

Measuring the value of e-resources

Abstract²

Libraries are spending increasing proportions of their budgets on e-resources and therefore the need to justify these costs is increasing also. This article examines the different methodologies that can be used to measure the value of e-resources including usage statistics, the cost-per-use metric, impact factors and surveys. The focus of this article is on academic libraries with examples from the IReL Monitoring Group given for illustrative purposes. Methods relevant to public libraries are also provided.

Keywords

Electronic resources, e-resources, e-journals, e-books, databases, usage statistics, cost-per-use, CPU, cost-per-download, impact factor, qualitative methods, surveys

Introduction

Electronic resources today account for an increasing proportion of library budgets with many academic libraries spending more than 60per cent of their budgets on these resources (Aipperspach and Lapham 2010, Sreekumar 2012).In Irish academic libraries, electronic resources or e-resources mainly include e-journals, e-books, and bibliographic and full-text databases. Increasingly public libraries in Ireland are offering



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e-resources including e-books, online databases, online music and online audio books, and data and GIS resources such as maps from Ordnance Survey Ireland.

In the current economic climate, the need to justify the large spend on e-resources is ever more important. In this article, I will describe some of the main methods that can be employed to measure the value of e-resources based mainly on my experience working with the Irish Research eLibrary (IREL) Monitoring Group.

IREL – Irish Research eLibrary

IREL is a consortium of the seven universities in the Republic of Ireland and it includes Science, Technology and Medicine (STM) and Humanities and Social Sciences (HSS) e-resources (IREL 2013). For selected e-resources, the Royal College of Surgeons in Ireland (RCSI) and the Institutes of Technology are also provided by IREL.

Since its establishment in 2004, funding for IREL has come via Science Foundation Ireland, the Higher Education Authority, the Department of Jobs, Enterprise and Innovation and the Irish Universities Association Council. The IREL Monitoring Group was established to monitor the performance of IREL resources and from 2005 onwards this group has gathered usage statistics for all resources and has used these to help produce an annual monitoring report. This report is presented to the IREL funders to demonstrate the value of the subscribed e-resources to the consortium. Examples from the IREL Monitoring Group reports are used throughout this article to illustrate the methods of measuring the value of e-resources.

Usage Statistics

Probably the most important method of assessing the value of e-resources is measuring their usage. COUNTER (Counting Online Usage of Networked Electronic Resources) is an international initiative that was launched in 2002 to improve the reliability of

online usage statistics by implementing agreed standards (COUNTER 2013a). Publishers who are COUNTER compliant agree to provide many different usage metrics including the number of html and pdf full-text requests for e-journals and e-books and the number of searches for online databases (Table 1). The usage statistics are compiled into standard COUNTER reports such as Journal Report 1 and Database Report 1.

Table 1: The most relevant COUNTER metrics to examine for various e-resources

E-Resource	Most Relevant Metric	COUNTER Report Required
E-Journals	Number of full-text article requests	Journal Report 1
E-Books	Number of section requests	Book Report 2
Online Databases	Number of searches	Database Report 1

Figure 1 shows an extract from a COUNTER Journal Report 1 or JR1 report which shows the number of successful full-text article requests by month and journal for an e-journal package. The JR1 report shows the number of downloads for each journal per month and also the reporting period total number of downloads html documents and PDF documents.

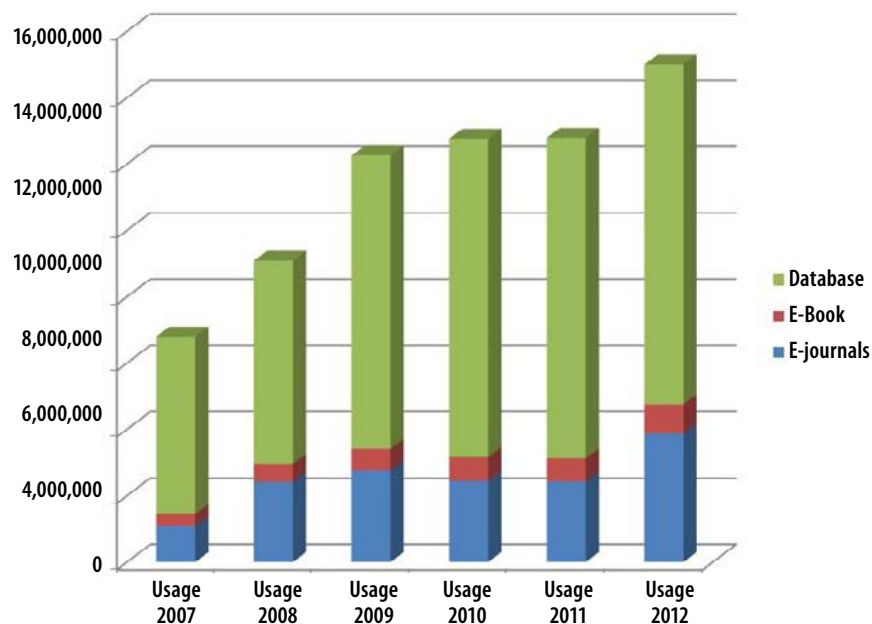
Figure 1: Extract from a COUNTER Journal Report 1 (Release 4)

