Working for an open e-publishing service to improve GL editorial quality

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Abstract
A survey of in-house publishing practices at CNR Institutes is described. Fourth categories are introduced to measure the level of innovation in the management of in-house publications in order to identify the business model used by each CNR Institutes to manage their editorial products, especially digital products. Data used for this descriptive and quality study were obtained from CNR Institute websites.

1. Introduction

The widespread adoption and diffusion of the Internet as well as the increasing application of digital publishing technologies have modified and streamlined functions, processes and products in the scholarly communication chain. The consequences of the application of ICT in context of scientific research and education has been analyzed in many studies. Starting from the first contributions (Roosendaal 1997, 2004; Gierveld 2002) that were focused on the transformation of the linear scientific information chain, through to more recent studies on the changes in scholarly communication focused on e-science collaboration and information and data sharing (Borgman 2007; Tenopir et al. 2012), many analyses are now focused on added—value services embedded in the digital publishing technologies. The latter particularly point out the key role played by academic and research libraries in challenging the traditional business publishing model on in favour of a more sustainable economic model to produce and diffuse scholarly research outputs. Many of these studies refer to e-publishing library services development which *is rapidly becoming a norm for research libraries, particularly journal publishing services* (Mullins et. al. 2011; Iglezakis et al. 2011).
Moreover, the widespread diffusion of electronic publishing technologies is increasing digitization initiatives addressed to traditional libraries' print collections, which involve also Grey literature collections. This means that digital publishing technologies are creating a "second life" for traditional and valuable grey documents and this innovative way of managing grey contents can improve editorial quality, as well as, their diffusion and discovery.

Several studies and reports have demonstrated that moving from print to a digital publishing model reduces production costs through rationalization and automation of editorial procedures (Houghton 2011;Willinsky 2011; Crow et al. 2009). Within this context studies on innovation emphasise the combination of electronic publishing and open access as represent the major drivers of editorial changes.

2. Research hypothesis and aims

Generally an editorial activity is a component of scholarly communication that can be managed as an autonomous activity and/or integrated with the management activities of the scientific production of an academic or research institution.

These activities can be carried out in-house and/or in collaboration with commercial publishers.
Our basic premise is that the editorial activity depends on the organizational-productive context while the number and type of editorial products depends on the disciplinary area. Moreover it could be carried out in an innovative way in terms of process and/or products, to make the editorial process more efficient and effective.
The National Research Council (CNR), is one of the biggest Italian multidisciplinary research institutions and comprises a network of 109 Institutes geographically distributed Institutes, which have scientific and organizational autonomy. One of the institutional missions of CNR is the diffusion of scientific information in Italy and its editorial products reflect this institutional mission. At local level too, CNR institutes have always created their editorial products strictly connected with their studies and research interests, tailored to different target of users (general public and/or their research community), for their production and diffusion they have used and still use conventional and non conventional channels. Of course this activity may vary from Institute to Institute.

The survey analyses in-house production available at CNR Institute web sites to identify: a) type of products and use of bibliographic elements; b) technology used to manage in-house products and c) degree of innovation concerning the management of the contents; and finally d) access and discovery of products. In other words the analysis concerns the description of the business model used in the editorial production and the policy adopted for the diffusion of its contents.
As the framework of our analysis are new publication models strictly connected with open access movement, the general aim of the survey is to obtain information on current publishing practices at CNR institutes as a means to improve editorial quality of in-house scientific publications and increase visibility of CNR scientific products.

3. Materials and Methods

3.1. Survey design

The object of our analysis is CNR institutes' editorial products published in-house and/or in collaboration with commercial publishers.

The survey was divided into two phases.
In the first phase, we checked each CNR Institute website to gather preliminary information about in-house production, identifying current and ceased editorial products directly produced and managed by CNR Institutes, in a stable standardized way and with continuity. Then we classified Institutes according to a set of criteria that measures the level of innovation in the management of their editorial products (see box).

I (*Innovative*) Institutes that manage in-house-publications applying an editorial control that includes at least an identifiable standardized series title and numbers; and using electronic-publishing systems to manage editorial processes.
A (*Traditional*) Institutes that manage in-house-publications applying an editorial control that includes at least an identifiable standardized series title and numbers.
Z (*No editorial control*). Institutes that produce GL without applying any editorial control or where we could not find any information on their production on their website
X (*No in-house publications).* Institutes that do not produce GL at all and/or produce it sporadically - <5 per year-.

