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## Usability and Return on Investment (ROI) of Electronic Information Resources: An Evaluative Study on Selected Scientific & Research Institutes Libraries in Odisha

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# **Usability and Return on Investment (ROI) of Electronic Information Resources: An Evaluative Study on Selected Scientific & Research Institutes Libraries in Odisha**

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## **Abstract:**

The paper outlines the perspective of electronic resources in scientific and research libraries and effective methods to utilize maximum so that the amount spend can be justifiable. Sixteen scientific & research institute libraries are surveyed for the purpose of present study. The study discuss various methods to evaluate usages of e-resources so that it can help to the management to make a wiser decision in investing huge amount of expenditures on it. The library services can be extended and customized, to reflect user interests suiting the users the most, in the light of the evaluation and analysis done. The study highlights the importance of quantitative analysis of the usage of e-resources in research libraries an integrated approaches to calculate ROI in terms of research output (publications).

Keyword: Electronic resources, Return on Investment (ROI), Usage statistics, Scientific Libraries

## **1. Introduction**

Libraries make tremendous investments in the products and services they offer, especially, in collections and electronic resources. Over the past decade, there has been a substantial increase in the reliance on electronic resources. CD-ROM databases, online services, document delivery systems and the Internet. Often the decision to acquire these types of services is made without completely understanding the actual costs involved and without knowing whether the new resources are economically better choices than more traditional resources. Further, the library budgets are often stagnant or shrinking and librarians are frequently asked to justify these types of acquisitions and to prove their values (White,1998)<sup>1</sup>. In such cases, ROI technique for library

services and products is the best way to calculate the value and justify the returns. Librarians too can use the technique in their libraries and face the situation in appropriately.

Scientific and Research Institute Libraries (SRILs) are shifting their role from the custodian of traditional information resources to the proactive disseminator of service oriented electronic information resources. Emerging and Cutting-edge technology , high rate of data growth, rapid growth of Internet and explosion in the quality, and quantity of information compelled libraries to adopt new means and methods for the storage, retrieval and dissemination of information. Libraries have been employing ICT and electronic resources and services to satisfy the diverse information needs of their users. E-journals, CD-ROM databases, online databases, e-books, web-based resources, and a variety of other electronic media are fast replacing the traditional resources of libraries.

The paradigm shift of Library Professional competencies and skills to manage electronic resources have left a lasting impact in the arena of E-Resource Management access and retrieval. A revolutionary change in publishing industry has brought major changes with respect to Authors, Users, Journal editors, Publishers, Libraries and Subscription Agents in LIS domain. Though 1990s saw major use of web-based products and services, today's digital revolution mainly depends on internet and web technologies with electronic journals as their major content.

Emerging e-resources in educational & research Institutions continued to have profound effects on the promotion of information sharing; especially in the library world, making possible rapid transactions among professionals and supporting global collaboration among individuals and organizations. E-resources are now became backbone of research and development activities and it is growing at exponential rate.

## **2. Literature Review**

Anbu K., J.P., Kataria, S. and Ram, S. (2013)<sup>2</sup> in their study pointed out that ERMS (E-resource Management Systems) are essential tools to be adopted by the libraries in the context of the current digital landscape. These systems not only save time and energy but also provide efficient & effective management of e-resources. Jotwani, D. (2014)<sup>3</sup> IIT libraries are taking a multidisciplinary strategy and using 27 marketing methods to encourage the usage of their

