The library return on investment study – also known as ROI – began in 2007 when Elsevier sponsored a pilot project in order to establish a formula that would show a return on the university’s investment in the library.

The University of Illinois at Urbana-Champaign volunteered as the study subject. Judy Luther of Informed Strategies led the investigation and Dr Carol Tenopir and her team at the University of Tennessee, Knoxville, served as a project advisor. The results were very positive, so Elsevier agreed with Dr. Tenopir to expand the study beyond the pilot into a second phase that would seek to validate the findings of phase I, at a variety of scientific and academic institutions to learn if the ROI model could be expanded to other aspects of the “library-institution” relationship.

This presentation aims to give a brief overview of the so called “ROI phase II project” completed in autumn 2009 and share some of the CSIC results and the main global project key findings.

We’ll present the ROI libraries study we did last year at CSIC. But first we need to say a few words about Spanish National Reserach Council (http://www.csic.es) and why we’ve decided to enter into a ROI study sponsored by ELSEVIER in 2008.

The CSIC (Spanish Research Council) is a multi-sector, multi-disciplinary public research entity attached to the Spanish ministry of Science and Innovation. It is a scientific institution which collaborates with the state, autonomous and local authorities, with other research institutions (universities, public and private research entities) and with social and economic organisations both national and foreign, to which it brings its research capacity and its human resources and materials either in the development of research programmes or as scientific and technical advice and support.

Spanish National Research Council (CSIC) is the public leading scientific agency in the country. Nowadays, CSIC is a huge organization consisting of 147

AGNÈS PONSATI OBIOLS, Unidad de Coordination des Bibliotecas, Consejo Superior de Investigaciones Científicas, Madrid.
research centers and institutes distributed throughout Spain, comprising an overall staff of more than 15,500, out of which almost 9,600 are devoted to direct research activities, including permanent and hired researchers as well as fellows and with an annual budget over 800M €. CSIC network of research institutions is organised in 8 broad scientific areas including Humanities and Social Sciences, Biology and Medicine, Natural Resources, Physical Sciences and Technologies, Materials Science and Technology, Food Science and Technology, Chemical Sciences and Technologies and Agricultural Sciences. This huge scientific community is reinforced with a network of academic libraries equally spread over the country.

These libraries, in turn are organized into the CSIC Library Network made up of 76 specialized libraries. In coordination they make up one of the largest contributions to the system of scientific information in the country; highly specialized library resources of more than 1,500,000 monographs (print) and more than 45,000 titles (print) corresponding to 76,000 journal collections as well as other types of documental material such as maps, photographs, manuscripts, archive materials etc.

CSIC libraries got automated in 1985 and the negotiation, subscription and management of electronic scholarly resources began in 2000 so as to provide CSIC researchers with most updated and ease access to scientific information. Since then, the importance of electronic resources within the agenda of CSIC libraries has not stopped growing: for instance, in 2009 its digital collection totalled 8,400 subscription-based titles, in contrast with 3,303 titles in its paper collection. In addition, CSIC Virtual Library (http://meatlib.csic.es) gives access to 4,618 titles available for free on the Internet, which makes a total of 13,018 electronic titles at the disposal of CSIC end-users.

CSIC libraries also holds an important collection of 197,000 e-books, and other important e-resources like databases, repositories… etc.

Overall, CSIC spent 8,959,325 € to enable its research centers to access a varied range of scientific information, including electronic journals, e-books, reference databases and so on through its network of libraries in 2009. Further, usage statistics show that researchers make use of electronic material more and more: thus, full texts articles in electronic journals were downloaded 2,497,932 times in 2009, which makes a 6.15% more than in 2008. By the same token, the collection of e-books, containing 197,000 titles, was downloaded 109,902 times in 2009, that is to say, an 80.41% more than in 2008.

But… Why ROI studies now within the library environment? and what a ROI study can do for libraries improvement?

In 2008 we’ve heard that ELSEVIER were seeking for candidates to participate in a new ROI project and CSIC agreed to do so because at that time we’re very interested in showing up which could be the possible ROI after 9 years of huge institutional investment in digital collections.
Using figures from the Association of Research Libraries, we can see that while the amount of money libraries spend on resources has gone up over time, library users perceive a decrease in the value of the library overall as an information gateway.

