

Libraries and publications

of the future



Libraries and publications of the future

A guide to understand current challenges, opportunities and requirements.

The following organisations have participated in drafting and endorse its recommendations:

Fonds national de la Recherche www.fnr.lu

Bibliothèque nationale de Luxembourg www.bnl.lu

Université du Luxembourg – Bibliothèque www.uni.lu

Centre de Recherche Public Gabriel Lippmann www.crpgl.lu

Centre de Recherche Public Henri Tudor www.tudor.lu

Centre de Recherche Public Santé www.crp-sante.lu

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Résumé analytique ✓

Version anglaise

Version française

Il est impératif que des publications de la plus haute qualité soient accessibles en nombre suffisant, non seulement pour l'Université du Luxembourg et les Centres de Recherche Publics, mais encore pour la population entière.

Pour promouvoir une croissance durable, l'innovation et la création d'emplois d'avenir, le Luxembourg a décidé de développer des infrastructures universitaires et de recherche de haut niveau et d'accélérer sa transition vers une performante société de la connaissance. L'Union européenne s'est fixé comme objectif, à travers son *Digital Agenda*, de maximiser l'impact social et économique des nouvelles technologies de l'information et de la communication¹.

Parmi les conditions requises pour atteindre les objectifs visés en matière de développement de la société de la connaissance, de la créativité, de la recherche et de l'innovation, il est impératif que des publications de la plus haute qualité soient accessibles en nombre suffisant, non seulement pour l'Université du Luxembourg et les Centres de Recherche Publics, mais encore pour la population entière. L'apprentissage tout au long de la vie, la formation permanente et la participation des citoyens à la vie culturelle et intellectuelle doivent être promus de façon active. Ces considérations ont fortement contribué à la décision du gouvernement de moderniser le secteur des bibliothèques et de doter la Bibliothèque nationale et la Bibliothèque de l'Université de bâtiments appropriés.

Bien que les publications imprimées ne disparaissent pas, un volume rapidement croissant ne sera dorénavant disponible que sous forme numérique. En même temps, les technologies de l'internet accroîtront nos possibilités de création de réseaux et d'accès à des collections gigantesques d'informations.

Ce document se concentre sur les publications numériques, qu'elles soient accessibles sous licence, par le biais d'un éditeur, suivant le modèle Open

¹ http://ec.europa.eu/information_society/digital-agenda/index_en.htm.

**Version anglaise****Version française**

Access ou par la numérisation d'originaux imprimés. Les organisations signataires de ce document ont choisi de relever, de façon proactive, les défis de ces évolutions décisives pour l'avenir.

Le présent document a pour but de décrire les potentialités et les problèmes issus de la « culture et de la science numériques » auxquels sont confrontés les bibliothèques, les organisations de recherche ainsi que ceux qui financent les bibliothèques et la recherche en général.

La bibliothèque numérique au Luxembourg

A partir de la première offre d'eJournals, mise en ligne en 2002 par la Bibliothèque nationale, fut créé en 2006, le *Consortium Luxembourg pour l'acquisition et la gestion de publications électroniques*. Ses membres sont la Bibliothèque nationale, l'Université et les trois Centres de Recherche Publics (CRP Henri Tudor, CRP Gabriel Lippmann et CRP Santé).

Les statistiques prouvent clairement que la demande pour un tel service est énorme : la consultation des publications accessibles via le portail du Consortium, *findit.lu*, a progressé en moyenne de 58 %, d'année en année, entre 2008 et 2012. L'offre actuelle (mars 2013) consiste en 49.161 titres d'eJournals, 99.455 eBooks scientifiques et plus de 350 bases de données et plateformes de références spécialisées, en langues anglaise, française et allemande. Le coût annuel de cette offre s'élève à environ 1,5 million d'euros, partagé entre les membres du Consortium Luxembourg. Le portail *findit.lu* est géré par la Bibliothèque nationale.

Bien que les services centralisés et partagés permettent de minimiser la complexité et le coût de l'infrastructure, les budgets et le personnel disponibles pour assurer les tâches consortiales atteignent leurs limites depuis 2012. Par ailleurs, les membres du Consortium ne peuvent plus contribuer des budgets d'acquisition additionnels. Ainsi, des abonnements de publications scientifiques, pourtant absolument essentielles, sont en danger de ne pas être renouvelés. L'effet le plus dramatique de cette situation, allait-elle perdurer, réside en l'impossibilité d'acheter de nouveaux contenus, indispensables aux chercheurs chargés d'ouvrir de nouveaux champs de la recherche au Luxembourg. La stratégie et les priorités scientifiques des institutions de recherche et de la Bibliothèque nationale feraient les frais de ce défaut de littérature spécialisée.

Open Access

Il existe un consensus international dans les milieux de la recherche et des bibliothèques scientifiques que le modèle économique des publications scientifiques va évoluer vers un modèle marqué par l'Open Access. Le Fonds national de la Recherche (FNR) soutient activement ces développements.

Le modèle Open Access va permettre à ceux qui financent les bibliothèques et la recherche de regagner une certaine emprise sur le processus de publication et ses coûts. L'Open Access offre une perspective qui va permettre de contrôler indirectement le prix des publications non-Open Access et de stimuler la compétition dans le domaine des frais et services de publication d'articles. Toutefois, ces effets ne deviendront apparents que dans le moyen à long terme.



