E-Resources Usage Statistics as an Indicator and Measure of Knowledge Consumption in Higher LearningAcademic Institutions

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Abstract - **Digital resources and services have become an essential part of the growing collection of libraries all over the world, and their relevance and importance in the higher academic and research institutions have been increasing day by day. Library users also embrace the electronic resources quite enthusiastically considering their multitude of advantages. On the other hand, the collection, development and management of e-resources demand a lot of financial commitments on the part of the institutions, and as a result, they expect and encourage a fair return on investment. Therefore it has become mandatory on the part of libraries to assess the usage and usability of their procured/subscribed resources. Usage statistics are now considered as one of the most prominent measuring tools that help the libraries to examine the usage of online resources and ensuring their optimum utilization. At the same time, the collection of usage reports from the vast number of e-resources is a challenging task for the librarians. E-resources exist in multiple formats such as e-journals, e-books; aggregated full-text databases, company, industry, statistical databases etc. and the usage data collected for these resources vary from each other. There exist many ways and methods to collect usage reports of e-resources. It can either be downloaded manually from the e-resources website, using administrative credentials provided by the publishers or automatically harvested through SUSHI (Standardized Usage Statistics Harvesting Initiative). This paper attempts to draw the attention of information professionals on the enormous potential in the usage of e-resources by the libraries. It presents the IIM Kozhikode library's experience in obtaining the usage statistics of e-resources and attempts to examine how these reports are used as a tool to assess the usage of e-resources. This paper puts forth the argument that the e-resources usage statistics acts as an indicator of the knowledge consumption of the organization, as evidenced by the relative growth in its research output, quality of education being imparted and its placement records.**
Keywords: **E-Resources, Usage Statistics, Higher Learning Academic Institution**

I. INTRODUCTION

Electronic resources occupy an important place in the higher learning academic and research libraries, and they have proved to be remarkable in improving the teaching, learning and research activities of their parent institutions. The academic community also accepts these resources on account of its unique advantages and benefits. At the same time e-resources subscription, management and maintenance involve a substantial financial investment on the part of the institutions. The administration, therefore, expects a fair return on investment by promoting the increased usage of e-resources. The hypothesis of the study is that increased knowledge consumption will lead to research productivity of the college/institution and it will also be reflected in the quality of education that is being imparted. Evidence of quality of education by the college/institution could be identified from their placement. Therefore, it has become the responsibility of the libraries to assess the quality, usage and usability of their subscribed e-resources and thereby ensuring their optimum utilization. A new e-resource is identified for subscription only after it is evaluated for determining its suitability. The libraries check the quality of the content and see whether the subject/topic is suitable for the institute's academic and research objectives and interests. Every e-resource's renewal/cancellation decision is taken based on the actual usage of the resource during the subscribed period. The usage of e-resources can be measured by conducting usage surveys and most accurately by analyzing the usage statistics. Therefore libraries need to monitor the usage of e-resources by capturing the usage data, as they provide a more realistic picture of the actual usage of library resources.

A. Background of the Study

IIM Kozhikode (IIMK) is the leading management institution established by Ministry of Human Resource Development, Government of India in 1996. With different academic, research and corporate programs such as Post Graduate programme (PGP), Executive Post Graduate Programme (EPGP), Fellow Programme in Management (FPM), Management Development Programme (MDP), Faculty Development Programme (FDP), Business Incubator Program etc., IIMK is a fast progressing management institute in the country. The Library and Information Centre (LIC) acts as the knowledge hub of the institute. The LIC works in close collaboration with the various program departments in supporting the academic, curriculum and research activities of the Institute. IIMK library subscribes to a large number of resources in multiple formats such as e-journals, e-books, aggregated full-text databases; company industry, statistical databases etc., and this vast pool of information resources form the information and knowledge repository for every student, faculty as well as researchers in the institution. In recent years, the IIMK library budget for e-resources has been increased tremendously, and the library spends over 75percent of the total budget for e-resources. Presently, the library possesses

over 20,000 e-journals (most of them having back files going up to 15-25 years), 200,000 e-books, 72 online services/databases, 15000 corporate reports, theses and dissertations, and an excellent collection of cases and working papers. This collection statistics describe the escalated growth of e-resources and e-services at IIMK (Sunitha, 2017). The library has adopted various up-to-date ICT based applications and programs for ensuring quick and easy access and retrieval of e-resources. In addition to this, the library collects the usage reports to assess the actual utilization of e-resources.