In the second phase, we have chosen, among in-house publications, the editorial products, with a minimal set of editorial and bibliographic elements (i.e.: series title and/or number) produced by the Institutes belonging to Letter I and A, and we have analysed their products in terms of:

- Type of products and their publication frequency
- Type of production/diffusion
- Technology used
- Access policy

Data was collected from CNR Institute Websites, between June and September 2012.
For those websites with scarse information about their in-house production, we also checked the CNR central archive that collects both conventional and non conventional literature, and also includes the editorial products produced and managed by CNR institutes.
In addition we decided to conduct informal phone interviews with the manager of the CNR Institute library, to obtain further and more detailed information, in particular on the procedure used to manage the editorial products, critical issues connected with the editorial activity, such as budget and human resources as well as future editorial plans. The phone interview further considered the characteristics of the publishing systems used, focusing in particular on the technical requirements for locally developed systems.

2.2. The business model

An important part of our analysis aimed to identify the business model used to manage in-house publications by CNR Institutes that fall in the category I, namely the Institutes which have introduced changes to the editorial process and/or created a new end product, in other words those Institutes that make the editorial process more efficient. As mentioned before, digital publishing technologies have in addition led to many changes in the core functions of the libraries and publishers, as well as of scholars, affecting the general flow of an editorial processes.
In our view the main steps that are foreseen in an editorial process encompassing different phases.

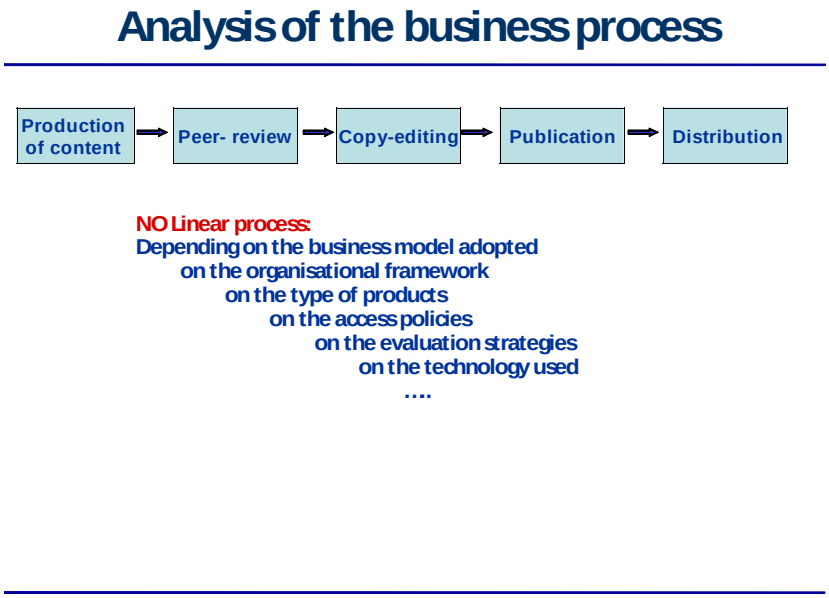

Fig. 1. Business process model

It starts with the production of content, that is the acquisition of contents that are going to be published. These contents can be managed as an internal or external activity and can be automated or not. The contents may be subject to peer review or other reviewing systems or not. Then there is the phase of copy-editing where the manuscript is submitted to improve editorial quality and ensure the content's bibliographic and textual style, while the proof reading checking for typos and layout

transforms the editorial product for publication and distribution
Most of these activities can be carried out in-house or outsourced to external services providers or also to commercial publishers.
Along with the aforementioned issues the business model also depends on the policies adopted fo access to contents, ranging from subscription fees to full OA, but also on the products which can be peer reviewed or not and, of course, on the technology used. In addition the editorial process can be influenced by the organizational framework and human resources available, or by the type of products to be produced. (Journals, monographs or reports are very different in terms of cost. The cost is higher for a monograph compared to for example that of a reports.

To identify the business model we checked for each editorial products the type of business process carried out: a) how the Institute manages products in terms of production & diffusion and/or distribution and which phases were externally managed; b) if the Institute has introduced some changes to the editorial process management (we checked whether the contents of the editorial product were not just a version of the printed one) and, c) if they make use of an online content management and publishing platform or an electronic handling manuscript system (content management system).

