

Digital Library Economics: The Dutch Perspective

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Introduction: the landscape

In the Netherlands there are 13 universities, each with its own university library. These universities vary from 29,000 students and 2,800 academic staff (Utrecht) to 5,000 students and 1,200 academic staff (Wageningen). There are three technical universities and one agricultural university. The 13 university libraries are working together in an informal consortium, called UKB, which also includes the Koninklijke Bibliotheek (Royal Library) in The Hague. This consortium is not formalised. Although negotiations take place on behalf of the consortium, no one can commit or sign on behalf of the entire consortium. Each university library is financed by its parent organisation which, in turn, is financed by the Ministry of Education, Culture & Research.

There are differences in the way the libraries are organised and financed within the university. The old and comprehensive, 'classical' universities had a decentralised library organisation during the last decades of the 20th century: in addition to a central library there were faculty libraries reporting not to the university librarian but to the faculty management. All classical university libraries are now, or have recently been involved in, a process of organizational centralisation. Some universities have a centralised library organization except for the medical library, which then reports to the management of the University Medical Centre.

There are also differences in the way a university finances its library services. Some libraries do not receive any budget directly from the university management, but have to 'collect' their resources in yearly negotiations with the faculties. Others are completely centrally financed; several in-between variants can also be observed. In most of the universities, however, the resources for the acquisition of information resources (books, journals, databases etc) are provided by the faculties and not directly by the university management.

The Dutch university libraries have some tradition of co-operation in infrastructure. During 1969, PICA was formed and soon became a foundation for academic libraries in the Netherlands, but it is now part of OCLC. As the Dutch organisation for library automation, PICA took care of a national catalogue in which most of the university libraries and also public libraries participated. Connected with this catalogue was a system for interlibrary loan and since 1998 also a portal for a number of integrated databases containing bibliographic records, table of contents data and hyperlinks to full text and web pages (Bossers, 2005). As well as being responsible for this national

infrastructure, PICA provided a local library system to a number of Dutch university libraries. On several occasions this combination gave rise to discussions about the extent to which these two different services had to be distinguished more clearly.

In 1987, in a co-operative effort of the Dutch universities, SURF was set up, a foundation aiming at innovations in IT (www.surf.nl). Since then SURF has played an important role in the innovation of education and research within universities, in co-operation with the university libraries and the UKB.

A Short History of Innovation

The University Library of Tilburg was the first to start a comprehensive innovation process, which was closely connected with the planning of a new library building (Geleijnse and Roes, 1996). In 1989, Tilburg University launched a plan in which the building of a new high-tech library and the development of innovative information services was announced. The innovation program recognised the growing importance of electronic information and aimed at making full use of information technology in order to improve library processes and library services (among others desktop integration of online library information with other computer services). Close co-operation between the library and the computer centre was a decisive factor. Project teams were started for a number of key issues (involving faculty staff as well). In May 1992 the new library was opened with the first innovative services in operation.

Another example of a comprehensive innovation programme was the Electronic Library Utrecht project, which was started in 1995 and lasted for three years (Grygierczyk, 1996). This was a joint project of the University Library and the Academic Computer Centre of the Utrecht University. It consisted of a number of systematically interdependent subsidiary projects with one common goal: the qualitative and quantitative improvement of the provision of information, including an improved accessibility of information sources and the development of a series of completely new library services. The leading principle was to comply with the requirements and wishes of researchers, teachers and students.

The subsidiary projects included definition studies (information retrieval system), pilot projects (electronic publishing of PhD theses, the making of a new electronic scientific journal), and implementation projects: (e.g. training of the library personnel). After completion of the subsidiary projects, the project management started the transfer of the responsibility for maintenance and support of every newly developed application to the regular sections of the library.

Gradually, all university libraries engaged in innovation, also stimulated by the Steering group IWI (Innovation Scientific Information) in which the universities, KNAW (the Royal Academy of Sciences), NWO (the Netherlands Organization for Scientific Research) and the Royal Library were represented. The steering group initiated a study on the future developments in information and IT (SURF, 1995), and it supplied matching funds for innovative projects. Important topics were e-collection building, e-archiving, e-publishing, electronic course packs, digitisation of special collections,

copyright, licensing, staff development. The steering group strongly stimulated co-operation between university libraries. At the end of the 1990s IWI was integrated in SURF.