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	JR1 Number of Successful Full-Text Article Requests by Month and Journal												
2													
3	Account: University A												
4													
5	Journal	Publisher	Platform	Journal DOI	Proprietary Identifier	Print ISSN	Online ISSN	Reporting Period Total	Reporting Period HTML	Reporting Period PDF	Jan-13	Feb-13	Mar-13
6	Total							69,893	39,311	30,582	15,919	25,079	28,895
7	Journal 1	Publisher A	Platform A		JRN1	1876-2859		7	4	3	0	5	2
8	Journal 2	Publisher A	Platform A		JRN2	1062-1458		5	2	3	1	1	3
9	Journal 3	Publisher A	Platform A		JRN3	0001-4575		113	58	55	13	39	61
10	Journal 4	Publisher A	Platform A		JRN4	0965-2302		13	6	7	4	5	4
11	Journal 5	Publisher A	Platform A		JRN5	0155-9982		14	11	3	3	3	8
12	Journal 6	Publisher A	Platform A		JRN6	0959-8022		7	4	3	3	1	3
13	Journal 7	Publisher A	Platform A		JRN7	0361-3682		77	36	41	11	21	45
14	Journal 8	Publisher A	Platform A		JRN8	1875-2780		0	0	0	0	0	0
15	Journal 9	Publisher A	Platform A		JRN9	1875-4597		0	0	0	0	0	0
16	Journal 10	Publisher A	Platform A		JRN10	0094-5765		23	12	11	9	6	8
17	Journal 11	Publisher A	Platform A		JRN11	1874-1029		0	0	0	0	0	0
18	Journal 12	Publisher A	Platform A		JRN12	1742-7061		119	64	55	21	54	44
19	Journal 13	Publisher A	Platform A		JRN13	1872-2032		0	0	0	0	0	0
20	Journal 14	Publisher A	Platform A		JRN14	0379-4172		0	0	0	0	0	0
21	Journal 15	Publisher A	Platform A		JRN15	0065-1281		1	1	0	0	0	1
22	Journal 16	Publisher A	Platform A		JRN16	1359-6454		219	129	90	54	77	88
23	Journal 17	Publisher A	Platform A		JRN17	0252-9602		1	0	1	0	1	0
24	Journal 18	Publisher A	Platform A		JRN18	0894-9166		7	0	7	5	2	0

This version of the JR1 report is based on the latest Release 4 of the COUNTER Code of Practice for e-Resources which all vendors and publishers were required to implement before the end of 2013 in order to remain a COUNTER compliant publisher (COUNTER 2013b).

Keeping track of e-resource usage on an annual basis will show you if usage of certain resources or types of resources increases or decreases. For example, the usage of all IReL resources has more than doubled from 6.8 million uses in 2007 to 15 million uses in 2012 (Figure 2). In 2012, there were 10.2 million e-journal article downloads, 880,000 e-book uses and 3.9 million database searches (Figure 2).