4. Results

Table 1 shows the results of the first phase of the analysis that aims to classify the level of innovation of CNR Institutes in the management of in-house production.

Table 1. *Number of CNR Institutes by Department according to grouping criterion (see box**)*

DEPARTMENTS	*Number of Institutes*	***I***	***A***	***Z***	***X***
Earth & Environment	13	2	3	8	0
Agricullture & Food	10	1	2	7	0
Biomedical Sciences	17	0	0	7	10
Chemistry & Materials Techn. Sciences	14	0	0	7	7
Physics Sciences	14	0	2	5	7
Engineering & ICT	21	1	7	12	1
Social Sciences & Humanities	20	6	8	5	1
Total	**109**	**10**	**22**	**51**	**26**

The majority Institutes that have a variety of in-house production, managed in different ways (ranging from the most innovative to traditional) are concentrated in the Departments of Earth and Environment, Agriculture and Food, Engineering and Social Sciences and Humanities.
Conversely, institutes belonging to the Department of Biomedical Sciences and Chemistry don't either produce GL or carry out any in-house editorial activity to manage and diffuse their products. They obviously use traditional channels to diffuse their research results.
However, as we can see in the table, there are many Institutes that are classified in category X (26), these are Institutes which produce GL sporadically and in a very limited number (> 5 x year).

The Institutes classified in category Z (51) produce a lot of GL documents, that are not organized in well-established, standardized series. This is also confirmed in a previous survey (Di Cesare, 2010). These are GL documents produced “ad hoc”, such as project deliverables, conference proceedings and so on and this is the case especially for institutes belonging to the Engineering and Information Communication and Technologies Department (ICT).
They were excluded from the analysis because their products lacked the minimal set of editorial and bibliographic elements.
Further to the recent signing of the Berlin Declaration by the CNR, following the development of the CNR Institutional Repository (IR), a working group was established to elaborate specific guidelines for quality and metadata control of the CNR researchers’ output, including current and back GL collections. So we hope in the near future to have more suitable procedure in the management of in-house publications, together with consistent editorial policies for all CNR Institutes.

4.1.CNR Institutes editorial products

Table 2 shows the number of traditional and digital products broken by CNR Department. We found 106 editorial products with the minimal editorial set (i.e.: series title and/or number, corresponding to inclusion criteria) to be included in the analysis. 106 out of 19 – equal to 18% - are digital products.

Table 2. *Number of editorial products by Department*

Department	***Number of editorial products***	***Traditional product***	***Digital product***
Earth & Environment	14	8	6
Agriculture & Food	8	6	2
Biomedical Sciences	1	1	0
Chemistry & Materials Techn. Sciences	0	0	0
Physics Sciences	2	2	0
Engineering & ICT	11	9	2
Social Sciences & Humanities	70	61	9
Total	***106***	***87***	***19***

There is an evident concentration of traditional products in the Department of Humanities and Social Sciences, with 70 out of 106 and are predominantly only in print version. The digital products represent a small proportion (fig. 2) of the editorial products (17%). The Department of Earth and Environment accounts for 42% of digital products, a high value considering the total number of products produced and compared to the 12% of the Department of Humanities and Social Sciences.

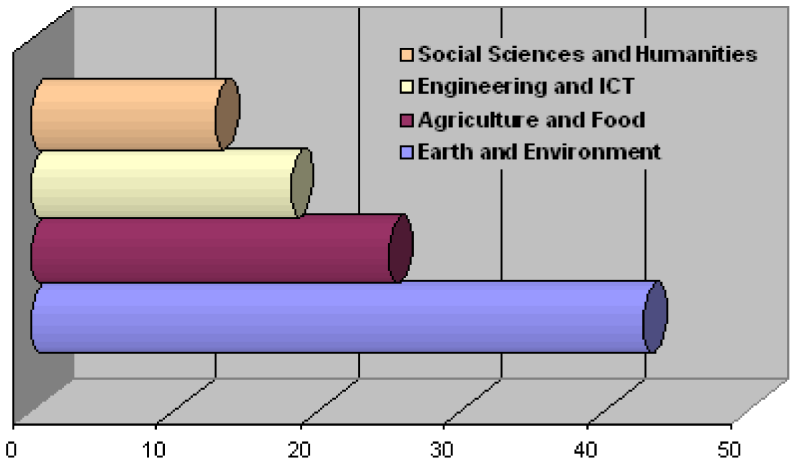

Fig. 2. *Digital products by department (%)*

As expected (fig. 3) we found that the journals are the majority of document types that are published online. This is not surprising because usually the Journal product is the first type of document that was supported by electronic manuscript handling system and has now shifted to online publishing. In our sample, journals account for 13 out of 19 – equal to almost 70%, - 2 of which are digital-born and open access. Both are journals produced by the Department of Humanities and Social Sciences.