Version anglaise

Version française

Pour mener à bout un projet d'une telle envergure, il faut trouver les moyens pour assurer le financement des professionnels, des contenus et des infrastructures informatiques.

En vue de ces changements, il est impératif pour le FNR et les membres du Consortium Luxembourg que des mesures appropriées soient mises en place dans les prochains contrats de performance 2014-2017. Ces mesures doivent inclure le suivi et la transparence dans le déplacement partiel des frais d'abonnement vers les auteurs, informations cruciales pour l'équipe du Consortium dans ses négociations avec les éditeurs.

Dans le cadre de sa stratégie Open Access, l'Université a mis en place un dépôt institutionnel Open Access pour ses utilisateurs. Un tel *Repository* est un élément-clé pour assurer que les résultats de la recherche au sein de l'Université du Luxembourg aient la visibilité internationale nécessaire et soient facilement accessibles. Un dépôt Open Access national, au-delà de l'Université, n'est pas encore en place, mais constitue une option possible.

Les Humanités numériques

Digital Humanities est une expression générique pour signifier la (ré)découverte et l'utilisation plus efficace du patrimoine intellectuel et culturel, une fois disponible sous forme numérique. Les technologies numériques sont d'une importance cruciale pour la recherche en sciences sociales et humaines et pour la promotion de la culture et du capital intellectuel en général. La Bibliothèque nationale, bien que restant largement en dessous des recommandations de la Commission européenne, a numérisé jusqu'à présent plus de 600.000 pages et les rend accessibles à travers son portail www.eluxemburgensia.lu.

Version anglaise**Version française**

En complément de la numérisation, la collecte des publications *nées numériques* et leur préservation à long terme est d'importance-clé pour les chercheurs d'aujourd'hui et demain. La législation du Grand-Duché a déjà été adaptée pour permettre le dépôt légal des publications numériques, dont une partie essentielle est l'internet national.

Pour positionner le Luxembourg dans le paysage des *Digital Humanities*, il est impératif de le doter d'une infrastructure de préservation numérique à long terme. Le travail d'analyse et de spécification d'un tel système national de préservation à long terme sont très avancées et représentent une priorité partagée et commune des Archives nationales et de la Bibliothèque nationale de Luxembourg.

Réseaux et visibilité internationale

Le travail en réseau des bibliothèques de recherche et des bibliothèques nationales, que ce soit sur le plan national ou international, est aujourd'hui incontournable. La visibilité des bibliothèques dans les réseaux internationaux de la recherche et des bibliothèques scientifiques exige non seulement la mise à disposition de contenus et de services numériques de haut niveau, mais encore des interfaces conviviales et de haute technicité, permettant d'exporter les métadonnées des dépôts Open Access et système de préservation numérique et de les connecter aux infrastructures équivalentes, bases de données existant dans d'autres pays.

Offrir une grande quantité de publications et de métadonnées numériques de qualité, assurer l'alimentation et la maintenance d'un tel dépôt à libre accès et d'un système de préservation numérique à long terme, interconnecter les bases de données par des interfaces performants au service de l'utilisateur final, génèrent des coûts non-négligeables côté informatique, mais, surtout, aussi en matière de personnels. En effet, la performance des bibliothèques de l'avenir ne dépend pas seulement des infrastructures bâties mais encore de la qualité des services offerts.

Les personnels des bibliothèques ont toujours été des professionnels de l'information. La révolution numérique les oblige à devenir des spécialistes en NTIC au service de la société de la connaissance. Une tradition extrêmement forte de partage et de développement des meilleures pratiques, prédestine aussi bien les bibliothèques universitaires que les bibliothèques nationales à être des moteurs de l'innovation en NTIC et de la transition envers la société du savoir.

Pour mener à bout un projet d'une telle envergure essentiel à l'essor de la société du savoir, de la recherche et de l'innovation, il faut trouver les moyens pour assurer le financement des professionnels, des contenus et des infrastructures informatiques.



Executive summary

English Version

French Version

High quality knowledge in all fields must be available not only for University and Research Centers but for the whole population.

For sustainable growth, job creation and innovation, Luxembourg has chosen to rapidly develop high quality university and public research infrastructures and transition to a knowledge society. Europe, through its "Digital Agenda" has chosen to maximise the social and economic potential of ICT¹.

In order to achieve these goals, high quality knowledge in all fields must be available not only for University and Research Centers but for the whole population. Lifelong learning and cultural commons need to be promoted actively. This was one of the motivations to modernise the library sector and to invest in new built infrastructures for the National Library and the University of Luxembourg.

Though printed material will not disappear, a rapidly increasing amount will be in exclusively digital format (the focus of this document) either licensed from publishers, made accessible under Open Access regimes or through digitisation of printed originals. The internet continues to have a big impact on knowledge creation and cultural creativity through vastly facilitated networking and availability of very large amounts of information. The organisations endorsing this document have taken up the challenge to respond pro-actively to this evolution.

This document is a guide to help readers understand a number of current challenges and opportunities for digital culture and science, relevant to libraries, research organisations as well as research and library funders.

¹ http://ec.europa.eu/information_society/digital-agenda/index_en.htm.

**English Version****French Version**

Digital library in Luxembourg

Based on the National Library's first offer of digital scientific journals from 2002, the "Consortium Luxembourg pour l'acquisition et la gestion de publications électroniques" was founded in 2006 by the National Library, the University of Luxembourg and the three Public Research Centers (CRP Henri Tudor, CRP Gabriel Lippmann and CRP Santé).