Figure 2: Usage of IReL resources (e-journals, e-books and databases) by resource type between 2007 and 2012



Cost-per-Use (CPU)

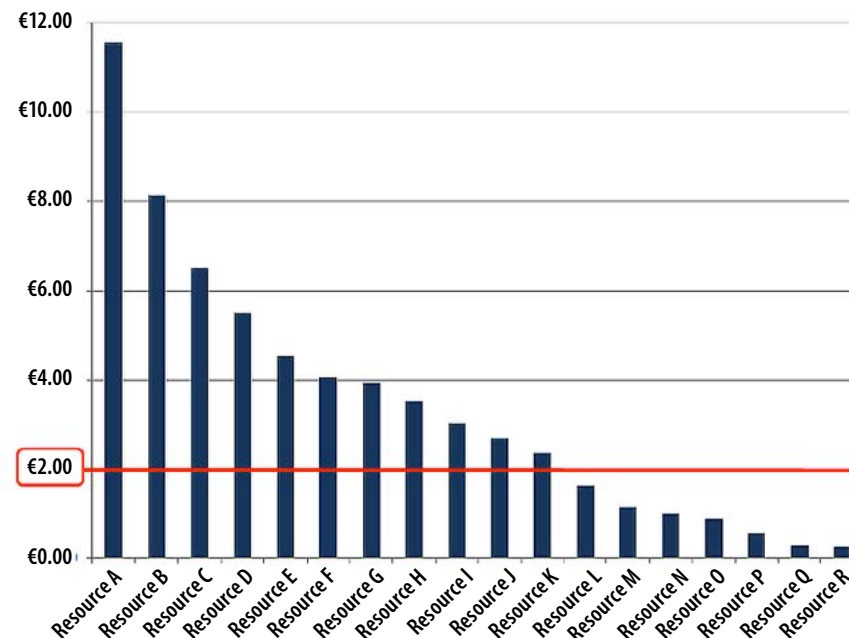
A key metric for measuring the value of e-resources is the cost-per-use or CPU. The cost-per-use is calculated by dividing the full costs of the e-resource for the year by the total number of uses (downloads or searches) in the same year

obtained from COUNTER usage statistics. The costs for each resource must always be calculated in the same way, so for example, it must be decided from the outset whether to include or exclude VAT in costs calculations.

It is useful to set a threshold level for the CPU above which all resources will be reviewed in detail. For example, the chosen threshold figure could be the approximate cost of obtaining a journal article by inter-library loan. Resources with high CPUs may be earmarked for cancellation or this information can be used in negotiating with publishers to achieve lower subscription prices.

Creating a graph similar to Figure 3 makes it easy to see which resources have very high CPUs and allows easy comparison with other resources. Resources are shown in descending order of CPU with the threshold level used by IReL of €2 shown by the red line. This figure was chosen by IReL as it was the approximate cost of obtaining a journal article by inter-library loan in 2007.

Figure 3: Comparison in descending order of Cost-per-Use (CPU) between various resources with a threshold CPU of €2 indicated by the red line



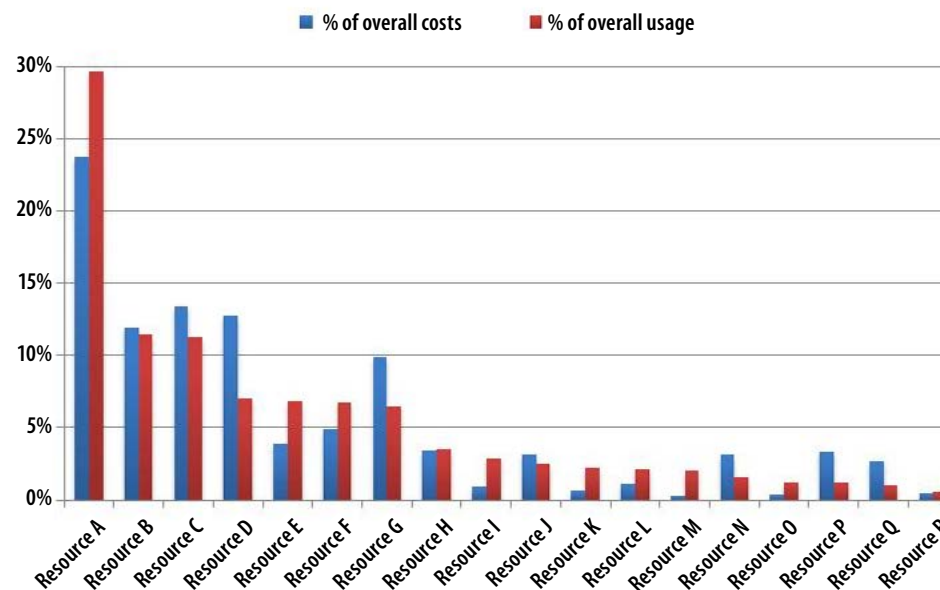
Cost-per-use is a very important method of evaluating e-resources but it should not be used exclusively and other methods should also be used. Bucknell (2012) shows that there are several reasons why the cost-per-download of one e-journal may not be as directly comparable with that of another journal as might be expected. The reasons include: differences between subjects in terms of how they use articles; the design of the platform affecting whether html and PDF downloads are sometimes double counted; usage spikes; journals transferring between publishers; title changes; hybrid journals; and aggregator platforms (Bucknell 2012). However, steps can be taken by librarians to identify and to apply corrections to misleading usage statistics (Bucknell 2012). A balance must be struck to ensure that tidying up usage statistics does not become too time-consuming as cost-per-download or CPU metrics are only one tool that librarians can use to measure the value of e-resources.