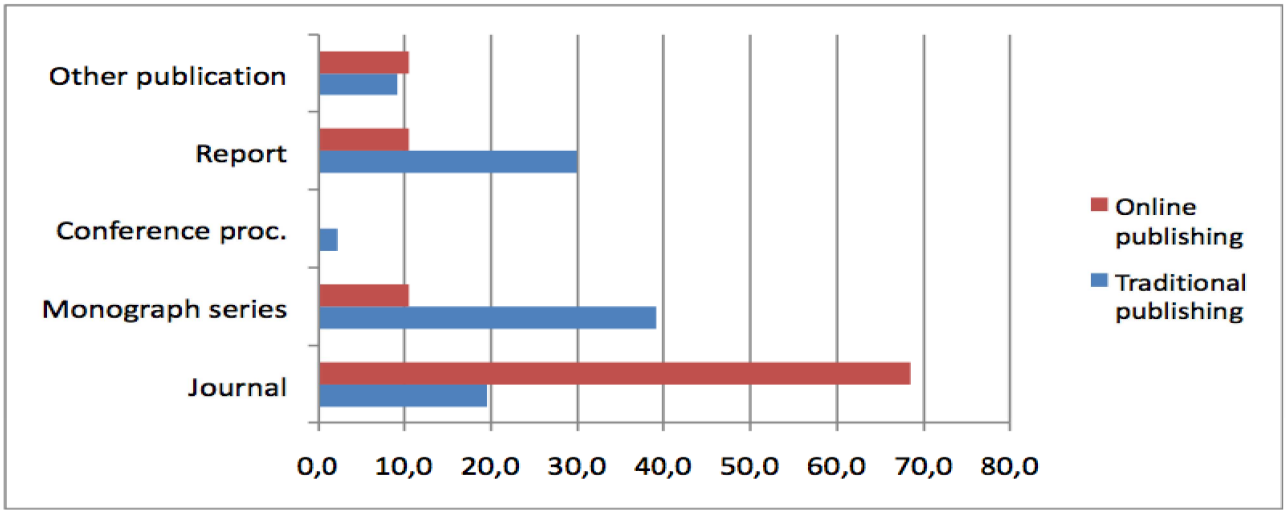

Fig. 3. *Traditional and online publishing by document type*

4.2 Traditional and online publishing

Figure 4 shows traditional editorial products produced by CNR Departments. Many of them are established and valuable collections and have been published without any interruption since the foundation of the Institute. They are products that are typical output of a scientific community, including journals, monograph series and reports. The Department of Humanities & Social Sciences produces the whole range of products, especially Monographs that are well known in the international scientific community for their high-profile. While reports are almost exclusively in-house productions of other Departments and equally quantitatively relevant.