Other studies show that the library is increasingly becoming disenfranchised from the actual research process, and that library patrons at institutions have come to perceive that information resources are available electronically from sources other than from their own library.

![Library value gap emerges: ARL expenditures vs perception of library](chart)

Nowadays, and specially in turn down situations like the one we’re living in Europe and specially in Spain, research libraries must find ways to demonstrate the value of their collections and services to their funders and the researchers they serve. Return on investment is one way to quantify the value of the library in research.

The perception that “library is increasingly becoming disenfranchised” along with a combination of other factors (economic ones… etc), makes establishing a ROI for libraries more important than ever. It’s time to visualize what libraries “do” to improve institutional scientific performance. That’s the reason why CSIC had decided to join the ELSEVIER ROI PROJECT in 2008.

Establishing value in the past has typically been accomplished by libraries,
first through focus groups and opinion surveys – these provided valuable testimonials that both expressed support for the library mission as well as suggestions for improvements. Once usage logs became more widely available, implicit value as expressed through usage statistics was deemed another value measure. Libraries then became even more sophisticated by conducting actual use surveys in order to show the relationship between data, value, and outcomes, and even made some attempts at establishing a return on investment. The goal of the late has been to focus on ROI as a true quantifiable model for measure.

In the previous library ROI studies, it was established that in order to demonstrate that library collections contribute to the income-generating activities of the institution, the case needed to be made that for every monetary unit spent on the library, the university/institution received a monetary unit in return.

The ROI study (Phase II) was focused on the “Grant Research Cycle”. The study examined returns of the library resources collection for the grant process of CSIC researchers, so it kept the focus on ROI for grants income.

The overall analytical approach of the study was to combine a) the interviews with key university leaders that capture the institutional goals, b) collect the library budget figures and the grants income, and then c) to overlay all with intelligence from the faculty survey, collecting both data as well as testimonials that focus on outcomes of using the library.

In order to perform the ROI study, different types of data and sources for obtaining that data were identified, and a model was drafted. Ten years of quantitative and qualitative data was asked and provided for further analysis. [CSIC study covered 8 years of completed data (2000-2007)].

The map below gives a visual representation of where in the world the participating institutions were located. 8 institutions, some academic, some scientific... with of course different sizes, missions, budgets, and policies, but all interested in a study that would help them to increase within its own institution the library value for research and education.

**ROI Phase II Institutions**
The quantitative data provided by each institution, numbers or percentages, as appropriate, were input into the model below, which were then juxtaposed and complemented with interviews and survey responses (ie. Qualitative data), finally a ROI result within a contextual framework for each institution was delivered by Tenpoir’s team.

ROI grant income formula

\[
\text{ROI grant income} = \frac{(\text{number of grants awarded} \times \text{% of faculty who say citations are important to grants awards})}{(\text{number of grant proposals} \times \text{% of proposals that include citations obtained through library})} \times \frac{\text{average size of grant} \times \text{number of grants in one year}}{\text{total library budget}}
\]

First step of the ROI project was to conduct in-depth interviews with Scientific Institution leaders. As was revealed from these interviews, there are many similarities in the visions and goals that institutions have worldwide, and as expected, some differences were uncovered too, particularly in the areas of institution mission, funding sources, mandates, and library alignment with the institutional mission.

Second step ahead was the faculty survey. The red boxes below indicate the questions needed to establish the ROI calculation model.
Scientists survey also asked a few questions in order for other types of analysis that the participating libraries might find valuable, including an open-ended question that could potentially provide revealing testimonials from faculty.

Finally, questions were also asked to evaluate faculty participation in the survey.

At CSIC, the faculty survey had been sent to 5,580 scientists and 1,180 answered it, which means a 20% success rate. Tables show information regarding scientific disciplines coverage in the faculty survey and CSIC research tiers distribution.
Faculty survey discipline distribution

Next table shows information about number of CSIC grants (funded-not funded) and money distribution.
CSIC faculty survey main results can be seen in the following table. In brackets the average results from ROI Phase II.

CSIC scientists submitting grants reported that 75% to 99% of grants cited items were accessed from the online library. Digital collections are heavy used but with different extents depending on disciplines and of course depending on e-resources coverage.