Towards Digital Collections

Collection Management

Since the mid-1990s, the digital collections of the university libraries have been growing, starting with contracts that provided the digital versions of journals as an add-on to the printed ones. But at the end of the 1990s, when the first so-called ‘Big Deals’ were arranged with Elsevier Science, digital journal collections grew rapidly. Accordingly, university libraries cancelled the print versions to a large extent. In 2006, 66% of the collection budget of all Dutch university libraries was spent on electronic resources. A considerable part of the collection budgets, however, is ‘frozen’ in Big Deals. Altogether, Dutch university libraries spent in 2006 € 12,700,000 on Big Deals with Elsevier Science, Springer and Wiley Science. This constitutes 40% of the budget for journals. In a science faculty, however, this percentage is considerably higher.

This phenomenon has increased the budgetary problems already confronting libraries. Because of the constant price rises of scholarly journals, there is constant pressure on collection budgets. By extrapolating journal prices, UKB has made a projection of the cost of the collections for the coming years. A comparison with the increase in the collection budgets (which at best rise with the inflation ratio) results in the following overview:

In M€	2002	2003	2004	2005	2006	2007	2008	2009	2010
Total collection costs	39.1	40.4	40.7	42.6	44.7	46.6	49.1	51.4	54.1
Total collection budget	39.1	40.4	40.7	42.9	44.6	44.8	45.0	45.1	45.2
Difference	0.0	0.0	0.0	0.3	—0.1	—1.8	—4.1	—6.3	—8.9
Cumulative	0.0	0.0	0.0	0.3	0.2	—1.6	—5.7	—12.0	—20.9

Table: Development of collection costs and budgets Dutch university libraries 2002 – 2010 (UKB, 2007)

In 2003 58% of the budget (€ 26,000,000) was spent on journals; this grew to 72% (€ 32,000,000) in 2006. It is predicted that this percentage will be 94% in 2010. The flexibility in the budget will, thus, be even more diminished by the Big Deals.

The negotiations on those licences, in which a majority of the UKB-members is involved, are carried out by a licensing office of SURF-diensten. This office is paid for by the university libraries: the sharing of knowledge and expertise, as well the carrying out of the actual negotiations has proven to be efficient as well as effective. The licensing office is supported by a small working group of university librarians.

Initially, the costs of the Big Deals were divided among the libraries according to historical spending for print journals. In 2006, the UKB agreed on a new costing model, based on the number of users per discipline per institution. For some institutions, this new model implied a considerable change: more expensive, because of an intensive use of interlibrary loans in the past; less expensive because of a high number of multiple

subscriptions to print journals previously. To accommodate these differences, the UKB agreed on a gradual transition to the new model.

SURF participates in Knowledge Exchange, an international co-operative effort that intends to support the use and development of ICT infrastructure for higher education and research. Participating countries are Denmark, Germany, the United Kingdom and the Netherlands (<http://www.knowledge-exchange.info>). In this context the partners are striving towards national licences; also they are exploring the possibility of transnational licence negotiations.

Usage

Electronic resources, including those in the Big Deals, are very popular with users. This may, for instance, be seen from the number of downloads of Science Direct articles. In the early days, there was a very rapid growth: 180% from 2001 until 2003. In 2005 there was a growth of 17%, and in 2006 again 20%. Usage varies considerably per institution, depending on the search facilities offered by the university libraries. Most universities have opted for a metasearch solution, to allow for one search in several databases. This solution, however, has its limitations, such as limited functionality and differences in the quality of results, depending on the systems involved. Also a preliminary selection of databases to be searched is necessary.

As a result of the project Electronic Library Utrecht, Utrecht has chosen to develop its own system, Omega, which allows the possibility of one search in the full text of (the abstracts of) the complete digital collection. This user friendly system has resulted in a relatively high number of downloads: in 2006, Utrecht had an average of 373 downloads from Science Direct per faculty full time equivalent, which is 80% more than other comparable Dutch universities.

The growth of digital collections has had other consequences. The interlibrary loan requests of journal articles have decreased considerably. In 2003, the Dutch university libraries and the Royal Library together received 290,000 such requests. In 2006, the number of requests was 206,000, a decrease of almost 30%. This is a considerable advantage, not only for the users but also for the libraries, because interlibrary loan from a cost perspective is a rather inefficient activity (on average, the price paid is only a 35% of the actual costs). Another cost-effective effect of the replacement of print journals by digital resources is connected with the archiving of print journals. The UKB agreed on the principle that for past print journals, one print copy has to be archived, and decided on a division of disciplines, leaving each institution with the archiving task for a small number of disciplines. The others can dispose of these print copies, or deliver them to the institution responsible, which saves considerable space in the stacks.