Statistics show there is indeed a huge demand for a digital library: the average increase of usage between 2008 and 2012 is 58% year over year. The current offer (March 2013) of the Consortium portal *findit.lu* consists of 49.161 electronic journal titles, 99.455 science ebooks and over 350 specialised databases and reference platforms in English, French and German. The costs of these products – annually ca. 1.5 million euros in licence fees alone, with an average price increase of 5% (per year) – are shared by the members of the Consortium. The portal *findit.lu* is managed by the National Library.

Despite using centralised services to keep complexity and costs in check, budgets and staff available for managing the Consortium have come under strain since 2012. The Consortium members are not able any longer to contribute additional financial resources. Several absolutely essential subscriptions may be cancelled, but the most dramatic effect may be the inability of the Consortium to add new content required by its members, as this directly undermines research and policy priorities to expand into new research areas.

Open Access

There is international consensus that scientific publishing will evolve towards Open Access, this process is actively supported by the National Research Fund FNR.

The open access model will allow science funders and libraries to regain control of the publishing process and its inherent costs. Open Access offers the perspective of keeping subscription costs for non-open access publications in check, including the emergence of competition in open access article processing fees and services. This effect will only be noticeable in the mid to long term.

In view of these changes, it is crucial for the FNR and the members of Consortium Luxembourg to ensure that appropriate actions are included in the next series of performance contracts 2014-2017. This includes measures to ensure tracking and transparency in the partial shift of costs from subscriptions to authors as the Consortium management team needs this information in its negotiations with publishers.

English Version**French Version**

To accomplish a project of this magnitude and contribute to the knowledge society and innovation, funding for skilled professionals, content and infrastructure must be found.

As part of its Open Access strategy, an institutional repository has been implemented by the University of Luxembourg <http://orbilu.uni.lu> for its users.

Populating and running a repository has non-negligible costs on the IT side, but also significant costs on staffing, as a help-desk for authors is necessary to educate and help them with licensing, formatting and general publication requirements. These new skills and staff must be in place for repositories and open access in general to be successful.

An Open Access national repository strategy that goes beyond the University is not in place but investing in such a solution could be one of many possible directions to follow.

**English Version****French Version**

Digital Humanities

Digital Humanities is a catch-all term for the (re)discovery and more efficient use of cultural heritage through technology. These technologies are of key importance for research in the field of social sciences and for promoting culture and heritage. The National Library's portal www.eluxemburgensia.lu gives access to over 600.000 digitised pages, but this is far from being enough to fulfil the EU's recommendations for mass digitisation.

A national preservation infrastructure is a prerequisite for positioning Luxembourg in the emerging Digital Humanities. The analysis and specification of a national digital storage system, enabling the long term preservation of digital content of national origin, is in an advanced stage and is a common and shared priority for both the National Library and the National Archive. Digital long term storage is the equivalent of shelves and buildings in the analogue world.

Besides digitisation and preservation, collecting *born digital* content is of key importance for researchers, today and tomorrow. The Grand-Duchy's legislation has been revised to allow digital legal deposit of which a key part is the national internet.

International visibility and networking

Implementing mass digitisation, collection of *born digital* material and digital preservation, developing modern interfaces for users, ensuring the international visibility of high level library services and our national heritage all have significant costs for IT services and require expert staff.

Libraries and publications of the future not only rely on infrastructure, but also on professionals and services modelled around and integrated with the needs of researchers and citizens to provide a tangible added-value.

Libraries have always employed knowledge workers; the digital shift makes them high-tech service-oriented knowledge workers. The strong traditions of both research and national libraries to collaborate and share their best practices internationally, makes them key drivers of ICT innovation and the transition towards a knowledge society.

To accomplish a project of this magnitude and contribute to the knowledge society and innovation, funding for skilled professionals, content and infrastructure must be found.

Digital library in Luxembourg

The current offer of *findit.lu* consists of 49.161 electronic journal titles, 99.455 science eBooks and over 350 specialised databases and reference platforms in English, French and German.

The largest and oldest digital library in Luxembourg is managed by the National Library of Luxembourg and called *findit.lu*. A "starter kit" is available at <http://blog.findit.lu/start>. The current offer (March 2013) of *findit.lu* consists of 49.161 electronic journal titles, 99.455 science eBooks and over 350 specialised databases and reference platforms in English, French and German. These products cost annually ca. 1.5 million euros in licence fees alone, with an average yearly price increase of 5%.

The precursor of *findit.lu* was launched in 2002 by the National Library of Luxembourg. In 2005, the National Library implemented a national access policy and made substantive investment in content, interfaces and administrative tools. In 2006 the current portal² was launched and the University of Luxembourg Library joined what became the *Consortium Luxembourg pour l'acquisition et la gestion de publications électroniques*. In 2009, the Consortium was supported by the FNR with three-year funding for key scientific databases, such as *ISI Thomson Web of Knowledge*. Also in 2009, the three Public Research Centers, CRP Henri Tudor, CRP Gabriel Lippmann and CRP Santé, joined the Consortium.