COUNTER Release 4 usage statistics should address some of the issues Bucknell (2012) raises and, despite not being perfect, are still the best source of information available on the usage of e-resources.

Percentage of Overall Costs against Percentage of Overall Usage

An alternative method of measuring the value of e-resources is to calculate what percentage of the overall total expenditure on e-resources was spent on each resource and compare this figure to the proportion of the overall usage contributed by each individual e-resource. It would be expected that the percentage of overall cost versus the percentage of overall usage should be approximately the same for each resource. If these percentages are graphed then one can easily identify resources that provide good value for money (Figure 4). For example in Figure 4 resource A makes up almost 30% of the overall usage but only accounts for 24% of the overall costs. It is also possible to identify resources where the percentage of overall costs far exceeds the percentage of overall usage such as resource D and resource G in Figure 4.

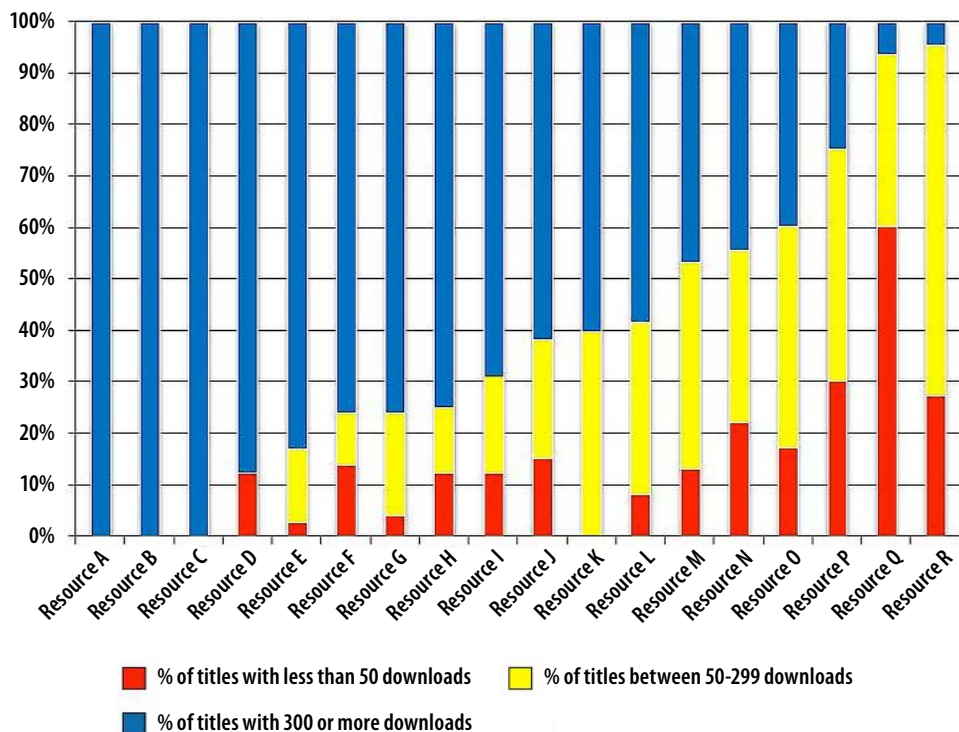
Figure 4: The percentage of overall costs versus the percentage of overall usage for various resources



E-Journal Collection Performance

If your institution subscribes to a number of e-journal collections, assigning each title to a usage band is a useful method of evaluating the performance of the collections. For IReL, three usage bands are used, less than 50 downloads in the year, 50 to 299 downloads, and 300 or more downloads. The example in Figure 5 shows the percentages of titles within each band for each e-journal collection. The blue represents the percentage of titles in the collection with 300+ downloads and we can see that resources A, B and C have 100% of their titles in this usage band (Figure 5). In contrast resources Q and R have less than 6% of their titles with 300+ downloads and 60% of resource Q's titles have less than 50 downloads, indicated by the red portion (Figure 5).