resources. These libraries review marketing strategies and methods regularly, study their effect on e-resource knowledge and use, recognize and remove bottlenecks. An additional effort made to ensure optimum utilization of its subscribed electronic resources. Deepa.Siwach, A.K. and Malik, S.K. (2019)<sup>4</sup> investigated and analyzed the usage of e-resources by the faculty and research scholars in selected universities of North India. Data was collected using a comprehensive questionnaire. The results obtained from respondents indicated that the usage was highest for e-journals in comparison to other e-resources. It is found that very less number of users have attended any training course to use e-resources. The study suggested that conducting of more training programs and promotion of e-resources for their optimum utilization. Nazir, T. (2016)<sup>5</sup> in his paper on "E-metrics: Tools for measuring usage of electronic resources" revealed that the usage data of e-resources provided by the publishers proved to be helpful for libraries and decision-makers in selecting best possible resources for their users. Also discusses the various e-metrics tools and their advantages and limitations. Peter Edward Sidorko, 2010<sup>6</sup> in his paper entitled "Demonstrating ROI in the library: the Holy Grail search continues" talked about approaches by academic libraries in demonstrating return on investment (ROI). The paper helps in ROI analysis and for demonstrating the return on investment. Christine Urquhart, Jenny Turner, 2016,<sup>7</sup> in their study on critically review methods of impact assessment and economic analyses is a comprehensive study. The study found that Terms for library assessment (outcome, output, impact, value and benefit) vary among different sectors. The study is helpful and gives insight into the ROI Analysis. Carol Tenopir, 2011<sup>8</sup> in her paper entitled "Beyond usage: measuring library outcomes and value" primarily discussed the explicit and derived value of academic libraries. Result of the study shows that for every dollar invested in the library faculty attribute many more dollars returned in grant income through more successful grant proposals. Kathrin Grzeschik, 2010<sup>9</sup> developed an ROI formula for the libraries. The author opined that the ROI formula is complex and varies across the study. The study further recommends that it is high time to simplify it as well for further use. Nuria Lloret Romero, 2011<sup>10</sup> in the research paper entitled "ROI. Measuring the social media return on investment in a library" compared the parameters governing social media ROI. Author find out that Comparisons can draw between the behaviour of a user before following the library on social media and then after .Svanhild Aabø, 2009<sup>11</sup> presents a meta-analysis on "Libraries and return on investment (ROI): a meta-analysis". Study indicates the patterns in the findings are consistent with expectations regarding the benefit types that should include in the ROI figure, the methods used, and the scope of the study. Jubb,

M., Rowlands, I., & Nicholas, D. (2013)<sup>12</sup> explores the relationships between library expenditures, levels of usage, and research outcomes, and the use of e-journals. The resultant data findings revealed that that levels of library expenditure influence subsequent levels of use of e-journals. While the modelling does not show strong direct linkages in either direction between library expenditure and research performance, it does show an active, positive feedback loop between the use of e-journals and research performance. Sutton, S. (2013)<sup>13</sup> study of ROI of libraries opined that “current budgetary climate is forcing libraries to be more selective about e-resource purchases and renewals, and often to consider cancellations”. The study is an attempt to “developed a model for assessing the value of our e-resources to our community of patrons that relies on a combination of metrics including content coverage, usage, patron needs and feedback, and costs”. The model applies to decisions about renewal or cancellation and potential new purchases. Singh, S., & Pandita, R., 2019<sup>14</sup> in their study on ROI of IITs Libraries presented a study which “aims to assess the Returns on Investment (ROI) of the twenty leading libraries of the Institutes of Engineering and Technology in India in the form of institutional research output”. An attempted has been made to rank each library based on seven different parameters”. The rankings have been calculated for individual libraries based on scores earned against each parameter. The results of the study revealed that “Institutes of Engineering and Technology in India concentrate more on procurement of electronic resources in their libraries, spending nearly three-fourth of their budget on the procurement of electronic documents mostly in the form of online journals and eBooks”. The study gives an insight into the importance of libraries and the part these sub-institutions’ play in the overall ranking of their institution.

Based on the literature reviewed the following objectives were drawn:

### **3 Objectives of the Study**

The key objectives of the proposed study were:

- i. To study the amount of income (return) to each scientific and research institute that the library contribute compare to the budget or monetary investment the organisation make in the library.
- ii. To study the awareness of subscribed electronic information resources among the scientists, faculty, research scholars and students.
- iii. To study the different types of electronic information resources used by scientists, faculty, research scholars and students

- iv. To study the research output of scientists, faculty, research scholars and students in terms of usability of electronic information resources.
- v. To study the economic value of library to the scientific and research institute.
- vi. To study the library value within the context of intuitional research output.
- vii. To suggest some possible measures to strengthen vis-a-vis enhance the usability of subscribed availability of electronic resources.

## **4 Methodology**

In order to achieve pre-defined objective, the following steps were adopted to conduct the study.

### **4.1 Data Collection methods**

This research work is in the form of empirical and exploratory study for which the information was gathered from the Primary and Secondary sources.

**Primary Data:** For primary data, a well-structured questionnaire has been prepared. Questionnaires are filled by the respondents of SRILs. The primary data gathered through two set of questionnaires-one for getting data from LIPs and other for Users of respective SRILs (16).

**Secondary Data:** Secondary data is collected from print and electronic resources. From Print resources the various studies already being conducted in this area, Books, Magazines, Journals, Periodicals and Reports were used while from Electronic media E-Books, Online journals, Annual Reports, Budget reports and websites were used to gather required information.

