Open supply? On the future of document supply in the world of open science

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"The best way to predict your future is to create it." (Abraham Lincoln)

Purpose: The paper proposes a personal viewpoint on the development of document supply in the context of the recent EU decisions on Open Science.

Approach: The paper provides some elements to the usual questions of service development, about business, customers, added value, environment and objectives.

Findings: The EU goal for Open Science is 100% available research results in 2020. To meet the challenge, document supply must change – include more and other content, serve different targets groups, apply innovative technology, provide knowledge. If not, document supply will become a marginalized library service.

Originality: Basically, Open Science is not library friendly, and it does not offer a solution for the actual problems of document supply. But it may provide an opportunity for document supply to become a modern service able to deal with new forms of unequal access and digital divide.

Keywords: Document supply, open science, open access

Article Classification: Viewpoint

The recent conclusions of the Competiveness Council of the European Union established the roadmap for the transition "to a new way of doing research and science based on openness, big data and cloud computing"[1] in Europe. The overall goal is open science, i.e. a new "friendly regulatory environment for research and innovation (which) breaks down the barriers around universities and ensures that society benefits as much as possible from all scientific insights (maximizing) the input of researchers, universities and knowledge institutions". All scientific publications ought to be freely accessible by 2020.

Speed up scientific communication, make scientific publications and results accessible, in particular for industrial R&D – this offensive research policy opens a wide boulevard for information services,

[1] Council of the European Union 26-27 May 2016
http://www.consilium.europa.eu/en/meetings/compet/2016/05/26-27/

such as academic interlending and document supply which pursues similar goals. However, today these services appear strangely absent from the debate, as if in a "time warp (…) on the periphery of traditional STM publishing" (Brown 2016, p.207). Have they definitively become relicts from a bygone library past? In a world with 100% freely available scientific documents and data, a document supply service may look like a kind of Palmyra ruins of scientific information.

So is there no future for document supply in open science? Some may object that only fools or dreamers will believe in 100% free content. But in the lapse of time of reading this paper, let us dream. Let us imagine that the EU Member States transformed their declaration of intention into action and that they reached their ambitious objectives. What would this mean for the development of document supply? Could document supply become "open supply"? Here are some elements of an answer to the usual questions of strategic marketing.

What is the business?

IFLA defines document supply as "making information in all formats available throughout the world through a variety of resource sharing and document supply techniques"[2], or more generally, "shared use of individual library collections (…) supply of loans and copies between libraries"[3]. Usually, this is true for lending of returnables (books etc.) and copy delivery (journal articles etc.), not only to and via libraries but also to the end-user. *Interlending & Document Supply*, the leading journal in the field, describes its scope as "information discovery and access (and explores) the digital information supply chain i.e. transport, flows, tracking, exchange and sharing, including within and between libraries (and) digital information capture, packaging and storage by 'collectors' of all kinds"[4].

Access and discovery, not dissemination or curation is the business. Basically, the reason for document supply is not scarcity of information but unequal and unsatisfactory distribution of vital resources for education, research and development. Document supply is a process to provide access to information despite this uneven distribution, to deal with or better, to compensate inequality. Initially a library-based service related to local holdings, document supply has incorporated for several years now information brokering, providing documents from a great variety of sources, including publishers and authors themselves.

With the rapid growth of journal publishing and the Xerox technology, interlibrary loan developed into document delivery; with the rise of large digital libraries, it moved forwards to a long tail business. Today, the challenge is twofold and paradoxical: while more and more scientific documents are freely available (the search engine BASE indexes nearly 4,500 sources with over 90m items), the future relevance of publications for scientific research is uncertain, above all because of the development of research data infrastructures. Today document supply has to decide how to deal with open access – should it integrate open access, for instance because library users still continue to struggle with information retrieval (Baich 2015)? Should it consider open access as an opportunity for further service development (Schöpfel 2014)? Nevertheless, the next question will be (already is) content of supply: will (should) document supply cover the whole range of scientific information, which means more and more data and "all kinds of stuff", or should it limit itself to the object "document" *stricto sensu*, i.e. books, articles, dissertations etc., thus running the risk of transformation from a long tail to a niche service?