II. OBJECTIVES OF THE STUDY

The study aims at a quantitative assessment of the usage of various subscribed e-resources by examining their usage data. The main objectives of the study are as follows:
1. To study and compare usage reports of e-resources available at IIMK Library
2. To assess the impact of usage statistics in e-resources collection development decision
3. To examine the effect of usage of e-resources in the knowledge consumption of the institute.

III. LITERATURE REVIEW

The present study explores the potential of e-resources usage statistics in assessing the usage of subscribed resources in the libraries. The studies relating to usage statistics were reviewed to understand its impact on knowledge consumption and how this data can be used as a tool in the collection development decisions. McDowell & Gorman (2004) conducted a study to assess the usefulness of vendor's usage statistics to New Zealand academic libraries in their e-resources collection management decisions. The study found that though they use the usage statistics in collection management decisions, there is no correlation between supplied statistics and those demanded by the libraries. The study also found that lack of standardization in the usage data reduced their usefulness. Medeiros (2005) discusses the importance of e-resource usage statistics in library decision making and highlights the need for developing a decision support system for e-resources to make better use of usage statistics. Suseela (2011) reports the results of the study on the evaluation of the usage of e-journals in the University of Hyderabad by applying the usage statistics. The results show that the university library uses this data in the selection, upgrading and cancellation of the subscription to e-journals in their library. Tripathi & Jeevan (2012) narrated the methods used for evaluating the usage of e-journals in a Distance Education University with the help of usage reports and emphasized the need for developing a method for measuring the usage of e-resources to meet their internal requirements. Wical & Kishel (2013) surveyed to understand various types of usage statistics used by Wisconsin Academic librarians and analyzed the purpose for which it is being used. The study found that, though all these academic libraries use the same database to manage e-resources usage statistics, these statistics were not used in the same way and for the same purpose. Tripathi, Kumar & Jeevan (2013) give an in-depth evaluation of the published literature on the significance of usage statistics of subscribed e-resources in the academic libraries, and they find that usage statistics support the libraries in assessing the user behavior, and it further helps them in making modifications in library services as per the user requirements. Fry (2014) pointed out that examining usage statistics is the most meaningful method for assessing the effectiveness of e-resources promotional and marketing activities in a university. Conyers *et al.,* (2017) narrated the means of acquiring and evaluating e-books and the importance of usage statistics in the library workflows. The study also discusses the need for assessing the use of such statistics within the organization, requirements of customers while dealing with the usage statistics and challenges involved in providing the usage data of e-books. The review of these studies on usage statistics clearly states that such studies are useful to assess the usage of e-resources and also helpful in delivering efficient and effective library services.

IV. USAGE STATISTICS

Usage statistics provide information on the extent to which the e-resources are used as well as, how and where it is being used. This data facilitates libraries to study the usage pattern of e-resources over a period (Peters, 2002). The usage data also support and help the administrators and other library stakeholders in taking appropriate collection development decisions relating to e-resources. But the collection of usage data is undoubtedly a challenging task for librarians. E-resources exist in different types and formats like e-journals, e-books, aggregated full-text databases, corporate databases etc., and new models of databases are emerging. The usage reports collected from these resources vary with the type of databases and the publishers. COUNTER (Counting Online Usage of Networked Electronic Resources) is an important initiative for the standardization of e-resources usage statistics. COUNTER release 4, the current code of practice handles the usage data of journals, books, databases, reference works and multimedia content. COUNTER is considered as the internationally accepted code of practice and standard that helps the libraries, publishers and vendors to ensure consistent, credible and comparable usage reports (Project Counter, n.d.). The Standardized Usage Statistics Harvesting Initiative (SUSHI) facilitates the automatic harvesting of COUNTER statistics. SUSHI is based on Simple Object Access Protocol (SOAP) that interchanges the usage reports in XML format. SUSHI generally works as part of Electronic Resource Management (ERM) systems and usage consolidation databases for retrieving the usage reports (Pesch, 2007, 2013). The adoption of COUNTER/ SUSHI compliant statistics helps the libraries in getting a more reliable data in the relatively simple form, and these statistics have a significant place in revealing the real value of e-resources in the academic and research libraries.