The national access policy is innovative and allowed Luxembourg to leapfrog from a digital library no-man's

land to a strong player in the knowledge society³ by serving academia, research and the general public with high quality content, licensed from third parties as well as provided from the National Library's own digitisation program and portal www.eluxemburgensia.lu.

Putting the Consortium's national access policy, in place since 2005, in a European context one can see that today most countries try to develop such national access policies to increase access of the licensed content beyond the scientific community to their populations at large and to streamline investment to fewer but more competitive national services.

A strong demand

Statistics show that there is huge need for such an offer, the average increase of usage between 2008 and 2012 is 58% year over year. To give an idea of the quantity of information: the 313.000 Megabytes downloaded in 2012 would be equivalent to 10 million text pages in Word.

Consortial administration and licence negotiation are centralised at the National Library, whose IT services, in cooperation with the CTIE, also manage its hardware and software. Centralised infrastructure ensures that investments are rational and complexity is kept in check. Systems are well-integrated with other national service platforms such as the library network *bibnet.lu*, regrouping a large number of scientific and public libraries in Luxembourg. For example, this integration has allowed the implementation, since 2006, of a single-sign-on system, where users only need one password to login to all National Library systems, including *findit.lu*.

² Portal and backoffice software: MetaLib, SFX, Aleph PDS by Exlibris; EZProxy by OCLC and CORAL licensing management.

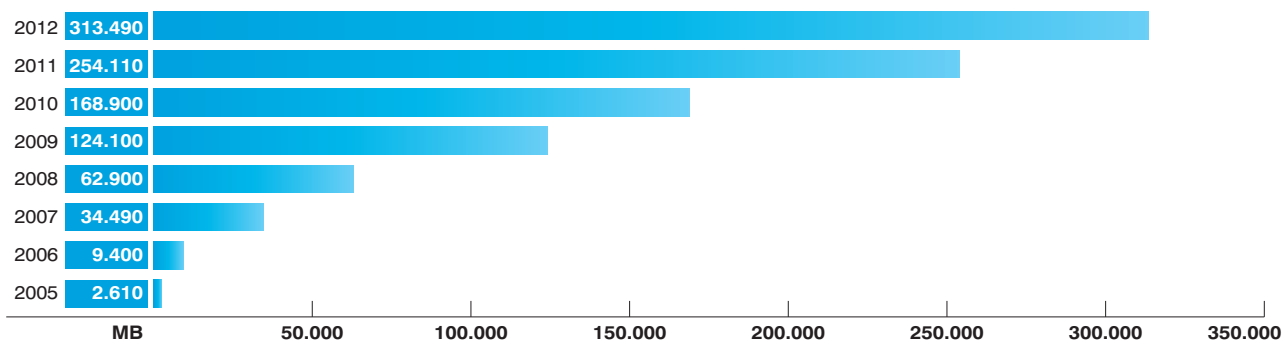
³ Lewis G. Liu, "The contribution of public libraries to countries' economic productivity: a path analysis", *Library Review*, Volume 53, Number 9, 2004, pp. 435-441: <http://www.emeraldinsight.com.proxy.bnl.lu/journals.htm?issn=0024-2535&volume=53&issue=9&articleid=859797&show=html>



Statistics show that there is huge need for *findit.lu*, the average increase of usage between 2008 and 2012 is 58% year over year.

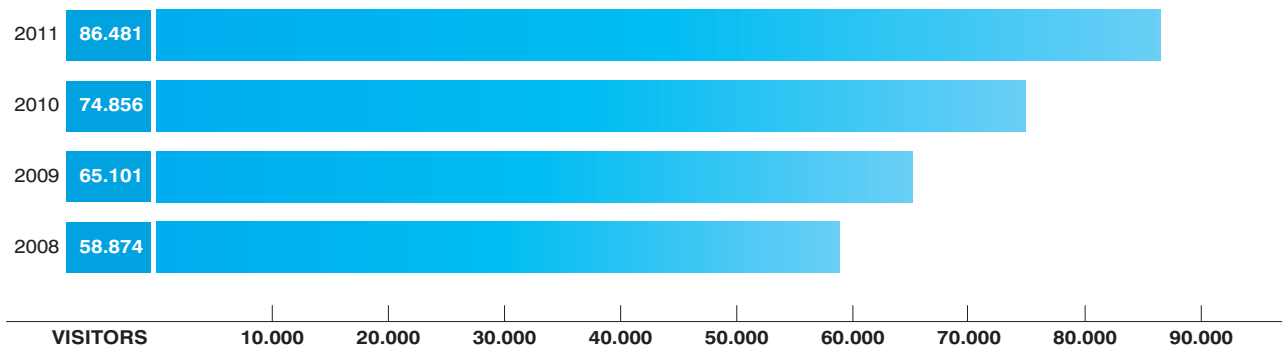
findit.lu traffic from licensed (paid) sources in megabyte per year

Source: Consortium Luxembourg, Rapport 2012, AWstats webstatistics



University of Luxembourg Libraries – Number of visitors

Source: <http://www.en.uni.lu/content/download/52946/632917/file/BUL%20-%20Chiffres%20Cl%C3%A9s%20-%20Key%20Data%20-%202012.pdf>





Journal subscriptions – Cumulative Cost Increases – 2003 to 2012 (Base 100 = 2002)

Source: <http://orbilu.uni.lu/files/Journal%20Subscription%20Costs%20-%202002%20to%202012.pdf>