Digitization of the institutions' collections

There are several national programmes in the Netherlands for digitising the library's collections. The Royal Library is especially active in this field and it plays an important role in the national programme Memory of the Netherlands (digitising the Dutch cultural

heritage, <http://www.geheugenvannederland.nl/?/en/homepage>) and the Digital Library of Dutch Literature (<http://www.dbnl.org/overdbnl/>), a growing collection of primary and secondary information on Dutch language and literature and its historical, societal and cultural context. Other Royal Library projects concern the Dutch parliamentary papers and newspapers from 1618.

The larger humanities libraries in the Netherlands (Amsterdam, Leiden, Utrecht) also have programmes for digitising their special collections. They take part in national programmes on the basis of the Short Title Catalogue Netherlands, STCN (<http://www.kb.nl/stcn>), the Dutch bibliography until 1800. They also digitise parts of collections on their own initiative, and especially those documents that are heavily used and vulnerable. When relevant and possible, the digital version of the collection is enriched with additional information and results of research involving the document. Also co-operation between several universities may result in a virtual collection of physically dispersed documents.

Archiving

The Royal Library maintains an e-depot, with the primary task of archiving and preserving Dutch electronic publications. In addition to this, the Royal Library has international archiving agreements with large international publishers, striving towards the coverage of a large part of the worldwide production in science, technology and medicine (STM) publications.

The Royal Library also takes part in international co-operation towards a *safe places model* in which digital publications are archived and preserved in a limited number of libraries. It also participates in the National Coalition for Digital Preservation (NCDD), a national coalition with the aim of ensuring long term access to digital data (<http://www.ncdd.nl/en/over.php>).

Open Access

Some universities were active in Open Access in an early stage. The Library of Utrecht University, for instance, started in 2000 with the publishing of Open Access journals. But the real momentum for Open Access in the Netherlands came with the DARE programme (Digital Academic REpositories). This program was a joint initiative by the Dutch universities, the KNAW (Royal Academy of Sciences), NWO (the Netherlands Organization for Scientific Research) and the Royal Library. Its mission was to improve access to the results of publicly funded research, its objective a network of institutional repositories of all 13 Dutch universities and other research institutes. The program started in 2003 and ran until December 2006. It had a budget of M€ 5.9, and worked with accepted standards such as OAI-PMH2.0 and Dublin Core. An important aspect was that each institute could use its own preferred repository software. All DAREnet members are responsible for their own repository; in all 13 universities, the repository is the library's responsibility. In January 2004, DAREnet was actually realised, providing access to the repositories of each university (Waaijers, 2006).

In order to create awareness in the academic community, Cream of Science was initiated within the DARE program. Each DARE participant was to collect the digital version of the complete oeuvre of at least 10 top scientists. Cream of Science became a showcase for prominent research from the Netherlands. The website lists the names of 217 top Dutch academics, providing worldwide access to their 47,000 publications. About 60% of these can be accessed in full-text (www.creamofscience.org). Cream of Science did indeed create awareness in the academic community, but it was a relatively small step to a structural commitment of faculty management and researchers to upload their publications. The next step in the DARE programme was, therefore, DARE HunDAREd thousand, aiming at a total of 100,000 articles in DAREnet all being available in full text. Also, Promise of Science was started, with the aim to collect and provide access to doctoral e-theses. The growth of DAREnet was facilitated by the fact that all Dutch universities were already working with a Current Research Information System (CRIS) called METIS.

All universities have a contract with the Royal Library, stating that the Royal Library will take care of the long term preservation for the repositories in its e-depot.

In January 2007, the Royal Academy of Sciences took over responsibility for DAREnet and since April 2008 DAREnet has been integrated into the scientific portal NARCIS (<http://www.narcis.info/index>). It now provides access to 154,965 open access publications and research output from all Dutch universities, KNAW, NWO and a number of scientific institutes, as well as information on researchers (expertise), research projects and research institutes in the Netherlands. Promise of Science is a subset of NARCIS and DAREnet, providing access to 20,026 full-text doctoral e-theses from all Dutch universities. In 2006, 77% of all doctoral theses were presented through DAREnet. All universities now have a mandate for the delivery of doctoral theses in to the repository. All Dutch universities have signed the Berlin Declaration, but none of the Dutch universities yet has a mandate for all publications. In addition to journal articles, several universities have started working with multimedia and datasets.

