

HOW SCIENCE 2.0 IS AFFECTING THE SCIENTIFIC PUBLISHING INDUSTRY: AN ANALYSIS OF THE WEB 2.0 INITIATIVES FOR SCIENTIFIC KNOWLEDGE PRODUCTION AND DISSEMINATION

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In the last decade, the **Internet** has extensively shaped several dimensions of the social and business sectors. First of all, Information and Communication Technologies (ICT) allow to **cut the costs of sending information and raising efficiency**. Second, an increasing number of **Web 2.0 initiatives** offer a **collaborative** and **open** way of generating, organizing, and managing knowledge.

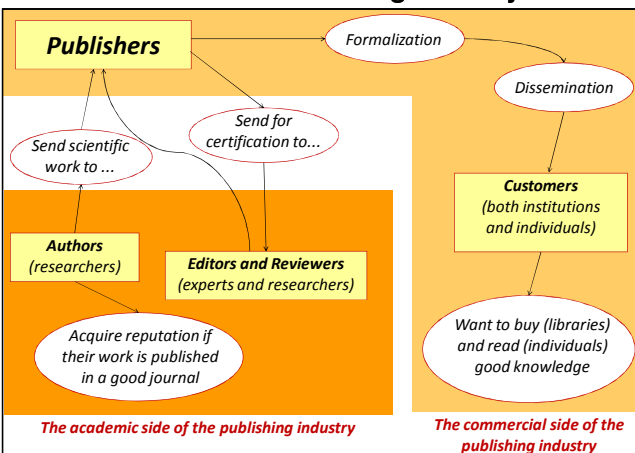
While ICT permitted the whole sector to shift from a paper-based to a digital-based medium, nowadays several Web 2.0 initiatives are exploring innovative ways of scientific knowledge production and dissemination. In particular:

- 1) some internationally recognized journals are adopting an open/collaborative process of review/evaluation (e.g., **arXiv, Nature Precedings, PlosOne**)
- 2) some initiatives permit the so called social bookmarking and tagging of Web resources (e.g. **Connotea, CiteULike, Del.icio.us, BibSonomy**)
- 3) several services allow researchers to create and maintain blogs, wikis, and participating in social networks (e.g. **ResearchBlogging, ScienceBlog**)
- 4) innovative tools allow the collaborative writing of documents (e.g. **Google docs**)
- 5) new actors such as Google are shaping the citation indexing and search engine initiatives (e.g. **Google Scholar**)
- 6) complex projects attempt to provide complete platforms for the above mentioned initiatives (e.g. **2collab, Nature Network, Liquidpub**).

While this burgeoning number of initiatives indicates that the potentials benefits the Web 2.0 utilization gathered attention from actors of the whole sector, **the diversity and inconsistencies among these initiatives show that the field is still a "work in progress"** and no common understanding on what a "Science 2.0" should be, has been achieved.

To understand the potential benefits and weaknesses of such initiatives we compare them with services provided by traditional scientific publishers. This analysis **allows us to highlight where and to what extent innovative services might compete with or affect the traditional ones.**

The Decoupled Nature of the Scientific Publishing Industry



Publishers' Services Before and After the Web

PUBLISHERS' SERVICES	BEFORE THE WEB	AFTER THE WEB
Registration	Based on mail and printing dates	Moved to a digital medium
Certification	Peer review Impact factor	Moved to a digital medium
Dissemination	Based on hardcopies	The market is slightly moving towards a "digital only" delivery
Formalisation	Publishers check papers	Authors and publishers check papers
Preservation	Libraries store hardcopies in their archives	Publishers and libraries preserve electronic data although the situation is evolving
Access	Libraries archives	Websites with user-friendly navigation systems

Examples of Innovative Initiatives

Research blogs

Wiki and collaborative writing

Collaborative tagging and social bookmarking

Citation indexing and search initiatives

Journals with open and collaborative review processes

Enhanced initiatives

Innovative Initiatives: the Issue of Sustainability

WEB 2.0 INITIATIVES	REVENUE MODEL
Social Networks and researchers' blogs	Covered by means of other initiatives of the firms Public subsidies
Journals with innovative peer review services	Subsidies Covered by means of other initiatives of the firm Open access: author pays
Wikis and collaborative writings	Users pay Open software
Collaborative tagging and social bookmarking	Covered by means of other initiatives of the firms
Citation indexing initiatives	Users pay Covered by means of other initiatives of the firm
Enhanced initiatives	Still at an experimental phase

Conclusions and Future Work

From our analysis it emerged that **Web 2.0 initiatives are sparse, barely integrated and are provided by actors who might appeared for the first time in the scientific publishing market.** Although some of the entering actors are not directly involved in the publishing activities, they provide innovative services to both libraries and researchers. For instance Google Scholar and the Google Book Search Library Project will enable libraries to make available more significant portions of its extraordinary archival and special collections to scholars and researchers worldwide in ways that will ultimately change the nature of scholarship.

There are many threats affecting the use of these tools:

- 1) most of Web 2.0 tools are subject to **network effects** and present **critical mass problems** in their adoption
- 2) many tools are provided by **heterogeneous actors** (traditional publishers, learned societies, Web 2.0 start ups) competing in **"winner-takes all" markets**
- 3) there is **no common and well accepted evaluation procedure** to judge the reputation of researchers who contribute to Web 2.0 tools and initiatives
- 4) the content created and maintained thanks to these initiatives might raise **Intellectual Property Right as well as preservation issues**
- 5) no player offers a **comprehensive Web 2.0 based system**, thus posing relevant issues of interoperability and integration among various platforms.

Finally, according to the raw analysis of revenue models it emerges that many initiatives are based on public funds or subsidies by other revenue streams. This analysis raises concerns on the **long term sustainability of these services.**

This analysis, far from being exhaustive, is a first attempt to assess the impact of the wide and heterogeneous set of Web 2.0 initiatives in the scientific publishing market. Future work on actors interdependencies, business strategies, financial assets, revenue models and case studies are needed to strengthen the initial findings.