2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	Annual change
119,74	124,63	145,58	155,35	168,27	180,49	194,45	205,62	218,54	229,89	Agriculture
108,29	128,22	126,22	137,98	124,14	133,74	144,31	153,75	163,36	173,04	Astronomy
109,94	125,52	130,08	141,11	152,6	164,99	177,21	185,5	197,45	207,93	Biology
114,57	127,87	138,36	151,05	166,42	181,92	197,9	206,81	208,88	217,3	Botany
105,31	111,1	126,48	134,98	150,18	162,3	170,45	178,41	187,45	197,77	Business & Economics
121,13	125,75	140,54	151,83	148,7	162,84	170,16	176,93	187,94	197,23	Chemistry
112,96	119,28	131,84	140,48	141,36	153,52	170,33	179,37	189,37	200,57	Engineering
126,92	141,46	155,6	169,23	184,55	203,54	188,87	200,4	204,85	217,56	Food Science
95,28	103,46	108,94	118,08	122,82	130,45	131,42	138,41	145,61	155,83	General Science
109,9	115,27	125,73	132,04	132,71	145,73	154,05	165,32	172,16	180,88	Geography
110,64	109,62	128,96	135,41	144,62	155,67	164,47	172,46	184,94	195,79	Geology
112,26	124,23	133,28	144,24	153,8	169,47	180,04	189,35	202,98	215,72	Health Sciences
117,13	131,38	149,58	159,08	170,16	188,37	219,23	233,48	248,52	263,55	History
124,88	138,45	150,21	159,26	180,98	199,98	225,32	248,85	263,32	276,9	Language & Literature
117,95	128,99	116,21	130,74	149,33	159,79	188,84	196,4	204,53	212,67	Law
94,56	105,76	108,83	115,43	119,49	127,44	133,67	139,18	145,41	152,55	Math & Computer Science
105,15	114,61	121,46	128,45	131,51	139,85	146,38	151,79	155,13	164,46	Physics
111,68	121,49	131,75	140,39	147,59	159,83	131,21	137,78	148,94	157,13	Technology
110,62	98,31	124,33	134,83	129,15	140,39	158,39	164,06	179,05	189,44	Zoology
102,06	104,26	106,84	109,34	113,01	114,24	116,29	119,52	123,32	126,18	Consumer Price Index (Lux)

⁴ <http://svpow.com/2012/01/13/the-obscene-profits-of-commercial-scholarly-publishers/>

⁵ RIN report: "E-journals: their use, value and impact, final report" <http://www.rin.ac.uk/our-work/communicating-and-disseminating-research/e-journals-their-use-value-and-impact>

On the consortial management side, funds for library staff for the four Consortium members and for the Consortium management team at the National Library are not keeping up with increasingly demanding and specialist tasks.

Rising costs and new tasks

In 2011 however, the combined funding available from the five members of the Consortium to licence third party content has come under strain, the same is true for the digitisation program of the National Library.

The Consortium's member institutions are faced with the urgent need to subscribe to additional high-cost publications as new research areas are developed.

At the same time, budgets are eaten up by simply maintaining existing subscriptions, which rise by 5% year over year (some outliers have increased by double digits as publishers have implemented "equitable" new pricing models) while major publishers' revenues increase 30% to 40% over the same period⁴. With their oligopoly over content distribution, subscribers have little choice but to pay the prices they demand or to initiate long and usually unfruitful negotiating processes.

An additional cost is coming from the on going switch from print subscriptions to *e-only*; this is forced upon libraries by publisher's pricing models and the expectations of the Consortium's users. Managing this switch represents a lot of work for staff, as new contracts with complex parameters such as inventory and equivalence of digital packages with print collections, often historically from different vendors and publishers, need to be investigated and analysed before negotiations can begin.

On the consortial management side, funds for library staff for the four Consortium members and for the Consortium management team at the National Library are not keeping up with increasingly demanding and specialist tasks.

The result of these developments is three fold: First, the National Library had to limit its investment in licensing additional content since 2012 to make sure that the most urgent new managerial and infrastructure tasks can be handled. These include:

- > a multi-year transition plan with Consortium members towards a new cost sharing model based on the results from a new statistics data warehouse, supported by new user data management;
- > a strategic internal analysis on how to update its back office and authentication infrastructure to support new tasks such as differentiated access, cloud-based indexes, open access fees accounting, etc.; and
- > an analysis of how to evolve its current end-user interface to make sure it remains adapted to user demands.

Second, the Consortium members' ability to contribute financially to additional content has also run out. While the new cost sharing model may enable more equitable calculation of the different members' parts, the total sum available is exhausted since 2012. The immediate effect is that several running and absolutely essential subscriptions may be cancelled in 2013 or not renewed in 2014 due to lack of funds.

Finally, the most dramatic effect may be the inability of the Consortium to add new content required by its members, as this directly undermines research and policy priorities to expand into new research areas, simply because no relevant literature will be available for doing research⁵.

Open Access, a new paradigm ✓

Open Access opens the door for scientific funders and libraries to regain control of the publishing process and its inherent costs. This effect will only be noticeable in the mid to long term.

The pricing crisis

Traditionally, access to scientific discoveries was only possible by purchasing a copy of the printed journal. The advent of the internet changed the manner and the speed by which information can spread. Despite this potential, delays in publishing and restrictions on access are still in place, mainly due to the licensing restrictions imposed by publishers. The increasing growth in the number of publications as well as the disproportionate increases of licensing fees due to the publishers' oligopoly has led to unsustainable costs.