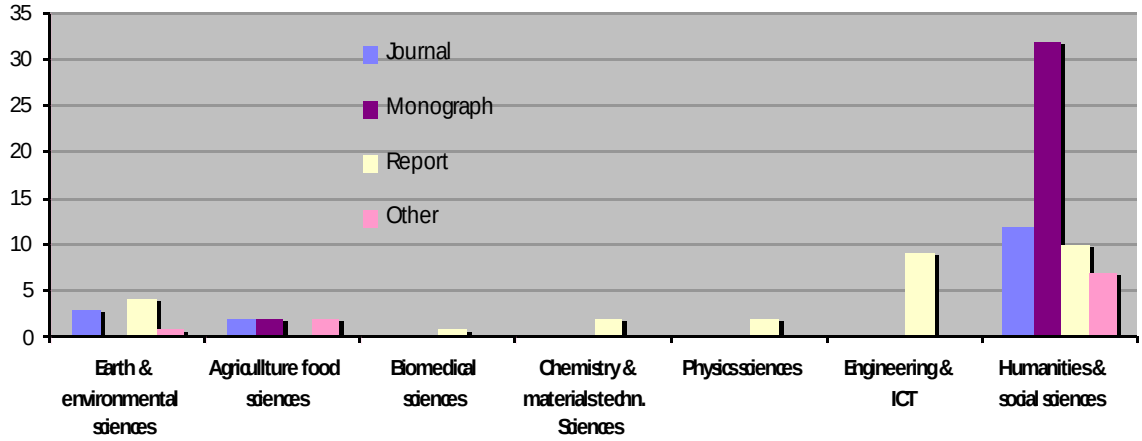

Fig. 4. *Traditional editorial products by Department*

The figure below shows the digital products managed by electronic publishing systems. They are, as already mentioned, mainly Journals that more frequently shifted from printed to digital formats and adopted proprietary or open source systems to support the whole publishing process taking advantage of flexibility, easy reusability of the content and cost saving. The majority of online publishing journals are concentrated between the Department of Earth & Environment and of the Department of Humanities and Social Sciences, while lower numbers are found respectively for the Departments of Engineering and Information Communication Technology and only a single example for that of Agriculture & Food.

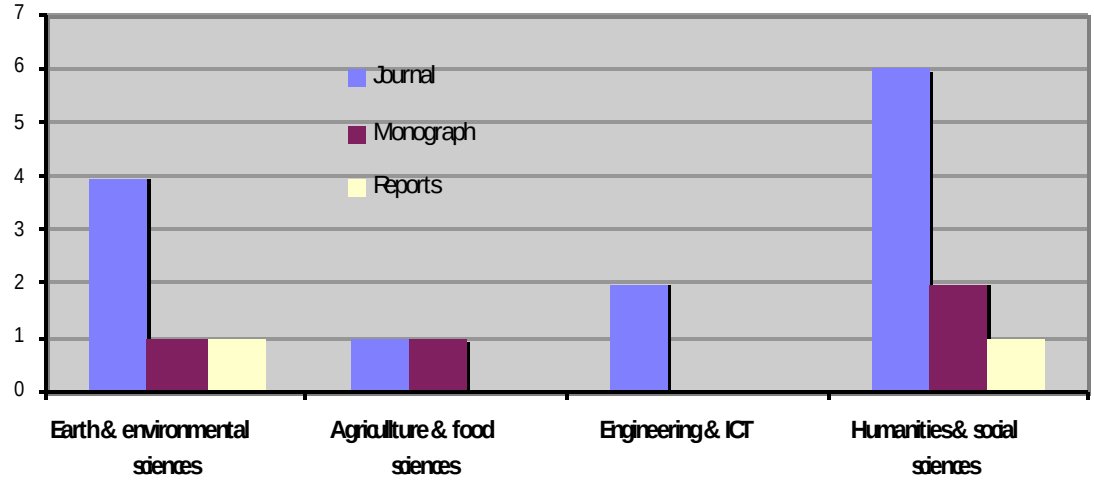

Fig. 5. *Digital editorial products*

Clear differences in the digital publishing can be noted for the other kind of documents such as reports and monographs. Of course we think that these documents too can benefits from the advantage of electronic publishing systems[1]. (Costigan 1999, 2004; Crow 2009).

[1] CIAO (Columbia International Affairs Online) is one of the first digital publishing project to put online scholarly information in the field of international affairs. CIAO includes now full-text online books, journals, seminars and research projects, working papers, reports and conference proceedings. Launched in 1997, CIAO project was presented at a previous GL Conferences (1999, 2005).