DAREnet is very scalable, and thus, the SURF Foundation is an important partner in the DRIVER project (Digital Repository Infrastructure Vision for European Research, <http://www.driver-repository.eu/>). DRIVER aims to build the testbed for a future knowledge infrastructure of the European Research Area.

In relation to the DARE programme, SURF also designed a Copyright toolbox for authors, including a license to publish (<http://copyrighttoolbox.surf.nl/copyrighttoolbox/authors>) as well as a Communication toolkit for the acquisition of doctoral theses. Before the end of 2008, a License to Deposit and a License to Use, both in relation to the repositories, will be available.

The present usage of DAREnet is about 31,000 visitors per month (20,000 unique visitors). These, however, are not the only visitors to the Dutch repositories; visitors may also go directly to a university repository. The repository of Utrecht University, for instance, has about 11,000 visitors per month at present. The number of visitors of

DAREnet appears to have stabilised at the moment. Additional content and additional services will be needed to increase the usage.

The structural costs for maintaining a repository vary somewhat from institution to institution, from 0.6 fte for a small university to 3 fte for the larger ones. Most university libraries have integrated the responsibility for the repositories in one or more already existing organisational units. A limited number of them have a separate organisational unit for this task, possibly combined with other Open Access activities. Three universities are active in the field of Open Access in addition to the maintenance of the repository. In particular, the Universities of Amsterdam and Utrecht are publishing a number of Open Access journals, Amsterdam through its Digital Production Centre (http://www.uba.uva.nl/digital_production_centre/home.cfm), Utrecht through the unit Igitur (www.igitur.nl). The University of Amsterdam has a fund to cover publishing costs in Open Access journals.

Since 2007, the UKB has co-operated with Springer regarding its Open Choice programme. This offers authors the opportunity to have their journal articles made available with full open access in exchange for payment of a basic fee ('article processing charge') of \$3,000. There is, however, little incentive for authors to do so, because the payment of this fee will not result in a visible reduction of the subscription price. In the pilot between the UKB and Springer a maximum of 1,250 publications per year of Dutch universities are made available with open access, without additional payment. Above the number of 1,250, \$ 1,500 has to be paid for article processing costs. The number of Dutch publications in Springer journals in 2007 was 1,162. Springer hopes this pilot will result in an increase in the number of articles, downloads and citations, while the UKB expects an increasing awareness of, and insight into Open Access among all stakeholders and a fruitful discussion about business models. The project runs until the end of 2009 and then will be evaluated.

Relation with Research and Teaching

There is considerable evidence that the digital library at the desktop of the researcher, teacher and student improves efficiency and effectiveness, especially of the process of information retrieval. Thus, staff and students have more time available for studying information resources. One may suppose that this also enhances the quality of research and education. In this context, it is the goal of all Dutch university libraries to integrate the library services as much as possible in the primary processes of the university, teaching and research. This is a necessary condition for increased efficiency and quality enhancement.

An important impetus for this development is the SURF Share program, a follow up to the DARE program. More than in the preceding programme the research and communication processes in the SURF share programme 2007-2010 are viewed as a unity. The SURF share programme is concerned with the following issues:

- Innovation of parts of the research and communication cycle by means of (among others) ‘enhanced publications’
- Creating and assessing *collaboratories* that allow researchers to collaborate and to share their sources
- The development and application of several tools and applications for quality control
- Dissemination and impact to support the researcher in an open access environment
- Registration of research data and achieving long-term access and data curation.

A *collaboratory*, or virtual research environment, is a digital, web-based collaborative association of researchers at several locations that allows them to work together and to share knowledge and sources. A digital workbench will be developed to provide an optimum of support for the researcher in his or her work. This workbench will contain several applications, including the means to create enhanced publications and to simplify the authoring and review processes. The added value of the SURFshare programme for researchers lies in an improved access to research results and an improved dissemination and impact of their own research results. Additionally, collaboration through *collaboratories* and open access results in increased productivity as well as enhanced and accelerated research.