V. METHODOLOGY

The study focuses on the analysis of usage statistics of various e-resources available at IIMK library. E-resources collection in IIM Kozhikode library is classified into E-Journals, E-Books, Aggregated Full-Text Journals packages, Citation services and Online Databases. A few prominent resources from each category are identified and selected for the study by applying judgment sampling method. The usage reports downloaded from the publishers' website were used, and the study evaluated the usage data of e-resources for the years 2016 and 2017.

A. Usage of E-Journals

IIMK library has a subscription to a large number of e-journals collections of the leading international publishers, and the prominent journals packages among them are Emerald, Oxford University Press, Sage, Taylor & Francis, Springer, Elsevier and Wiley collections. The COUNTER-compliant usage reports for the years 2016 and 2017 were downloaded from the respective e-journals websites. The comparative analysis of their usage is presented in Table I. The usage statistics clearly show that there is a steady increase in the usage (19%) of e-journals collection in IIMK from 2016 to 2017. Among the e-journals collection, IIMK users prefer Science Direct collection, and its usage is quite stable during the years 2016 -2017 and it is followed by Emerald and Wiley collection. It is also clear that Oxford University Press (OUP) collection has the lowest usage at IIMK. But there was a steep increase in the usage (65%) of OUP during the year 2017. At the same time, the usage of Springer collection decreased during the year 2017. But as a whole, it is clear that e-journals collections are the favorite resources among IIMK users.

TABLE I USAGE OF E-JOURNALS COLLECTION: 2016-2017

E-Journals Collection	Total Use (2016)	Total Use(2017)	Change in Use (%)
Emerald	9752	13132	35%
Oxford University Press	1098	1814	65%
Sage	4634	5719	23%
Science Direct (Elsevier)	31856	36040	13%
Springer	3127	3078	-2%
Taylor & Francis	4057	4515	11%
Wiley	5755	7372	28%
Total	60279	71670	19%

B. Usage of E-Books

E-books are the fast-growing collection in all libraries and IIMK library is not an exception to this. IIMK library has access to over 200000 e-books mainly from two major e-books platforms, Ebrary and EBSCO E-Books Academic Collection. The usage data (Book Report2) was used for analysis purpose. The usage data relating to the number of e-books downloaded from Ebrary and EBSCO packages during the years 2016 and 2017 are presented in Table II.

The data presented in Table II shows the moderate use of e-books in IIMK library when compared to the number of titles available in these packages. But it is worth mentioning that the usage of e-books has increased to a great extent (50%) during the year 2017 as compared to 2016. There is a remarkable increase in the usage of Ebrary package during the year 2017. But the usage of EBSCO E-books Academic collection was reduced by 25 percentages in 2017.

TABLE II USAGE OF E-BOOKS COLLECTION

E-Books Collection	Total Use (2016)	Total Use(2017)	Change in Use (%)
Ebrary	113	474	319%
EBSCO E-Books Academic Collection	407	305	-25%
Total	520	779	50%

C. Usage of Aggregated Full-Text Packages

Aggregated Full-text packages are the collection of a large number of E-journals published by many publishers in a single platform that provides integrated access to the E-resources. IIMK library has access to many aggregated full-text packages, and four leading packages namely, EBSCO's Business Source Complete, JSTOR, Project Muse and Proquest's ABI INFORM Complete, and they are included in the study. Table III gives the usage data of these packages for the years 2016 and 2017. Table III shows that there is a remarkable increase in the usage of ABI INFORM complete during the year 2017 (79%). Though Business Source Complete is a heavily used aggregated package in IIMK, its usage has drastically decreased in 2017 (22%). It is also clear that Project Muse is the least used aggregated package in IIMK and its usage further diminished in 2017 (18 %). At the same time, usage of JSTOR is quite encouraging and stable during this period.

