44	135.54	183.50	236.94	213.66

Research Article

Table 3: Frequency of Usage of e-Journals from Reputed e-Publishers

SN	Organizations	Mean and CV	e-Journals Usage											
			Elsevier	Springer Link	Taylor and Francis	Emerald	John Wiley (Inter-Science)	Blackwell	Cambridge University Press (CUP)	Oxford University Press (OUP)	Elsevier – Science Direct	Journal of Atmospheric Sciences	Airforce – Airman	Aircraft Engineering and Aerospace Technologies
13	ISRO-ISTRAC	Mean CV	0.91 143.66	0.82 144.30	0.82 128.67	0.59 178.33	0.68 152.73	0.86 125.30	0.95 127.19	0.82 139.29	0.73 175.89	0.50 182.57	0.36 180.94	0.41 194.67
14	IISc	Mean CV	2.65 53.33	2.47 52.95	1.44 104.17	1.24 105.57	1.76 69.83	1.21 107.60	1.38 99.18	1.53 89.96	1.91 86.74	0.68 188.12	0.26 283.75	0.47 204.19
15	JNCASR	Mean CV	3.00 0.00	3.00 0.00	3.00 0.00	0.00 0.00	1.00 0.00	1.00 0.00	3.00 0.00	0.00 0.00	3.00 0.00	2.00 0.00	0.00 0.00	0.00 0.00
16	NAL	Mean CV	1.93 81.01	1.70 88.60	1.05 127.09	0.81 142.32	1.07 114.27	0.88 134.57	0.97 132.96	0.90 141.67	1.15 122.32	0.58 193.11	0.36 242.22	0.58 162.24
Mean Scores Obtained for Frequency of Usage of e-Journals from Reputed Publishers		Mean CV	1.34 149.15	1.11 126.45	0.75 156.73	0.67 164.78	0.86 137.66	0.72 158.99	0.75 154.40	0.80 150.28	0.92 143.46	0.55 196.74	0.41 225.42	0.62 166.84
P Values			0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.041	0.004

Research Article

Conclusions

The main conclusions that we would like to draw from this study are:

E-Journals are an important source of scientific scholarly information to the aerospace scientists and engineers.

It has a tremendous impact on their scientific research in terms of: (a) inspiring collaboration and joint research work, (b) resulting in faster completion of tasks, (c) resolving technical problems, (d) Enormous time saved in terms of article retrieval or time spent at the library, (e) immensely helps in publishing more scientific papers, (f) helps in getting information related to specific scientific processes, (g) enables exchanging and distributing of scientific articles with colleagues, (h) assist in more organized archival of research papers and finally aids in gaining more scientific knowledge.

Analysis of Variance (ANOVA) was applied for testing the significant difference among the 16 mean scores attained from the scientists and engineers of the aerospace organizations for 'Frequency Use of e-Journals from Reputed Publishers'. It is observed that all the 16 aerospace organizations show a significant difference ($P < 0.05$) in their mean scores. This implies that the 'Use Patterns of e-Journals from reputed e-Publishers' are dissimilar amongst the 16 selected aerospace organizations.

This also implies that, the percentage of preference of the 'Use Patterns of e-Journals from reputed e-Publishers' by the aerospace engineers and scientists are not approximately the same.

It is also observed that there is heterogeneity in the 'Use Patterns of e-Journals from reputed e-Publishers' amongst the aerospace scientists and engineers of the selected 16 aerospace organizations of Bangalore.

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