Figure 5: The percentage of the journals in various e-journal collections with less than 50 downloads, between 50 and 299 downloads, and greater than 300 downloads



Using this method can help one identify collections that may have a small number of strongly performing titles but numerous titles with little or no usage. It may be worth investigating if it would be cheaper to subscribe to the strong performing titles on an individual basis and cancel the subscription to the full collection.

Journal Impact Factor

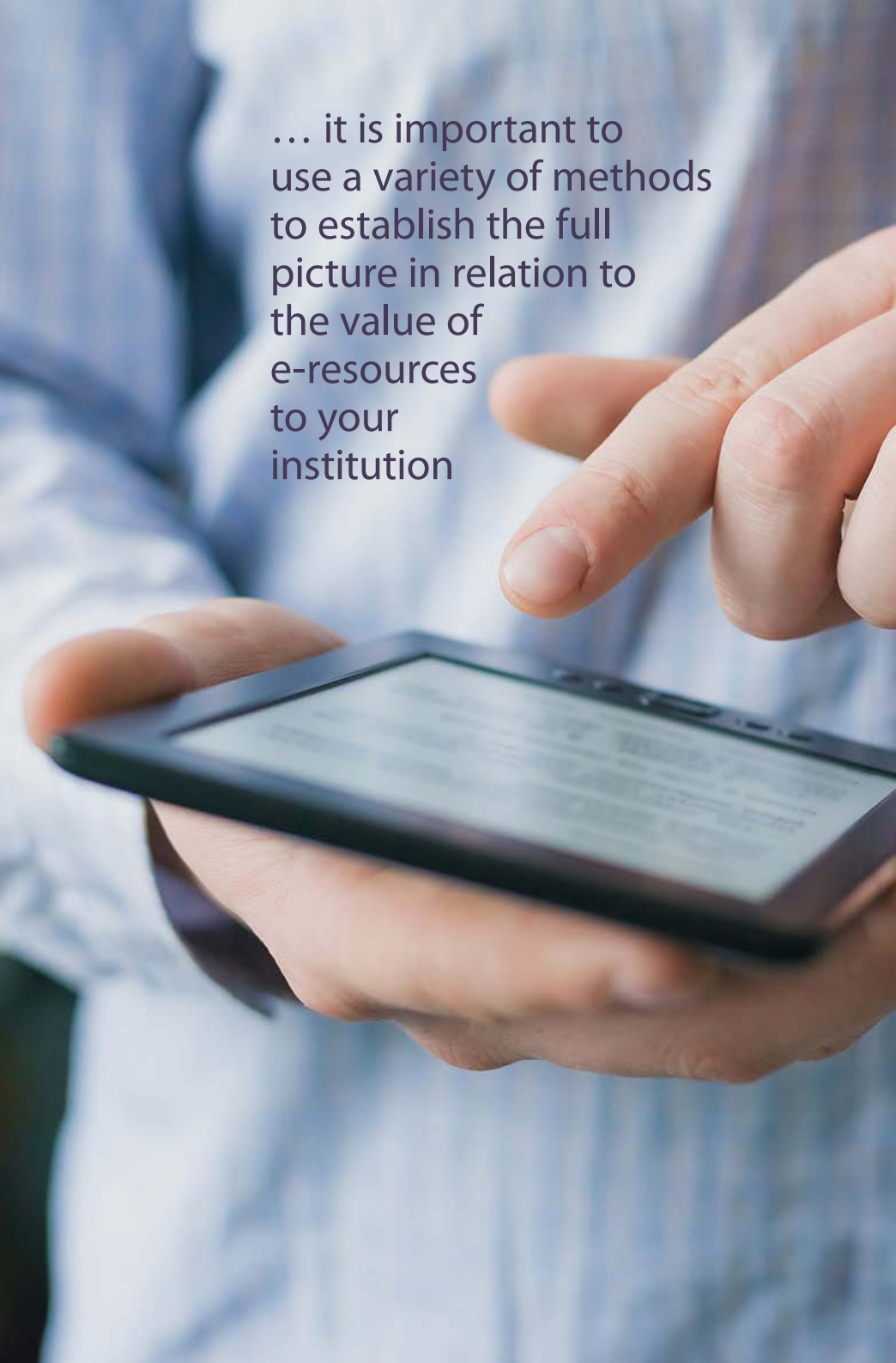
The Journal Impact Factor is a benchmark of a journal's reputation and reflects how frequently articles in a peer-reviewed journal are cited by researchers in a particular year. The Journal Impact Factor is the average number of citations counted in a given year for articles published in the previous two