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[2] IFLA Document Delivery and Resource Sharing Section http://www.ifla.org/docdel

[3] IFLA International Resource Sharing and Document Delivery: Principles and Guidelines for Procedure http://www.ifla.org/publications/international-resource-sharing-and-document-delivery-principles-and-guidelines-for-proc?og=56

[4] ILDS on Emeraldinsight http://emeraldgrouppublishing.com/products/journals/journals.htm?id=ilds

Who are the customers?

The scope of traditional document supply is narrow and large at the same time. Narrow, insofar as it is designed above all for public Higher Education and research communities, with their specific information needs and usage. At the same time large, because one part of the service is supplied for the industrial R&D sector, a great consumer of scientific information with various objectives and constraints. With open science, the focus shifts towards an even larger target, including unaffiliated knowledge workers (Brown 2016) and people involved in citizen science, i.e. public participation in scientific research conducted at least partly by amateur or nonprofessional scientists (Hand 2010).

ILDS defines its target readership as "digital information researchers (including) educators, knowledge professionals in education and cultural organisations, knowledge managers in media, health care and government, as well as librarians" (see footnote 2). The *Amsterdam Call for Action*, main input to the Competitiveness Council on the 27th May states that "excessive time periods between submission and publication, payment walls, embargos and other access barriers impede the transfer of knowledge (and obstruct) the evolution towards an open and transparent academic process and the associated knowledge exchange with society at large" (Netherlands' EU Presidency 2016, p.20). With open science, "society at large" becomes the target of scientific communication.

At the same time, this target is no longer seen as a (passive) consumer of information but as a (active) partner of knowledge exchange. Citizen science is considered as an "innovative model for knowledge transfer", along with crowdsourcing (ibid. p.23). Crowdsourcing - another key concept for this new environment. The term encompasses many practices and may be identified with virtually any type of internet-based collaborative activity. But the blurry nature is part of the concept, along with participative activity, task-orientation, voluntarism, heterogeneity of knowledge, resources and contributors (individuals, institutions, non-profit organizations, companies...) and mutual benefits (Estellés-Arolas & González-Ladrón-de Guevara 2012, p.197).

Thus, through open science, document supply is faced with a choice: either to limit its activity to scientists from universities, research institutes and corporate R&D, or to broaden its scope to "society at large", beyond the scientific community, which means more participation and exchange, and also much more variety of needs and usage than before. Recently, OANA, the Open Access Network of Austria stated that "all research results should be accessible to people that are diverse in physical, economic and other conditions" (Kraker et al. 2016, p.6). A couple of years ago we said that "modern document supply is customer-centred, not service-centred" and that "document suppliers need to improve knowledge of their customers (…), who their customers (are) and for whom they work, and why" (Schöpfel & Gillet 2007, p.202). This knowledge is more than ever, a key to development. Adjusting to diversity - open supply is at this price.

What is the value for them?

What do customers appreciate? Studies on document supply reveal several aspects, such as a broad range of information, high quality information, simple discovery and ordering, timeliness, legal compliance, control, (re)-usability and reasonable, affordable pricing; some customers are also concerned with privacy issues or request confidential and secured processing to protect strategic interests. Customers want the requested item anywhere, at any time, in a format that fits with the intended use (Dehlez et al. 2005), which may be simple reading, import in resource management systems and also reuse in patent or new drug application or for promotion, conferences, publications or educational issues.

Different needs mean a large offering of formats and media, delivery options, rights and prices. For the service provider, this implies adjustment, flexibility, customization, one stop shopping, but no

one-size-fits-all approach. Also, to provide access to a wide range of information in a world of distributed knowledge bases does not necessarily imply rich holdings but, more than anything, compatible systems and formats (interoperability) to determine "who has what", open workflows, networking and resource sharing, an "incredible source of value to (the) users" (Goldner & Birch 2012, p.9).