### **4.2 Sampling**

The study proposes to use the convenience sampling method. Convenience sampling (sometimes known as grab or deliberate sampling) is a type of non-probability sampling which involves the sample being drawn from that part of the population which is close to hand and it can be representative of the entire state. That is, a population is selected because it is readily available and convenient. This method supposes to be most suitable for the present study because the sample consisted of all major SRILs of Odisha, the number and location of which is pre-discerned. Hence it would be convenient to obtain a sample of them. On the other hand, to select a sample of the end user, Random Sampling is suitable and adopted as sampling techniques.

### 4.3 Target population & Response Rate

Target populations of the study were Scientific and Research Institutes Libraries (SRLIs) of Odisha. Library and Information Professionals (LIPs) and Users of these Institutes were selected as sample of the study. Sample is being selected of SRILs based on Infrastructure and Resources available as well as the Library E-resources. The researcher distributed a total of 64 questionnaires LIPs of 16 SIRLs (Annexure-I). A total of 49 (76.5%) questionnaires duly filled by LIPs were received from SIRLs. Similarly, a total of 480 questionnaires were distributed randomly to Users of SRILs by hand and mail through Google online survey. Out of the total questionnaires distributed, 304 questionnaires duly filled in by SRILs users were received (63.33%). The details configuration of target population under each SRILs are depicted in table 1.1.

**Table 1.1: Details of the samples & Responses**

Sl. No .	Name of S&R Libraries	LIPs			Users			Total		
		No. of Responses	% of Rows	% of T of Column	No. of Responses	% of T of Rows	% of T of Column	TR of Rows	% of Rows	% of column of the Total
1.	CIFA	2	8.3	4.1	22	91.7	7.2	24	100.0	4.6
2.	CIPET	1	8.3	2.0	11	91.7	3.6	12	100.0	4.1
3.	NRRI	3	10.0	6.1	27	90.0	8.9	30	100.0	5.5
4.	IITB	7	19.4	14.3	29	80.6	9.5	36	100.0	6.8
5.	ILS	2	12.5	4.1	14	87.5	4.6	16	100.0	9.1
6.	IMA	1	6.3	2.0	15	93.8	4.9	16	100.0	10.0
7.	IMMT	3	9.7	6.1	28	90.3	9.2	31	100.0	5.5
8.	IOP	9	25.0	18.4	27	75.0	8.9	36	100.0	4.6
9.	CES	1	6.7	2.0	14	93.3	4.6	15	100.0	5.9
10.	NISER	8	21.1	16.3	30	78.9	9.9	38	100.0	4.1
11.	CIWA	1	7.7	2.0	12	92.3	3.9	13	100.0	6.8
12.	IIWM	1	5.6	2.0	17	94.4	5.6	18	100.0	7.3
13.	ORSAC	1	5.9	2.0	16	94.1	5.3	17	100.0	8.2
14.	RCTCRI	1	10.0	2.0	9	90.0	3.0	10	100.0	7.8
15.	RMRC	4	13.8	8.2	25	86.2	8.2	29	100.0	6.4
16.	RPRC	4	33.3	8.2	8	66.7	2.6	12	100.0	3.2
	<b>Total</b>	<b>49</b>		<b>100.0</b>	<b>304</b>		<b>100.0</b>	<b>353</b>		<b>100.0</b>

## 4 Key Findings

*4.1 The key findings of the research based on their perception, preferences and use by the Library and Information Professionals (LIPs) regarding e-resources are summered as follows:*

- i. Professional working in SRILs (89.8%) are well qualified and potential to manage e-resources effectively. However, Most of the SRILs (87.5%) do not use Integrated Electronic Resources Management system to manage e-resources.
- ii. E-journal consortium is the major way to get subscribed the electronic resources. Committee constituted with librarian and faculty/scientist are responsible for evaluating for purchase/renewal of e-resources and subscription of the same which is highly significant.
- iii. Uniqueness of the content, relevance to scientist/faculty/researcher, usage rate are important criteria for procuring of e-resources.
- iv. SRILs are adopting variety of techniques & platform to promote and publicizing of e-resources. Announcement of library portal, email, and electronic bulletin board are the most suitable platform for popularizing e-resources which substantially improved usage of these resources. Web based electronic display board will not only aware the user about the library e-resources but also increases the potential to attract the users to library services. Library should developed their integrated library portal along with all e-resources information certainly serve as gateway to the scientific information.
- v. Majority of the respondents opined that e-journal consortium played significant role in managing electronic resources and Majority of the respondents have agreed that professional knowledge and skill can solve variety of information problems in wide range of settings.
- vi. Majority of Library Professionals opined that financial constraint is one of prominent factor which causes obstacle in providing quality electronic information to the users. They have stated that users should not charged for the content rather the parent organisation should bear the cost towards procurement of the e-resources and the value added services.
- vii. A percentage of 93.88% and 91.84% of the respondent opined that library/institutional portal and library OPAC are the vital tools for improving access and usage of the e-



resources. Tools such as emails and exhibitions are to be extensively used for reaching out to the user and making aware about the e-resources availed by the library which will certainly impact the usage of these resources.