TABLE III USAGE OF AGGREGATED FULL-TEXT PACKAGES

Aggregated Full-Text Packages	Total Use (2016)	Total Use(2017)	Change in Use (%)
EBSCO's Business Source Complete	30715	23901	-22%
JSTOR	15827	17585	11%
Project Muse	265	218	-18%
Proquest's ABI /INFORM Complete	11546	20614	79%
Total	58353	62318	7%

D. Usage of Citation Services

Citation services are essential tools for measuring the research impact of researchers and institutions. They help in collecting information on the research output of an institution andalso facilitate the collaboration with other researchers. Citation services also allow generation of better funding for their research project. Web of Science and Scopus are the prominent commercial citation services used all over the world, and these two services are included in the study. Table IV gives the comparative analysis of the usage of these services during the years 2016 - 2017. The usage

statistics indicate the popularity of citation services in the institute. There is a sharp increase in the usage of Web of Science services during the year 2017 (14753%). But the usage of SCOPUS has remained stable during the years 2016 to 2017.

TABLE IV USAGE OF CITATION SERVICES

Citation Services	Total Use (2016)	Total Use(2017)	Change in Use (%)
SCOPUS	3809	4445	17%
Web of Science	91	13516	14753%
Total	3900	17961	361%

E. Usage of Online Databases

IIMK library possesses the subscriptions to a large number of online databases which include corporate, company, industry, marketing, economics, statistic, online newspaper/magazine and theses databases. Ten prominent international databases, viz., FT.Com, Euromonitor-Passport, Gartner, Lexis Nexis, Marketline, OECD i-Library, Press Reader, PQDT, WARC and World Bank E-library, are selected for analysis. The usage statistics of these databases are analyzed and presented in Table V. Usage statistics show a significant increase in the usage of various databases during the years 2016 to 2017 (41 %). Among the online databases, IIMK users prefer Press Reader database and its usage is quite encouraging during the years 2016- 2017. FT.COM follows it. OECD and World Bank E-library are the least used databases in IIMK, but their usage has improved during the year 2017. The usage statistics during the period 2016 to 2017 shows a reduction in the usage of Euromonitor Passport database (24%) and Lexis Nexis (17%). At the same time, there is a remarkable increase in the usage of Market-line (190 %) and Gartner (159 %) during the year 2017.

TABLE V USAGE OF ONLINE DATABASES

Online Databases	Total Use (2016)	Total Use(2017)	Change in Use (%)
Financial Times (FT.COM)	10130	13521	34%
Euromonitor-Passport	11587	8837	-24%
Gartner	437	1130	159%
Lexis Nexis	719	600	-17%
Market-line	565	1636	190%
OECD i-Library	48	82	71%
Press Reader	32219	52188	62%
Proquest Dissertation & Theses (PQDT)	648	992	53%
WARC	560	1013	81%
World Bank E library	54	68	26%
Total	56967	80067	41%

Usage report/statistics have a vital role in increasing the usage of e-resources and thereby improving the library services. The analysis of usage statistics shows that there is a substantial increase in the usage of the e-resources in IIM

Kozhikode during the past two years (2016-2017) (Fig.1). In the year 2016, usage statistics of all the e-resources under study were 180019, and it has reached 232645 in the year 2017, and it is quite convincing. The study gave a clear picture of the usage pattern of various categories of e-resources and showed the need for improving the use of resources like Project Muse, World Bank e-library, OECD, Lexis Nexis, Ebrary and EBSCO eBooks collection. Usage monitoring is a continuous activity of the library, and the library downloads the COUNTER compliant statistics from the publisher's website regularly. To facilitate better management of e-resources and to ensure SUSHI based automatic harvesting of COUNTER statistics, the library is planning to implement CORAL ERMS (Electronic Resources Management Systems) solution which is presently running on a trial basis. The library reviews the usage data every year to assess the utilization of these e-resources and submit to the library committee for taking appropriate renewal decision. The final decision relating to the renewal or cancellation of resources is made after considering its academic/research value to the institute. In addition to this, library conducts regular user orientation program and also implemented advanced ICT based access and retrieval systems for improving and increasing the usage of the subscribed e-resources and saving the time of the user community.
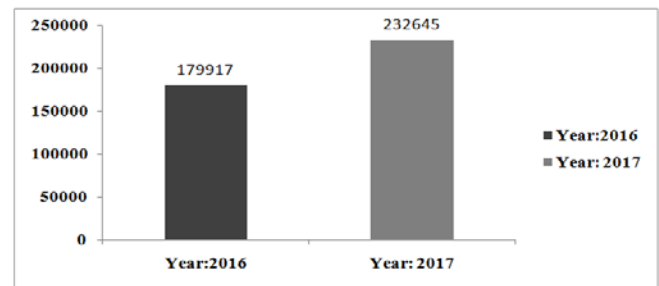