In the age of Amazon, Google and Facebook, one stop shopping (a physical or virtual place where customers get all or most of what they want) is expected and has become trivial; added value of document supply is more than that. For instance:

Availability: more and more documents are online but not necessarily available to all users, because embargoed, with limited rights or restricted to campus access. Sometimes they are available but too expensive. Non-availability has always been a major argument to call a service provider. Today, are libraries and document suppliers able to extend this service to sometimes rather tricky situations? Can they supply items for lower costs with less usage rights and options? Can they supply items (dissertations, reports etc.) which are restricted to campus or institutional use?

Reusability: depending on intended usage, customers need different formats, media and licenses. Reading a print copy may be enough in one case, while another customer expects to exploit the same item via text and data mining. In the past, document suppliers were able to negotiate with publishers' rights for multiple copies and/or commercial usage. Today they should be able, in particular in countries without fair use and Text and Data Mining exceptions, to obtain these rights on behalf of their customers.

Knowledge: in the past, document suppliers were able, through acquisition policies, source selection and discovery tools, to guarantee content quality, at least good search results. Today, with the ever growing mass of information, the relevance of a single item tends to decrease. Will the document supply be able to add knowledge to documents? To link documents to other information, to provide knowledge extracted from requested batches of documents?

Where is the business going?

Open science emphasizes the importance of dissemination and curation, in order to improve and guarantee findability, discoverability, accessibility and reusability of research results. The political and societal challenges are Ebola and Zika, global warming, new energies etc., and the objective is to accelerate and generalize availability of scientific publications and data in order to foster innovation. Open science shifts the focus from acquisition and access to dissemination, related to activities early in the value chain of scientific communication, and upstream of usual document supply.

The *Amsterdam Call for Action* covers issues like the assessment, evaluation and reward systems, text and data mining, intellectual property and privacy, transparency, research infrastructures, open access and new publishing models. At the same time, the action plan confirms the decreasing role of libraries which are NOT, unlike publishers and "businesses", considered as stakeholders on their own. As a part of "Research Performing Organizations" (p.3), their role is mainly limited to the stimulation of new publishing models for knowledge transfer (Action Item 8) where they should "act as publishers of open access for their institutions, create a database of open science best practices (and) support discipline-based foundations that help flip subscription journals to FAIR[5] open access by providing funds for APCs and transition by 2020" (p.23). As a matter of fact, the *Amsterdam Call*

[5] The FAIR guiding principles for scientific data management: findability, accessibility, interoperability, and reusability http://www.nature.com/articles/sdata201618

disregards the traditional library functions while the monitoring and management of the transition period are conferred to research performing organizations and publishers.

The "open science business" – future paradigm of scientific information - is moving away from document supply and out of the library. Other key elements for the understanding of the actual development of scientific information are:

- the rapidly growing volume and variety of published and unpublished material, print as well online, including articles, books, grey literature, posts and comments on blogs and social networks, tweets etc.;
- the growing importance of big and small research data and related tools (repositories[6], infrastructures, data management plans, data journals etc.);
- the development of research information systems for the analysis and evaluation of all kinds of research-related data, including metrics on impact, usage, networking etc.;
- the development of citizen science and crowdsourcing in the field of scientific research;
- the increasingly commercial character of open access, and the globalization and concentration of the scientific information market.

At first sight, all this seems very far from document supply; at least as far away as the Kazakhstan, home of Sci-Hub[7], the "world's largest pirate website for scholarly literature[8]", created by the neuroscientist Alexandra Elbakyan in 2011 and today indexing more than 50m "research papers", i.e. mainly articles. Some people say that Sci-Hub is here to stay. For others, Sci-Hub is an illegal singularity of massive counterfeiting. Speaking about counterfeiting: studying the case of Elzevier's counterfeited "Amsterdam Printings" of the French *Journal des Scavans* 350 years ago, we concluded that "to the extent that the mediation becomes an obstacle for open, smooth and seamless distribution of information, for instance through high pricing or excessive protection, the Republic of Letters will search for alternative options, such as direct communication" (Volpe & Schöpfel 2013, p.152). Even if one does not share Lawrence Lessig's statement that "many kinds of 'piracy' are useful and productive" (2004, p. 66), it is clear that large scale counterfeiting such as Sci-Hub, and its massive and global usage, are symptoms of the dramatic dysfunctional character of the academic publishing market. Sci-Hub has its roots in unequal access to vital resources. And here we are back again in the field of document supply.

