# Digital scholarship innovation and digital libraries: a survey in Italy

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## Abstract

A profound change is happening in the world of scholarly communication, where the object of scientific communication is no longer a linear text, although digital, but an object-centric network that consists of text, data, images, videos, blogs, also called Digital scholarship. This change is likely to deeply modify the nature and the role of the Digital Library and its relationship with the national platforms, publishers or thematic data center. The paper will present the findings of a survey about needs and practices of digital libraries in Italy.

## 1. Introduction

A profound change is happening in the world of scholarly communication, where the object of scientific communication is no longer a linear text, although digital, but an object-centric network that consists of text, data, images, videos, blogs, etc. "Digital scholarship" is the term defining the innovation of scholarly communication and it is invoked by those advocating for open access to scholarly knowledge (e.g. Charles Bailey's Digital Scholarship [1]) as well as those promoting collaborative research methodologies in the research life cycle. Science has entered a "fourth paradigm" that is more collaborative, more computational, and more data intensive (Hey, Tansley, & Tolle, 2009a) than the previous experimental, theoretical, and computational paradigms. This emerging scientific paradigm is often referred to as e-science or e-research (Hey, Tansley, & Tolle, 2009b).

This change is likely to deeply modify the nature and the role of the Digital Library and its relationship with the national platforms, publishers or thematic data center. This paper advocates that *connectivity* is the technological foundation of digital scholarship and argues that the characteristics of modern science are data-centric, multidisciplinary, open, network-centric and heavily dependent on internet technologies. Digital Library supporting scholars should be composed of interconnected discipline-specific data spaces, to enable more effective scholarly communication, to include, for example, enhanced papers and books, better links to data, the publication of software tools, mathematical models, protocols and workflows, and facilitating research collaboration by means of social media channels. The main functionality of a Digital Library as cyberscholarship infrastructure should have the ability to effectively and efficiently support a linking environment, resource sharing and collaboration.

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[1] http://digital-scholarship.org

## 1.1 Background

Issued in 2011, the Future of Research Communication and e-Scholarship (FORCE 11) group is a community of scholars, librarians, archivists, publishers and research funders. The group published a manifesto[2] offering a comprehensive vision of post-Gutenbergian scholarly communication. It forecasts:

> "*a future in which scientific information and scholarly communication more generally become part of a global, universal and explicit network of knowledge can be explicitly represented, along with supporting data, software, workflows, multimedia, external commentary and information about provenance. In this world of networked knowledge objects, it would be clear how the entities and discourse components are related to each other, including relationships to previous scholarship*".

The manifesto also outlines six key problems that prevent scholarly communication from achieving its full potential: how scholarship is evaluated; current copyright; the financial aspects of scholarly publishing; the mechanisms for assessing the quality and value of researchers; how scholarly data, information, and knowledge are (or could be) represented; how readers, users, authors, editors and computers can interact with these representations; and how different knowledge representations could be combined, queried, stored and re-used.

Force11 is collaborating with the Digital Library Federation DLF to provide their unique perspectives in scholarly communication.

An online complement to the Force11 manifesto, is the European Web site "101 Innovations in Scholarly Communication - the Changing Research Workflow"[3], prepared by Jeroen Bosman and Bianca Kramer[4], both from Utrecht University Library in the Netherlands (2015). The website and the poster with the same name have visualized how innovation is taking place across the research cycle, according to 6 phases of the research workflow: collection of data & literature, analysis, writing, publishing & archiving, outreach and assessment. Using this map, they created typical workflow examples that show how these innovative tools could be used for traditional, modern, innovative, experimental research workflows.