Fig. 1 Usage of E-Resources (2016-2017)

F. Knowledge Consumption and Its Impact on Research Productivity and Delivery of Education

E-resources usages by the faculty and researchers have a direct impact on the research productivity and academic activities of an institution. The increase in the usage of e-resources should lead tothe research productivity of the institution, and it should also be reflected in the quality of education. Evidence of quality education in the institution could be identified from their placement records. IIMK ensures a hundred percent placements to the students. The placement records of the institute show that there are a significant increase in the number of recruiters, highest domestic, highest international and average salary packages offered to the students as compared to the previous year (Fig. 2) (Placements – IIMK, n.d.). Similarly, the analysis of the research trends in IIMK, published by the research department for the years 2016 to 2017 reveals that there is a notable increase in the research publications, especially A* and A publications, refereed journal articles, working papers, cases, books and book chapters. The number of research publications produced during the year 2016 was

179, and it has reached 258 in the year 2017, and a total number of 437 research publications were produced during the years 2016 to 2017 (Table VI, Fig. 2) (Research – IIMK, n.d.). The tremendous increase in the quality of education, academic and research productivity also enabled the institute to get the sixth rank in NIRF ranking 2018.
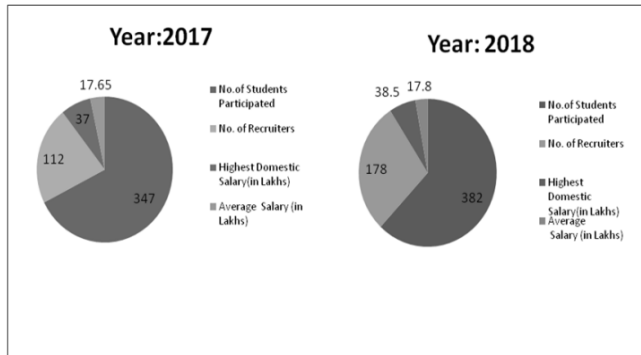

Fig. 2 Placement @IIMK (2017-2018)

TABLE VI RESEARCH OUTCOME AT IIMK DURING THE YEARS: 2016-2017

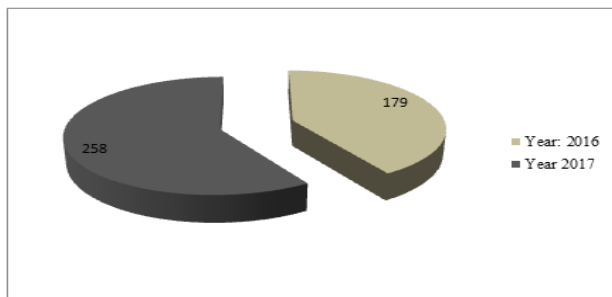| Publications	Year		Total Number of Publications
	2016	2017	
Refereed Journal Articles	45	52	97
Working Papers & Cases	26	74	100
Book & Book Chapters	7	16	23
Conference Papers	90	96	186
A*, A Publications	11	20	31
Total	179	258	437

Fig. 3 Research Outcome@IIMK (2016-2017)