years (Garfield 1999). The Journal Impact Factors are published each year in Thomson Reuters' Journal Citation Reports and are based on Web of Science citation data. Impact factors help to evaluate a journal's relative importance, especially when compared with other journals in the same field. The example in Figure 6 shows the top ten biology journals based on 2012 Journal Impact Factors. If your institution teaches or conducts research in biology you could compare this list with your holdings to see how many of the top ranked journals you subscribe to. The missing journals could then be considered for procurement if funds are available and if your users feel that they are relevant.

Figure 6: Screenshot of the top ten biology journals as ranked by Journal Impact Factor from the 2012 Journal Citation Reports® (Thomson Reuters)

Mark	Rank	Abbreviated Journal Title (linked to journal information)	ISSN	JCR Data ^(j)					
				Total Citos	Impact Factor	5-Year Impact Factor	Immediacy Index	Articles	Cited Half-life
<input type="checkbox"/>	1	PLOS BIOL	1545-7885	22908	12.690	13.447	2.151	152	5.2
<input type="checkbox"/>	2	BIOL REV	1464-7931	6326	10.256	10.949	1.811	53	8.7
<input type="checkbox"/>	3	Q REV BIOL	0033-5770	3312	7.500	7.904	0.111	9	>10.0
<input type="checkbox"/>	4	PHYS LIFE REV	1571-0645	659	6.583	6.690	9.455	11	3.5
<input type="checkbox"/>	5	BMC BIOL	1741-7007	2631	6.531	6.384	1.695	59	3.5
<input type="checkbox"/>	6	PHILOS T R SOC B	0962-8436	26581	6.230	7.298	3.522	289	7.3
<input type="checkbox"/>	7	FAGES J	0092-6630	39540	5.704	6.222	1.130	462	0.1
<input type="checkbox"/>	8	P ROY SOC B-BIOL SCI	0962-8452	37539	5.683	5.832	1.224	624	8.4
<input type="checkbox"/>	9	BIOESSAYS	0265-9247	8695	5.423	4.814	1.291	134	8.2
<input type="checkbox"/>	10	BIOSCIENCE	0006-3568	10903	4.739	6.146	1.272	81	>10.0

There are alternative metrics to the Journal Impact Factor such as the SCImago Journal Rank indicator (SJR) (Guerrero-Bote and Moya-Anegón 2012) and the Source Normalized Impact per Paper (SNIP) (Waltman et al. 2013) which can also be used to compile lists of top ranked journals in various disciplines. Both SJR and SNIP are based on Elsevier's Scopus citation data.



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Institutional Priorities

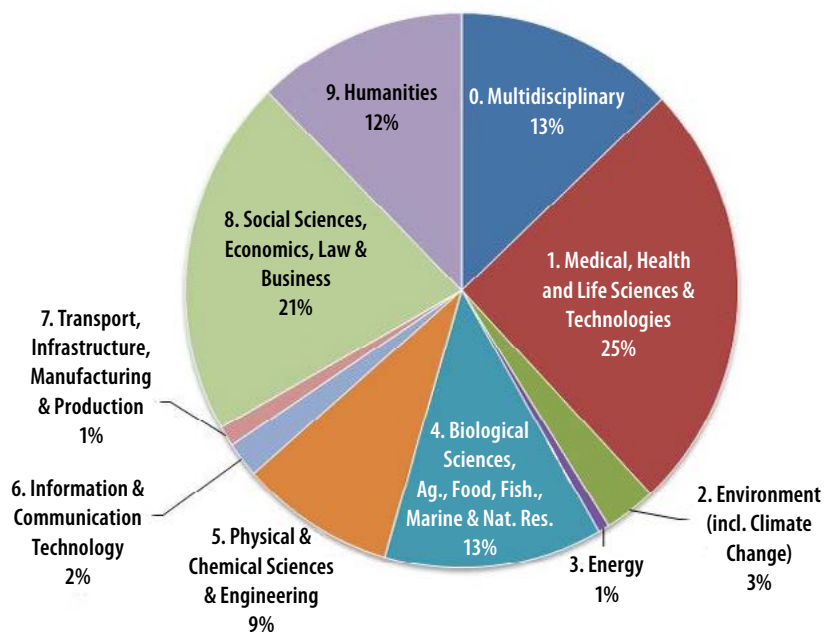
Another method of measuring the value of e-resources is to see how well they complement the priorities of your institution. Many public libraries, including Dublin City Libraries (Hayes 2012), Roscommon County Libraries (Roscommon County Council Library Services 2011) and Cork City Council Libraries (Cork City Council Libraries 2010), have library development plans which contain a list of the objectives and aims that are hoped to be achieved within the timeframe of the plan. The e-resources provided by the library may assist in achieving some of these aims and objectives. For example, e-resources can help achieve aims in relation to creating a library service that is open and accessible to everyone by providing remote services and online audio books which can be used by people with visual impairments. In addition, some library development plans, such as the Mayo County Library Development Plan 2011-2014 (Mayo County Library 2011), have specific aims to provide online databases, e-books and online audio books. The national *Opportunities for all* public libraries strategy for 2013-2017 (Department of the Environment Community and Local Government 2013) includes aims to improve access to information and knowledge through the provision of the virtual library and digital services, and to generate measurable data on the provision and impact of library services.