In Luxembourg, these costs are currently supported by the Consortium Luxembourg which buys subscriptions for the major publishing groups and guarantees access to relevant literature for Luxembourg-based researchers.

The open access initiative, launched more than 15 years ago, strives for the quick, unrestricted and free (free as in gratis) online access to the results of scientific research, notably peer reviewed articles. National, European and worldwide communities have established working groups, drafted recommendations and endorsed measures to foster the open access enterprise and combat current unsustainable and restrictive models⁶. The FNR is actively supporting the move towards Open Access. There is international consensus that the current publishing model will evolve towards Open Access.

⁶ European Commission, Digital Agenda on Open Access: <http://ec.europa.eu/digital-agenda/en/news/open-access-scientific-knowledge> see also the "Berlin Declaration on Open Access": <http://oa.mpg.de/lang/en-uk/berlin-prozess/berliner-erklarung/>

⁷ <http://www.doaj.org>

Gold and Green Open Access

Open access can be achieved through different means, with the most common models being the Green and the Gold Roads.

In the Gold model, researchers publish their articles in journals that offer open access publishing by making articles available to all readers free of charge immediately upon publication. The majority of Gold business models are usually based on a payment of an "article processing fee" to the publisher, directly by the author. However, other models do exist. The Directory of Open Access Journals currently lists over⁷ 900 journals, of which 66% do not charge an article processing fee.

Under the Green model (also known as self-archiving) researchers deposit their works, which have already been published elsewhere following the standard publishing model, in an institutional or subject-based repository. The copies in the repository are made available to the public for free, either immediately or after an embargo period, based upon the publishers' self-archiving policies.

The transition to open access publishing consists of two complementary but differing routes: the investment in institutional or subject-based repositories, Green Open Access, and, at the same time for those institutions or funders who choose to, the payment of article processing fees for their authors, Gold Open Access, for those journals who require such payments (33% of the journals listed in DOAJ).

As libraries take over some of the functions previously addressed by publishers, such as running institutional repositories, tracking publishing costs and, crucially, supporting authors to deal with publishers, there is a need for new skills and adequate staffing in the libraries.

The transition ahead

Open Access opens the door for scientific funders and libraries to regain control of the publishing process and its inherent costs. This effect will only be noticeable in the mid to long term, but it offers the perspective of keeping subscription costs for non-open access publications in check, including the emergence of competition in open access article processing fees and services.

In view of these changes, it is crucial for the FNR and the members of Consortium Luxembourg to analyse the present situation in Luxembourg and ensure that appropriate actions are included in the next series of performance contracts 2014-2017. This includes measures to ensure tracking and transparency in the partial shift of costs from subscriptions to authors as the Consortium management team needs this information in its negotiations over subscription prices with publishers, most of which are likely to combine open access and non-open access models.

As libraries take over some of the functions previously addressed by publishers, such as running institutional repositories, tracking publishing costs and, crucially, supporting authors to deal with publishers, there is a need for new skills and adequate staffing in the libraries.

The move towards open access publishing of the results of publicly funded research will have great benefits for the research community, industry, individual professionals and the public, contributes

to increase the visibility of Luxembourg research teams and their results and in the long term, helps to regain control over rising subscription costs.

In addition, the increased tracking and availability of data about publishing means that on the one hand, data exchange mechanisms facilitate the legal deposit requirements to the National Library (including digital preservation) and on the other hand, data exchange with national (for example author files of the National Library) and international databases is ensured.

The University of Luxembourg's Open Access repository

An Open Access digital repository, ORBi^{lu}, has been launched by the University of Luxembourg <http://orbi.lu.uni.lu> for its authors, researchers, professors, anyone who publishes the results of scientific work. A repository is a key element to support open access and ensure that research is optimally visible and accessible in the long run. As the University of Luxembourg's experience shows, populating and running a repository has non-negligible costs on the IT side, but also significant costs on staffing.

ORBi^{lu} is based on the successful experience of the University of Liège who is seen as a leader in the Open Access movement worldwide with its daring and innovative approach: the obligation of its authors to deposit all their scientific works in ORBi, their repository.

Digital Humanities

Without upgrading the current digitisation workflows to handle mass digitisation at the National Library, scholars will not have the critical mass and quality content they need to conduct competitive research.

The University of Luxembourg has therefore chosen to support the Green Road and as such, its philosophy is:

- > The author is at the heart of the publishing process, including the distribution and promotion of their works;
- > ORBi¹⁰ provides the means by which the authors can realise the full potential of their research;
- > More than the tools, a responsive help-desk and targeted training are the key elements in the success of the University's Open Access policy. To support the author and their use of the tool, the library offers a full range of services which include a help-desk providing concrete answers to their questions which cover the entire publishing process.

In addition to its own digital repository, the University Library is in the process of becoming Luxembourg's National Open Access Desk (NOAD) for the European Commission's OpenAIRE project. OpenAIRE⁸ provides a platform by which authors can meet the Open Access publishing requirements of the European Commission's 7th Framework Programme (FP7), and, in the future, Horizon 2020 (H2020). The role of the NOAD is to provide a nationally accessible help-desk which will advise all authors financed by FP7 and H2020, be they at the University or not.