As regard the reports series, there are not many of them that benefit from electronic publishing systems. The general practice is that "high quality printed report series" have been gradually replaced by digital formats, and sometimes back issues have been digitized and made freely available from the institutes' website. This conversion from paper to electronic formats has not changed the production process, even if there is a clear advantage for end users. However, the use of electronic publishing systems to manage also the production and distribution of reports could represent a step forward in terms of editorial quality and above it can introduce additional services such as peer review, indexing and abstracting in general and specialized search engines facilitating the web discovery.
In this context, it is well known that the CNR central library collects and manages valuable reports produced over time by CNR research Institutes. They could represent a starting point for a consistent digitations project within CNR. Moreover, it would be interesting to connect this initiative with the print collections stored in OPENSIGLE. This initiative would take into account Lynch's observation in reported in a recent study (Lynch, 2009; Hahn, 2008),.
In the case of monographs as we have seen previously, (fig. 4), a certain number of them are produced in-house following the traditional publishing process, while only a limited number is currently managed by e-publishing systems (fig. 5), because this would imply the change of the whole editorial process. In fact their shift to an innovative production model is more complex if compared, for instance, with the production of reports. However, considering that monographs, especially in Humanities and Social Sciences, are mainly scientific-based output and often a *niche product*, the use of e-publishing systems could be a valid alternative for cost containment, and we know that monographs in particular suffer budget constraints. Besides they are generally locally oriented, and often publish in their native language since they have greater difficulty finding commercial publishers. Last but not least, they are very expensive to produce and only few commercial publishers accept to publish in narrow and targeted study areas and even if they publish, they do not always guarantee a wide diffusion of contents or indexing and abstracting services.
In this regard many studies and reports stress these critical issues within Monographs. Some of them focus on the insustainability of traditional business models and report examples of successful experiences carried out by e-publishing library services as well as through alliance with more collaborative commercial publishers. (Hahn 2008; Alenius, 2007; Besen 2012, Ferwerda 2010; OAPEN project[2])

4.3. Some characteristics of the editorial business process

Table 3 provides an overview of the main characteristics of digital products management that we have analysed.
For the majority (68%) of digital products all the activities connected with their production and diffusion are carried out in-house, from content acquisition (including submission and peer review) to the online publications of the content. For a smaller proportion (26%) of digital products, the Institutes externalize part of the editorial process, often the phases of copyediting and publishing. As can be noted paper and electronic diffusion is still the dominant solution and for these reasons some commercial publishers are in charge of providing the printed copy while in other cases print versions are available on demand directly from the producers. Sometimes commercial publishers are responsible for management of membership fees and subscriptions.

It is now managed by EPIC (Electronic Publishing Initiative at Columbia University), together with other two e-publishing projects developed at the Columbia University

[2] OAPEN project stands for Open access publishing in European Networks- OAPEN developed and implemented open access publication model for peer reviewed academic and research monographs in the Humanities and Social Sciences.

Tab. 3 *Profile of digital products (=19)*

Production & Diffusion	n.	%
In-house	13	*68,4*
Partially in-house	5	26,3
National commercial publisher (for print distribution)	*10*	*52,6*
International Commercial publisher	1	5,3
Access policies		
Full OA	15	78,9
Delayed OA	2	10,5
Open access online/Subscription for print	1	5,3
Subscription (online & print)	1	5,3
Technology used		
Content management system	12	63,2
Open source electronic publishing system	6	31,6
Publisher'platform	1	5,3
Copyright & Licensing		
Yes	*14*	73,7
Not available	*6*	31,6
Peer review		
Yes	*14*	*73,7*
Not available	*5*	*26,3*
Scientific committee & editorial board	**19**	
Yes	*14*	*73,7*
Not available	*5*	*26,3*
International standard codes		
Yes	*16*	*84,2*

Coming now to the technology used, the table shows that 5 out of 19 digital products are managed using Open Journal System (OJS). OJS is a journal management and publishing system that has been developed by the Public Knowledge Project. It manages every stage of the publishing process, from submissions through to online publication and indexing, including peer review process. It is currently the most suitable and widely used system to manage online publications. OJS it is also OAI-PMH compliant and supports interactive functionalities, such as reading and social network tools (Willinsky 2005; Brian & Willinsky 2010).

However, in our survey we found that the majority of digital products are managed using content management systems. It is interesting to note that in one case the Institute has developed locally an OAI compliant open source publishing system to manage its journal. This is the case of the journal "Archeologia e calcolatori" (Moscati 2009)

With regard to access policies to the content, the majority of products are open access (15 out of 19) and most of them provide information related to copyright and licensing. Peer review and scientific committee and/or an editorial board are also contemplated for the majority of them. Finally, almost all have International standard codes.

Summarizing, in our survey the hybrid business model is the dominant solution: it combines in-house editorial activities with partial externalization. Moreover, it mixes open and toll-access as well as print and electronic format to diffuse the contents. In general we can say that each CNR Institute has its own business model and even within the same Institute there are different management models depending on the type of product.

4.4. Examples

The following examples are representative of different business models adopted by CNR institutes.