For example, a traditional workflow would use Web of Science, SPSS, Endnote 7 and Microsoft Word, Nature, ResearcherID, and Journal Citation Reports at each stage, respectively. However, modern, innovative, and Google workflows would use different tools such as Google Scholar, Google Books, Figshare, and Altmetrics. Furthermore, the most important developments in the six research workflow phases are discussed by Bosman and Kramer in the visualization. Some of the developments include:
*Trends*: Increased use of social discovery tools and scholarly social media

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[2] https://www.force11.org/about/manifesto
[3] http://dx.doi.org/10.6084/m9.figshare.1286826
[4] Bosman is the subject librarian in the geosciences; Kramer, in the life sciences and medicine

*Expectations*: More use of "publish first, judge later" and more open and post-publication peer review
*Opportunities*: Using repositories for institutional visibility
*Technology* is disrupting scholarly research and communications with trends like the increased use of social recommendations and circumvention of traditional publishers.

This overview of the poster, evidences the current processes of innovation, disruption, diffusion, consolidation, competition and success of digital scholarship, including Altmetrics and other tools for assessment.

## 2. New opportunities for digital libraries

Digital libraries are designed to improve methods of collecting, storing, and organizing information in digital forms and to make information available for searching, retrieval, and disseminating via communication networks. They cover information creation, access, sharing and re-use, and archiving and preservation for information and data. Libraries have always been at the intersection of research, publishing, career advancement and technical advancement within the academy. Often they act however as intermediary, instead of gaining insight into patrons' research practices, and to be embedded in the research cycle. Some examples di digital libraries supporting digital scholarship include: publishing activities, semantic technologies and research data curation.

Many digital libraries have turned towards advancing new models and platforms for knowledge dissemination either in conjunction with or in addition to their local university presses (Okerson & Holzman 2015). Library Publishing Coalition (LPC)[5] is an independent, community-led membership association to support an evolving, distributed range of library publishing practices and to further the interests of libraries involved in publishing activities on their campuses.

The principal transformations in digital libraries are now being enabled by advanced linking and semantic technologies. Linked Open Data in libraries, archives and museums ("LODLAM") continues to be a fast growing area of policy and technology having a major impact on the way digital libraries are opening to new kinds of research, discovery and access. The LODLAM acronym was coined in the fall of 2010 by Jon Voss[6] in attempt to begin gathering interest from like-minded individuals, largely in the United States.

Research Data Management is part of the research process, and aims to make the research process as efficient as possible to support the University community's pursuit of scholarship and to extend the University's public service third mission. Research data curation is important for institutions as well as researchers. RDM roles exist in almost every university today and many digital libraries are supporting the changing scenario of the research data management. In the U.S. and Canada, individual large academic research libraries often lead these activities (Association of Research Libraries, 2010). In 2014, the Scholarly

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[5] http://www.librarypublishing.org
[6] http://lodlam.net/about/

Communication and Research Infrastructures Steering Committee of LIBER in Europe published 11 case studies on Research Data Management[7].

## 2.1 Aims and objectives

The paper supports the vision of digital library as a digital infrastructure that would enable scalable and innovative research of scholars within digital collections using innovative tools. Very much intended as a conversation starter, the paper is presenting the first findings of a survey investigating how digital libraries in Italy are supporting digital scholarship.

The survey is conducted with the aim to better understand how current digital libraries in Italy effectively and efficiently support a digital scholarship environment. The objectives are:

- to describe the goals of the digital library initiatives supporting digital scholarship,
- the types of digital objects,
- how they are creating sustainable business models,
- how they afford copyright issues,
- how they deal with sustainability, disseminating and marketing,
- and research data curation process.

# 3. Methodology

The methodology plans to investigate needs and processes both of Italian scholars and librarians. The survey will include an investigation in two phases.

The survey of scholars needs is using the questionnaire prepared by 101 Innovations in Scholarly Communication which has been translated in Italian and put in the Website of the University of Parma.

The survey of needs and practices about digital libraries in Italy will be done through a librarian study – surveying a sample of librarians who currently provide support to scholars in academic and special libraries. A structured interview has been prepared to collect data in depth.

# 4. Findings

In this paper we will show preliminary results from our current national survey on digital libraries and research tools, illustrating which tools (including altmetrics tools) are actually used by researchers and librarians. The findings will give a picture of the organizational and political obstacles met by digital libraries in Italy and how they are trying to overcome.

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[7] http://libereurope.eu/committees/scholarly-research/research-data-management-case-studies/

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