An Open Access national repository strategy that goes beyond the University is not in place but investing in such a solution could be one of many possible directions to follow.

What are Digital Humanities?

"Digital Humanities" is a catch-all term for the rediscovery of cultural heritage through technology. This added value has many facets:

- > Public access via the internet to digital copies of previously inaccessible works: Printed works due to paper degradation have often become so fragile, or they may be so rare that access is either restricted to a minimum or totally forbidden;
- > Rediscovery of intellectual production: Digital copies are discoverable on the same level and through the same search engines as contemporary works, making them visible again and protecting them against being forgotten. This is particularly true for the humanities, whose scholarly communication style was much slower to take up electronic formats, leading to a much larger "black hole" of recent yet highly relevant literature;
- > Immense bodies of works can be searched instantly: Structural analysis and "Optical Character Recognition" of texts allow the creation of new interfaces and full-text search. Searches that were simply not feasible before are now accessible to everyone;
- > Application of digital technologies to create new insights: Data mining and advanced data analysis allow whole new research fields to open up and lead to insights whose structures were invisible in the analogue world, such as the speed with which, historical news spread across countries or knowledge spreads in today's communities;
- > Recreation of lost collections, libraries and artefacts: Once works are digitised, they can be virtually rebuilt into historical collections, just as fragments can be virtually reassembled into documents⁹, greatly facilitating studies.

Everybody knows websites that have disappeared and the same has happened to most of the Luxembourgish web. We do not know what we have lost and everyday that passes we lose more.

Digitising the intellectual production

The first indispensable key input for digital humanities is digitised content. High quality digitisation workflows including inventory, restoration, structuring and quality control provide the raw material for innovative research. Without upgrading the current digitisation workflows to handle mass digitisation at the National Library, digital humanities scholars at the University of Luxembourg will not have the critical mass and quality content they need to conduct competitive research.

Positive feedback can be achieved by re-integrating the new insights of digital humanities research into the national digitisation platforms, such as www.eluxemburgensia.lu. Open standards and open access to research data is a prerequisite to allow such mutual enrichment of librarianship and scholarship. This shows that debates about Open Access are by no means limited to the hard sciences.

Capturing born digital content

The second key input for digital humanities is so-called *born digital* content. Born digital are all works published digitally in Luxembourg (books, newspapers, etc.) which must be collected systematically, catalogued and added to a storage system.

Born digital includes, and this is new, the internet.

A revised "digital legal deposit" law and its *Règlement grand-ducal*, which is the basis for collecting such publications, have been passed already in 2004¹⁰

and 2009¹¹, but only a prototype was run for a short time by the National Library in 2006.

Since then, internet archiving technology has much advanced and is more streamlined, but web technologies have advanced and changed just as much. Through organisations such as the IIPC (International Internet Preservation Consortium) and the European Internet Archive, the National Library has access to an international network of experts, stable open source software tools and service providers. Everybody knows websites that have disappeared and the same has happened to most of the Luxembourgish web. We do not know what we have lost and everyday that passes we lose more.

International programs such as the Internet Archive cannot be relied upon to collect specific sites; they limit themselves to superficial and sporadic archiving. If one wanted to write the history of the web from a national perspective, there would be extremely poor records to work from. The 2009 decree recognises that in an online world it becomes impossible to differentiate between textual and audio-visual content. Web archiving would be handled collaboratively between the National Library and the Centre national de l'audiovisuel in charge of audio-visual content. It can only be hoped that the internet archiving program is revived and as a first step, possibly the next parliamentary elections in 2014, in which the internet will likely play an important role, can be kept for future generations, alongside the printed and broadcast media which are safeguarded by the legal deposit law.

⁸ <http://www.openaire.eu/en/home>

⁹ Virtual reconstruction of manuscripts from Echternach by the National Libraries of France and Luxembourg

¹⁰ Loi du 25 juin 2004 portant réorganisation des instituts culturels de l'Etat, article 10 : <http://www.legilux.public.lu/leg/a/archives/2004/0120/2004A17981.html>

¹¹ Règlement grand-ducal du 6 novembre 2009 relatif au dépôt légal : <http://www.legilux.public.lu/leg/a/archives/2009/0225/2009A3938A.html>

The next generation unified search engine *a-z.lu* implemented by the National Library will include its digital collections, alongside the catalogues from the National Library, the University Library, the national library network *bibnet.lu* and the digital library *findit.lu*.

Safeguarding for the future – National digital long term storage

Both the digitised and *born digital* content require a third infrastructure: long term digital storage. Regardless of the provenance of the digital heritage, and this crucially also includes Luxembourgish open access publications, a stable long term storage system and tools to manage files and data on the Petabyte scale are necessary to safeguard investments for the future.

The analysis and specification of a digital long term storage (also called digital preservation system) is advanced and has been a common and shared priority for both the National Archives and the National Library. Digital long term storage is the equivalent of shelves and buildings in the analogue world.

User friendly interfaces

The digitised content must be made available using state of art the websites. This is *the* key investment to ensure public usage of the digital collections; *www.eluxemburgensia.lu* offers such an interface¹², including a viewer component developed by the National Library and available under an open source licence. *www.eluxemburgensia.lu* has been available as an iPad app¹³ since 2011.