In academic libraries, it is important to examine if sufficient e-resources are being provided to cater for the institutions specific research priorities which are outlined in the latest strategic plan. It may also be useful to match your institution's e-resources against the government's research priorities as laid out in the National Research Prioritisation Exercise (Forfás and Department of Jobs Enterprise and Innovation 2011).

The National Research Prioritisation Exercise or NRPE Fields have been developed by the Irish Universities Association iResearch project team. While it is not yet set up as a standard, it is however a 'cross walk' between two well established classification schemes, the Frascati Manual Field of Science classification and the Web of Science classification. The NRPE has nine main fields and a tenth called 'Multidisciplinary' was added by the IReL Monitoring Group

to describe e-resources whose coverage encompasses several disciplines. Figure 7 shows the percentage e-journal usage by IReL members amongst the ten NRPE fields in 2011 and 2012. A quarter of IReL e-journal usage is in 'Medical, Health, Life Sciences and Technologies' with 21% of usage accounted for by 'Social Sciences, Economics, Law & Business' e-journals (Figure 7).

Figure 7: The breakdown of IReL e-journal usage in 2011 and 2012 by NRPE fields



Using a graph such as Figure 7 can help highlight which research priority areas are lacking e-resources or where usage by researchers and students is low.

Qualitative Methods

The final method of assessing the value of e-resources is to speak to the people who use your library to find out what resources they use and how they rate their importance. This can be done via informal conversations with

users or more formal methods could be employed such as surveys, online and paper questionnaires, interviews and focus groups. It is important when using these qualitative methods to assess the different types of users of your library services, so that you can establish if there are differences in the use of e-resources by these sub-groups. The different sub-groups could include academic researchers, undergraduate students, elderly people, teenagers, children, users with disabilities, and non-Irish nationals.

Surveys can be relatively simple and straightforward to implement especially with the recent development of websites such as SurveyMonkey that allow you to set up online surveys and embed them in your website or email links to your users. The IReL Monitoring Group has conducted a number of surveys since the establishment of IReL to provide qualitative data on the value of its e-resources to IReL users including the 2007 IReL Impact Survey (IReL Monitoring Group 2007).

Point-of-use web surveys have the potential to be a useful tool in assessing the value of e-resources. This type of short, standardized web survey placed at the point-of-use has been used by the MINES for Libraries® project to measure the impact of networked electronic resources and services (Thomas et al. 2012). The aim is that this information will then allow libraries and consortia to enhance services by enabling the future allocation of resources to areas of user-identified need (Plum et al. 2010).

Conclusion

There are many methods of measuring the value of e-resources with cost-per-use being perhaps the most useful metric. However, there is no single perfect method. Therefore it is important to use a variety of methods to establish the full picture in relation to the value of e-resources to your institution. The importance of this topic is further illustrated by the establishment of an E-Metrics Special Interest Group by the International Federation of Library Associations and Institutions (IFLA) to look at "the strategies and processes for the gathering, processing and reporting of statistics and performance

measures to describe the use, users and uses of electronic and networked information services and resources" (IFLA 2012).

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