<table>
<thead>
<tr>
<th>References in proposals are essential, very important, important</th>
<th>95% (71%-98%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average number of citations in proposals</td>
<td>31 (20-46)</td>
</tr>
<tr>
<td>Percent of citations in proposals (recognized) from library</td>
<td>75%-99% (50%-99%)</td>
</tr>
<tr>
<td>For every article cited, average number of more that are read</td>
<td>27 (18)</td>
</tr>
</tbody>
</table>

The survey also reported some qualitative comments made by faculty about e-resources value and accessibility and qualitative comments regarding impact of e-resources on productivity... and comments on value of e-resources to research.
Value of E-Resources

“The capability of doing thematic and author searches gave me a new control on my research field.” CSIC

“A sure way to kill a proposal is not to give proper credit or to not update new developments.” UIUC

“You have access to many more articles and although you do not read them completely, you are more aware of what is going on in the field.” CSIC

“Access has made collecting research resources infinitely more efficient; and facilitated interdisciplinary research.” UT

Impact on Productivity

“I guess that on average the online access saves me more than 10 hours per week.” CSIC

“My productivity would drop at least four fold if I had to go to the library for all my needs.” UIUC

It has saved me plenty of time...I can have remote access from home, which allows me to work on weekends.” CSIC

“The task of finding the most pertinent articles on a new topic used to take a full afternoon. The same work can now be completed in 15 to 30 minutes.” UT
Since it appeared from the faculty survey the library is an important gateway to e-resources, Library and it's e-collections and e-facilities has also some administrative values which were expressed.

After completed ROI study, we can so far show with some quantitative as well qualitative data that demonstrate that:

- Faculty use library resources to support their work.
- Library collections help faculty in areas of productivity, efficiency, interdisciplinary explorations, and international collaborations.
- Institution leaders can see and use the library to help recruit and retain faculty raise the institution’s prestige foster innovative research and interdisciplinary collaboration. Library plays a role in promoting the institution's international reputation and giving a higher level of visibility.
- A majority of faculty view the library and its resources as valuable to research and integral to the grants process.
- ROI results for grants income can vary widely depending on different scenarios.
- This study is solely on the contributions of the library’s resources to the grant process income. There are other ways to measure library values (like values on teaching, student engagement, institutional overall mission etc.).
On a high level, ROI results for grants vary widely and for a variety of reasons. This study clearly shows that caution is needed when comparing ROI among institutions with differing missions, and that “ROI for grants” is only one of many other measures of the library’s value.

The aggregated ROI results for all of the participating institutions, including a re-calculation for University of Illinois at Urbana-Champaign (University 9-phase 1), are shown on the next table.

<table>
<thead>
<tr>
<th>University</th>
<th>ROI</th>
</tr>
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<tbody>
<tr>
<td>University 1</td>
<td>3.44</td>
</tr>
<tr>
<td>University 2</td>
<td>15.54</td>
</tr>
<tr>
<td>University 3</td>
<td>0.27</td>
</tr>
<tr>
<td>University 4</td>
<td>13.16</td>
</tr>
<tr>
<td>University 5</td>
<td>0.55</td>
</tr>
<tr>
<td>University 6</td>
<td>1.31</td>
</tr>
<tr>
<td>University 7</td>
<td>0.64</td>
</tr>
<tr>
<td>University 8</td>
<td>1.43</td>
</tr>
<tr>
<td>University 9</td>
<td>5.60</td>
</tr>
</tbody>
</table>
The global results from the ROI Phase II were separated into 3 categories:

– The highest value ROIs come from institutions with a pure research mission or with a concentration in science and technology.
– The middle values are from research-oriented institutions that cover all disciplines and include both teaching and research; these may be located in an environment where seeking externally funded competitive grants is a priority and funds are available.
– Lower values are either from comprehensive liberal arts institutions with a mix of research and teaching, from universities where grant monies may be limited or full data was only available for a portion of total institution, or are institutions that rely primarily on government funding instead of competitive external grant funding.

In addition to the ROI studies that Elsevier had supported (Phase I and II), a number of other recent reports have been published, including the 2009 Research Information Network study entitled *E-journals: their use, value and impact*.

Contained in this study is information that shows strong correlation between articles downloads and research outcomes. Of particular note from the RIN report is that a 100% increase in downloads shows a statistical association with dramatic increases in research productivity. Journal use and expenditure, correlates with research outcomes: “… per capita expenditure and use of e-journals is strongly and positively correlated wit papers published, numbers of scientific awards and research grants and contracts income… In general these correlations are independent of institutional size”.

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