- viii. Majority of the respondent (79.59%) opined that usage of e-resources by the users has substantially increased the research activities of the institute and Users are become more dependable on e-resources for conducting their research work. The quality of research of individuals as well as institutes marginally increased due to access of these information products and services. Majority opined that the scientist/faculty are using e-resources for the purpose of their research activities, writing articles, submitting proposals and obtaining grants
- ix. Lack of awareness about e-resources as key barrier to e-resources aces and management opined by 83.67% of the respondent. The other barrier such as lack of trained manpower, not enough budget and inability to provide remote access to the resources from any location to users are concern for less usage of the e-resources.
- x. Library Professionals have common perception that training and orientation programme are highly relevant for effective management of an e-resources. Majority of the respondent indicated that they have implemented and deployed the skill which they have acquired through such training, seminar and orientation programme related to e-resources.

***4.2 The key findings of the research based on their perception, preferences and usage by the Users of SRILS regarding e-resources are summered as follows:***

- i. E-journals found to be most preferred e-resources type among users followed by full text database for their learning and research activities. The usages of e-books need to be promoted which is significantly low usability.
- ii. Majority Library Users (42.11%) opined that they are mostly satisfied with the SRILs services. It also found that 11.51% respondents are not satisfied with the services provided which is significant and there is scope to access further and improve the quality of the services provided by these SRILs.
- iii. Majority of the users are satisfied with the present holdings of e-resources of their library. 11.85% of the respondents are not satisfied with the collections and 21.38% of the users did not provide their views which is matter of concern for the authority. Libraries should

- rework and strategies to evaluate their e-resources collections further and weed out the resources which are significantly less used by the users.
- iv. Majority of the users opined that e-resources has impacted significantly on the research activities. It also save their time in avoiding the duplicate research that has already conducted.
  - v. A percentage of 74.01% of the users stated that without e-resources accesses their research activities will be hampered in to great extent and it would be very much difficult to accomplish their job. Their dependency on e-resources for doing learning and research work is huge.
  - vi. Majority respondent opined that library website is major platform for downloading e-journals and accessing online database.
  - vii. Majority of the users (research scholars, students) opined that primary purpose of accessing e-resources is for their research work (thesis, dissertation, project works and significant numbers also viewed that they use the e-resources to find relevant information in area of their specialization.
  - viii. Majority of respondent (scientist, faculty and scientific staff) opined that their primary objective for accessing e-resources for writing research grants/project proposal followed by routing study and preparing teaching and course materials where as low priority was given for the purpose of evaluating thesis and dissertations and project work using e-resources
  - ix. A significant percentage of 36.54% of the users indicate that e-journals is their most preferred types of e-resources and significant number of users also preferred e-databases followed by electronic thesis and dissertations. Electronic patent and standards are given least preferred opined by certain proportionate of the users.
  - x. Navigation through library portal, search engine and library OPAC are found to be major gateway to locate and access e-resources opined by large portion of the users.
  - xi. Majority of the users stated that PDF(Portable Document Format) is their most preferred format of an e-journals which is convenient for future use.
  - xii. Majority users opined that they prefer to access electronic resources from their terminals rather going to the library and accessing from library terminals points. Significant number of users also stated that the facility to access subscribed resources remotely to be extended which will ultimately maximize the usage of avail e-resources.

- xiii. Lack of training to be found the major barrier in accessing e-journals and significant number of users opined that the library professional need to be more supportive in providing assistance in accessing the electronic resources.
- xiv. It has been revealed by majority of users that SCOPUS database is used extensively for tracking citation and author indicative metrics. It also provides depth analysis in research trends and growth pattern of publications in a particular subject area.
- xv. Significant proportionate of the users group stated that open access e-resources cannot replace the commercial resources on their subjects. Majority respondent agreed that accessing e-resources has significantly improved their research and learning activities. Majority has desired to access the electronic resource subscribed by the library remotely irrespective of the location to support for their research work. Almost all the users disagree to pay fees for accessing the e-resources.