Where should document supply go?

Crucial for the success of Sci-Hub are easy usage, immediate and free access to documents, and rich content. Of course, Sci-Hub is not an option for document supply, for at least three reasons: less than rudimentary search facilities, anti-reusable file formats (unstructured PDF) and, last but not least, complete lack of legal compliance. *Fraus omnia corrumpit*, fraud corrupts everything says an ancient legal adage, and this is not an option either for public and corporate service providers or for their customers. We could also add a fourth reason, which is lack of transparency about the quality and origin of the indexed files. But, what could document supply offer more and better than Sci-Hub?

To be(come) part of open science, document supply should develop at least three features: an appropriate service offering for customers outside of traditional academia, more interactivity with

[6] See the international directory http://www.re3data.org with more than 1,500 data repositories
[7] Sci-Hub http://sci-hub.cc/
[8] Science Magazine April 28, 2016 http://www.sciencemag.org/news/2016/04/whos-downloading-pirated-papers-everyone

the target groups, and integration into a global service for research, instead of remaining a stand-alone, library-oriented service.

As a demand-driven service, it should move toward a kind of scientific information commons, able to provide all kinds of information on demand – research results, publications and also information about research and outcomes – to anybody interested and involved in research, in- or outside of academia, and in any format and with any license requested for specific usage. Some aspects:

- Innovation: efficient discovery and search technology, user experience design of the front office.
- Rich and structured formats compliant with content mining tools.
- Legal compliance and customized licensing.
- More and other content, including datasets, multimedia files, print material, learning objects, metadata, from trustworthy sources.
- Knowledge extracted from documents, data and metadata.

Concluding remarks

As far as we can see, open science is here to stay. It will shape our way of seeing and doing research, and it will impact the dissemination of scientific information. Basically, open science is not a library-based or even library-friendly project. Open science does not offer a solution for the actual problems of document supply. Basically during some years of transition, document supply can continue as before, doing the same business as usual. Why: the open science policy deadline is 2020, and there are still four years to go. Also, as this policy concerns above all public funded research and journal publishing, significant parts of scientific output remain more or less "out of scope", as for instance corporate or privately funded research, grey literature, older print material etc. Third, the EU Member States produce "only" one third of the worldwide scientific articles and, moreover, this percentage is slowly eroding (between 2010 and 2015 from 32% to 31%[9]) while the share of China and India is increasing (from 15% to 18%)[10] – a fact that limits the impact of the EU policy on the free availability of global scientific information. Document supply will remain useful for some years at least, and for one part of scientific literature.

However, in the context of open science, open access and open data, doing just business as usual will not be a solution as it would progressively marginalize document supply even more. Already, its share of access to scientific articles can be estimated at only 0.1% of the usage statistics of the major publishers' platforms. This is still useful but insignificant. Our last survey on public document suppliers shows a "shattered landscape" far from past ambitions; with institutional rather than global strategies and a focus on domestic needs; and suffering from budget cuts and political deficit (Schöpfel 2015). As we said before, open science does not offer a solution for the actual problems of document supply. But it provides an opportunity to transform document supply into something else – open supply, rooted in the basics of networking, resource sharing and awareness of inequality and clearly addressing the challenge of 21st century science.

Libraries, so long and insofar as they prove their usefulness in research organisations, are part of the game. They can contribute to the development of new types of services to researchers in support of open science. Our conviction is that document supply can and should be part of these new types of services. Is this utopia? Utopia keeps walking, said Eduardo Galeano, and for document supply this utopia requires the development of new organisational structures, skills and functions, including

[9] After Brexit, the EU part would only be 26%.

[10] Figures from the *Scimago Journal & Country Rank* website, based on Scopus http://www.scimagojr.com/

community management, marketing, data science, format expertise, and legal knowledge. It is possible that at the end, document supply – open supply - would be something very different from what it was before and what it still is. Is this a problem?

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