VI. CONCLUSION

E-resources have a significant role to play in higher learning academic, and research institutions.And so; the libraries of these institutions have the responsibility to assess the usage and usability of their subscribed e-resources on a regular basis. The usage statistics are consideredto be the prominent measuring tools that help the libraries to examine the usage of online resources. The paper analyzed the potential of usage statistics in assessing the usage of the subscribed e-resources in the higher learning academic institutions and underlines the need for using COUNTER compliant statistics and SUSHI for the automatic harvesting of usage reports. The study provided a summary of IIM Kozhikode library's experience in obtaining and using the e-resources

usage reports. The library ensures COUNTER compliant statistics from the publishers. To facilitate better management of e-resources and to provide SUSHI based automatic harvesting of COUNTER statistics, the library is planning to implement CORAL ERMS (Electronic Resources Management Systems) solution which is presently running on a trial basis. The study gave a clear picture of the usage pattern of various categories of e-resources and showed that there is a substantial increase in the usage of the e-resources in IIM Kozhikode. The increased usage of e-resources has a direct impact on the academic and research productivity of the institute, and it is visible from the tremendous increase in the quantity and quality of research publications and the institute's placement records.

REFERENCES

[1] Conyers, A., Lambert, J., Wong, L., Jones, H., Bamkin, M., & Dalton, P. (2017). E-book usage: Challenges and Opportunities. *Insights*, *30*(2), 23-30. Retrieved from https://insights.uksg.org/articles/10.1629/uksg.370/

[2] Fry, A. (2014). The Biggest Winner: Using Statistics to Assess the Effectiveness of E-Resources Promotional Campaign. *Journal of Electronic Resources Librarianship*, *26*(1), 1-16. Retrieved from https://doi.org/10.1080/1941126X.2014.877330

[3] McDowell,N.& Gorman, G E. (2004). The Relevance of Vendors' Usage Statistics in Academic Library E-Resource Management: A New Zealand Study.*Australian Academic & Research Libraries*, *35*(4), 322-344. Retrieved from https//doi.org./10.1080/00048623.2004.10755282

[4] Medeiros, N. (2005). Electronic resource usage statistics: the challenge and the promise. *OCLC Systems & Services: International digital library perspectives*, *21*(3), 145-147. Retrieved from https://doi.org/10.1108/10650750510612344

[5] Pesch, O. (2007). Usage statistics: About COUNTER and SUSHI.*Information Services & Use,27*(4),207-213.Retrieved from https://doi.org/10.3233/ISU-2007-27412

[6] Pesch, O. (2013). Simplifying Usage Statistics: What's Next for SUSHI.*The Serials Librarian, 65*(1), 25-31. Retrieved from https://doi.org/10.1080/0361526X.2013.790872

[7] Peters, T.A. (2002). What's the use? The value of e-resource usage statistics. *New Library World, 103*(1/2),39-47. Retrieved from https://doi.org/10.1108/03074800210415050

[8] Placement-IIMK (n.d.). Retrieved from https://iimk.ac.in/academics/pgp/placements.php

[9] Project Counter (nd).Retrieved from https://www.projectcounter.org/

[10] Research–IIMK (nd.).Retrieved from http://www.iimk.ac.in/research/

[11] Sunitha, T. (2017). E-resources access and retrieval strategies for enhanced usage and research: IIMK Case study. In Chand, S *et al.,* (Ed.*),* Transformation through electronic information resources for digital society.*Proceeding of International Conference on Knowledge Organization in Academic Libraries (I-KOAL-2017)*, 288-296, Goa.

[12] Suseela,V.J. (2011). Application of usage statistics for assessing the use of e-journals in University of Hyderabad: A case study. *The Electronic Library,29*(6),751-761. Retrieved fromhttps://doi.org/10.1108/02640471111187980

[13] Tripathi, M.K, Kumar, S.& Jeevan, V. K. J. (2012). Understanding Utilization of E-Journals through Usage Reports from Aggregators in a Distance Education University. *Journal of ElectronicResources Librarianship,24*(1), 22-42. Retrieved from https://doi.org/10.1080/1941126X.2012.657103

[14] Tripathi, M.K. & Jeevan, V.K.J. (2013). A selective review of research on e-resource usage in academic libraries. *Library Review*, *62*(3), 134-156. Retrieved from https://doi.org/10.1108/00242531311329473

[15] Wical, S. H. & Kishel, H. F. (2013). Strategic Collection Management through Statistical Analysis. *The Serials Librarian*, *64*(1-4), 171-187. Retrieved from https://doi.org/10.1080/0361526X.2013.760394