**4.3 The key findings of the research based on Returns on Investment in E-Resources in terms of Research Output /Publications of Scientific and Technical Institutes(SRIs).**

**Table 1.2 ROI Analysis of SRIs**

Name	Total Budget(B) in Lakh	Average Budget in Lakh (2010-18)	Total Publication (TP)	Total Staff(TS)	TB=TP/TS	ROI=TB/B*100	Rank
RMRC	103.70	11.52	354	70	5.06	4.88	1
IOP	286.70	31.86	1487	150	9.91	3.46	2
IIWM	119.72	13.30	174	52	3.35	2.79	3
IMA	85.50	9.50	37	16	2.31	2.70	4
CIFA	134.82	14.98	440	122	3.61	2.68	5
RPRC	49.90	5.54	74	60	1.23	2.47	6
RCTCRI	56.70	2.97	36	26	1.38	2.44	7
NRRI	110.30	12.26	584	239	2.44	2.22	8
CES	70.10	2.90	28	19	1.47	2.10	9
CIWA	29.49	3.28	21	45	0.47	1.58	10
ORSAC	32.90	3.66	37	99	0.37	1.14	11
ILS	312.00	34.67	639	190	3.36	1.08	12
NISER	440.09	48.90	2055	458	4.49	1.02	13
CIPET	37.30	4.14	19	50	0.38	1.02	14
IMMT	653.54	72.62	1252	218	5.74	0.88	15
IITB	1652.70	183.63	2227	420	5.30	0.32	16

In order to measure the impact on research productivity the following ROI formula has been used

$$\text{ROI(\%)} = \text{Total Benefits (TB)} / \text{Total Budget(B)} * 100$$

Scientist/Faculty member, Scientific/Technical staff, Research scholars were taken in to consideration of calculating ROI in term of research publications. However, supporting Administrative staff and students were not considered for ROI analysis because of their nature of work is not directly associate with in any significant research and publication activities. Table 1.2 depicted the study of details ROI analysis of e-resources in terms of research output/publications. The details of institution wise publications were obtained from SCOPUS database during the period 2010-18. It has been found that RMRC obtained maximum returns (4.88%) followed by Institute of Physics (3.46%).

## **5. Conclusions**

The study unearths and given an insights reading perception, preferences and usability of e-resources in different SRILs of Odisha. It also explored the further steps to estimate the Returns on Investment of various SRILs in terms of research output (i.e. Publications).The study might be set a benchmark for the future studies and research in the arena of E-resources & ROI analysis.

The study revealed many findings which clearly meets the objectives of the study. The major findings includes: users are satisfied with library services rendered and e-resources subscribed; they access and use resources frequently; they would like to recommends the subscription in "Print+Online" mode. In spite of the ICT has changes the way to access and use e-resources, users still prefer print formats which indicate that 'Paperless Society' is not a pragmatic concept. Further findings also revealed that e-journals are highly significance as compared to other e-resources. E-resource are highly important for the research works as compared to other learning activities. There are also evidence from the study that library users are using various citation databases to manage their citation. Library Portals are continue to be the important gateway to search and access e-resources.

The findings of the study are interesting and opened a window for further research in the suggested domain above. In conclusion, it can be said that in view of credibility, emerging and cutting edge technologies have changed the way of scholarly communication, e-resources access and management and the way people communicate, interact, acquire, share knowledge, search, investigate and participate in creation and reuse of the content. Further, the study concludes that the library committees, librarians and management of the Institutes need to be committed to be taken necessary steps being implemented strengthened the new e-resources collection and ICT infrastructure, training, awareness workshops to preserve the electronic information in the diversifying ICT context in order to prove the quality and sustainable research in the Scientific & Research Institutions.

The study unearths and adds a significant contribution to the body of knowledge and it is hoped that, results of the study can be used as a pointer for further research in this direction. Further, by applying the outcome of this study, SRILs can play a pragmatic role to cope with the rapid changes in scholarly communication, e-resource management, scholarly practices, and users expectations.

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**Annexure-I: List of scientific & research institute of Odisha covered under study**

CIFA	Central Institute of Freshwater Aquaculture
CIPET	CIPET- Institute of Plastics Technology
NRRI	National Rice Research Institute
IITB	Indian Institute of Technology Bhubaneswar
ILS	Institute of Life Sciences
IMA	Institute of Mathematics and Applications
IMMT	Institute of Minerals and Materials Technology
IOP	Institute of Physics
CES	Centre for Environmental Studies
NISER	National Institute of Science Education and Research
CIWA	Central Institute for Women in Agriculture
IIWM	Indian Institute of Water Management
ORSAC	Odisha Space Applications Centre
RCTCRI	Regional Center of Central Tuber Crop Research Institute
RMRC	Regional Medical Research Centre