1. ***Journal of limnology***

This is an example of the evolution from traditional to innovative publishing. It is a journal directly published by CNR since 1942 in the very specialized field of limnology one. At that time it was a forerunner in environmental studies. Since 1999, it has been an electronic open access journal. The content acquisition and management together with the peer review process is still managed by the CNR institute, while all the activities related to copy-editing and publishing are outsourced to an external e-publishing service that uses OJS platform. If subscriptions for the printed version are required, there is a local commercial publisher that provides them.

2. ***Archeologia e calcolatori***

This is an example of best practice. In 2005 the Institute followed the open access principles and developed an OAI-PMH compliant e-publishing system. The OAISISTEMA used a simplified solution to manage an OAI-PMH repository. In 2006 Archeologia e Calcolatori was indicated by Los Alamos National Laboratory study as an example of systems that enabled easy and efficient content discovery.

3. ***Geothermics***

The journal Geothermics represents a different example compared to the previous ones. It was founded in 1972 by the CNR institute and appeared immediately as an international peer reviewed journal. At the beginning the editor in chief belonged to CNR while at the moment this journal has become one the Elsevier journals and the business process is completely managed by this international commercial publisher and recently the journal lost its CNR branding.

4. ***IRPPS Editoria Elettronica*** (e-Publishing service)

This last example is different from the examples described above. The project of introducing an e-publishing system in IRPPS institutes was designed and carried out by the library with the collaboration of internal researchers. We' should stress that the introduction of Open Journal System (OJS) in the publication process has varying aims depending on the types of products. IRPPS started with working papers and monograph series, introducing internal peer review for WPS and external peer reviews for monographs. The editorial staff also intend to re-publish old reports that represented a breakthrough in population studies, giving a second life to GL documents. The entire business process is carried out internally.

Conclusions

This preliminary survey focuses on well-established editorial products published by CNR Institutes, with the general aim to better understand to what extent use of new digital publishing technologies have innovated their editorial process and products. Despite a limited number of innovatively managed products, they are in line with scientific scholarly publishing connected with digital publishing technologies and on open access publishing models.
From the results of the survey, it is also clear that the well-established and standardized products, with a solid tradition in print publishing are concentrated in the Department of Humanities and Social Sciences, where the products are predominantly monographs. At the moment innovative products managed by online publishing systems are concentrated in the Department of Earth & Environment.
Concerning the business process, first of all we can say that disciplinary fields do not influence the business model, or the trends in adopting new technologies. What we discovered to be very important is the evolution towards innovative products generally based on products having a long and stable tradition, representing the history of the institute as well as the scientific achievement in a specific field. Of course many back issues aren't accessible online and we consider this the ongoing task in future CNR digitation projects, which we think should be planned and defined at departmental level.
We have seen that the business model adopted is not uniform in all institutes, each one having found its own solution. Sometimes the entire business process is managed in-house, but there is a widespread tendency to contract the publication and distribution of both the electronic and printed format to commercial publishers. From our survey some best practice examples of in-house publication management seem to emerge, especially those using electronic publishing systems with their value-added services. Certainly the use of e-publishing systems increase the quality of editorial products: additional services can increase the visibility; indexing and abstracting of products in search engines make them more easily retrievable, and the peer review process can be quicker.

Moreover, products that represent narrow and targeted study areas with a limited potential market and therefore encounter difficulty finding commercial publishers could benefit greatly from in-house publishing services. Of course, even if costs are reduced by the use of e-publishing systems, it implies the setting up of its organization, training, maintenance and updating. For these reasons a possible sustainable model could be adopted by CNR organizing it at a departmental level in order to achieve economies of scale and to optimize coordination actions.
Taking into account that e-publishing initiatives developed locally by CNR Institutes will grow in the near future, our study was an exploratory pilot study for long-term program publishing activities. In the future we will test the role of CNR libraries in the development of e-publishing services together with the CNR research community, that should be involved in founding the best innovative publishing practices suited to their needs.

In this context it is well known that academic and research libraries that have had a fundamental role in supporting Open access practices in the construction of Institutional repositories, and digitization programs are currently moving toward the development of additional services for their community scholars. This is in line with the onus on libraries to reshape their role in the digital age following changes in scholarly communication models. In this context library publishing services represent a new modality to diffuse scholarly research outputs, improve the quality of in-house published products and decrease costs of publication.

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