The next generation unified search engine *a-z.lu* implemented by the National Library will include its digital collections, alongside the catalogues from the National Library, the University Library, the national library network *bibnet.lu* and the digital library *findit.lu*. This new search engine offers a simple yet powerful discovery interface and for the first time fully exploits the richness of the data that has been maintained by cataloguers for decades.

Never “out-of-print” again

Digitisation of printed culture has unexpected side effects also. Once a book is digitised, it will never be “out of print” again. If such a digital copy is made using sufficiently complex standards (such as the currently used METS/ALTO on *www.eluxemburgensia.lu*) the digital copy can be recreated in any digital format and for any screen size. Such services, existing already abroad, would be very helpful for research in the field of “Luxembourg studies”. What’s more, the digital file can be printed and bound as a physical hardcopy, using a bookmaking robot such as the Espresso book machine or a Print on Demand service. Since most Luxembourgish books are out of print and unavailable, except in libraries, there may be an interesting commercial angle in collaborating with publishers, the owners of commercial rights, while enriching the digital memory at the same time.

¹² Enhancing DigiTool with a new METS/ALTO viewer: http://igelu.org/wp-content/uploads/2010/09/1632_Maurer_IGeLU2010.pdf

¹³ iPad app “BnL-elux”: <http://itunes.apple.com/lu/app/bnl-elux/id461402921?mt=8>

International visibility and networking

Both the digitised and born digital content require a third infrastructure: long term digital storage.

The implementation of the “Memorandum for Understanding on Out-Of-Commerce Works” in Europe could be a starting point, as it was brokered in 2012 by the European Commission with all key stakeholders, including collective rights management organisations, closely involved¹⁴.

A mass digitisation program would also solve the problem of the “books in print” database, which does not exist in Luxembourg, unlike neighbouring countries. Collaboration with publishers makes most sense for contemporary publishing, although digital books and digital periodicals are negligible compared to print in Luxembourg, all publications start their life as a digital file. Establishing workflows directly from publisher to library is not trivial, yet with sufficient technological skill and data protection to safeguard commercial interests, allows to avoid having to invest in the nonsensical process of scanning printed copies of what was originally a digital file.

Access for people with visual impairments

The ability of digital files to change format has a great benefit to make the inherently visual culture of print accessible to those citizens with visual impairments. Creating files suitable for Braille readers, large print displays or even text to speech conversions comes at almost no additional cost. From an inclusion point of view this is possibly the strongest argument to support digitisation of culture¹⁵.

International visibility of high level library services and of our national heritage and culture is the last but certainly not the least benefit of investing in digital library services and digitisation. In an online world one is invisible if one does not offer great content and simple yet powerful interfaces.

To ensure visibility in the global scientific and library networks, extra care must be taken to build interfaces to allow the exchange of bibliographical data and linking of repository data with national and international databases, including digital long term preservation.

¹⁴ Memorandum of Understanding on Out-of-commerce works: http://ec.europa.eu/internal_market/copyright/out-of-commerce/index_en.htm

¹⁵ VisionIP - Facilitating Access to Copyright Works for Visually Impaired Persons: <http://www.visionip.org>



The role of libraries in the knowledge society ✓

The future development of libraries as a sector depends on shared resources, expertise and technology to respond to the changes ahead.

The National Library and the University Library are working on the implementation of international standards to automatically link their Open Access repository and long term storage systems.

Europeana, the European hub for digitised cultural and scientific content links to over 27 million objects. Europeana sees itself as a catalyst and driver of innovation for the whole sector. It is enriching, translating and contextualising the digitised collections from thousands of European organisations, of which nearly 100.000 come from Luxembourg¹⁶.

The National Library is coordinating the *Groupe Europeana Luxembourg*, an open network of organisations involved in digitisation to make sure that the basic principles are followed that allow the sharing of descriptive “metadata” about digitised objects. Without sharing this information, no enrichment, no contextualisation nor discovery of the objects is possible. The richness of the European heritage organisations lies in their interlocking collections, none of which are monolingual, -territorial or -cultural. This may be particularly true for Luxembourg, in its role in Europe and the Greater Region. Hence Luxembourg's extraordinary benefit from the enrichment and visibility that a project such as Europeana brings to its digitised culture and its digital humanities research.

Libraries' future content offerings must include paid subscription-based content as well as innovative open access initiatives. The content offered by *findit.lu* and the Open Access strategy must be based on the needs of researchers and society. Library professionals must be able to model services around and integrate them with the needs of researchers and citizens to provide tangible added-value. Coupled with mass digitisation, libraries can thus increase the attractiveness of Luxembourg to researchers from around the world.

The future development of libraries as a sector depends on shared resources, expertise and technology to respond to the changes ahead. Participating in these networks, be they national, European or international, such as Consortium Luxembourg, *bibnet.lu*, Europeana or OpenAIRE, requires expert staff, willing to network, continuously learning new skills and approaches, while distilling the appropriate solutions for national infrastructures and processes.

Libraries have always employed knowledge workers; the digital shift makes them high-tech service-oriented knowledge workers. The strong traditions of both research and national libraries to collaborate and share their best practices internationally, makes them key drivers of ICT innovation and the transition towards a knowledge society.

To accomplish a project of this magnitude and contribute to the knowledge society and innovation, funding for skilled professionals, content and infrastructure must be found.

¹⁶ The National Library has delivered to date over 60.000 digitised objects to Europeana.

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www.findit.lu
www.bnl.lu

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