An example of this development can be seen at Utrecht University, where the PARTNER program of the University Library develops Virtual Knowledge Centres (VKC), which support the creation and sharing of scientific and professional knowledge products, within well-defined knowledge domains and between academic staff members, students and others (such as alumni). The basic idea underlying the PARTNER program is the vision that academic education prepares students for the ‘membership’ of a certain academic circle, an academic discipline or profession (Kooistra et al., 2003). The graduate student has acquired the knowledge, skills and attitude belonging to that group. This idea is expressed in the concept of the VKCs, wherein all sorts of possible library services are pulled together. The integration of these services into education and research realises the added value of the library as partner in science. Consider the professional (alumnus) as a member of a VKC in his or her own discipline. Then, the student is a future member, which means that the educational process prepares the student for this membership via specific training built into the curriculum. The VKC comprises repositories for storage and management of content, and a collection of services that facilitate actions and interactions of the VKC members (store knowledge products, make them accessible, search and find, share, alert, personify, annotate, communicate, etc.). While the subject matter of the VKC is the responsibility of the research professionals, the library provides support and maintenance.

Another important aspect of the library’s services is the support of the digital learning environment. All libraries contribute to the training of academic skills, especially in information literacy. This training is integrated in the curriculum as much as possible. A good example is connected with the development of the method of problem based learning at the University of Maastricht. Here the library’s resources are seamlessly integrated in this specialized learning environment. The library’s support for the students

and teachers includes the archiving of student's theses as well as the archiving and disclosing of learning objects.

Organizational Consequences

Since the early 1990s, innovation has been pervasive in university libraries. This has had (and still has) radical consequences for the services and tasks of the libraries. This, of course, has also affected their organizational structures and, not infrequently, their budgets. Since innovation is of vital importance, all university libraries have paid attention to this in their organisation and dedicate structural resources to innovation. Most of the Dutch university libraries have integrated the innovation task in their mainstream library departments. The larger universities, however, each have a separate department for innovation. Thus it can be assured that innovation does not become a victim of the permanent struggle between priorities. The percentage of the budget that these organizations spend on innovation per year may add up to 5%, possibly to be supplied by externally acquired project funds.

For several decades, most university libraries have their own, dedicated IT department taking care of the maintenance and support for the library specific IT systems. In more and more cases, the generic services (PC support, server maintenance) are outsourced to an IT service department at the university level. Thus the university secures a constant level of services for students and staff. The size of the library's IT department appears hardly to be dependent on the size of the library and is about 8 fte.

Most Dutch university libraries, and especially the older and comprehensive ones, have traditionally a number of faculty libraries serving one or more faculties, sometimes reporting to the university librarian, sometimes not. There may also be a number of small institutional libraries. As more information becomes digitally available, the use of branch libraries, especially in the fields of STM (Science, Technology, Medicine) is rapidly decreasing. Researchers get all the information they need at their own desktop, and the branch libraries evolve to study facilities for students. Sometimes, the workplaces are profiled as an e-learning environment (especially in medical faculties), but more often the branch libraries are closed down. This process has taken place or is planned in almost all Dutch university libraries.

This process is mostly financially motivated. The majority of the Dutch university libraries have recently been confronted with one or more severe budget cuts, necessitating a radical reorganisation. The reason for these budget cuts may vary. Budgetary measures by the Government very often cause budget problems for libraries, since universities in general have the policy of applying budget cuts to service units at least as much as to faculties. But in older universities, budgetary problems were also caused by the rising costs of the maintenance or necessary renovation of their older buildings. The larger part of the budget reductions that took place were realised by closing down branch libraries (saving space and staff) and concentration of back office activities in one organisational unit and one building. Whereas the traditional library organisation was determined by locations, their character, size and number, modern

library organisations are functionally organised: public services, back office, and facilities (Savenije, 2002). This transformation, among others, brought forward a substantial decrease in the number of department heads. Libraries become more businesslike and efficient, but from the viewpoint of organisational culture, this is far away from that of the traditional library. The resulting internal tensions have often caused increasing absence of staff through illness, and demanded a lot of the library management's attention.

Staff

Looking at the staff costs, there has been, generally speaking, a reduction in back office staff (cataloguing, technical services, stacks). Fewer staff are needed at the circulation desks because of the closing down of branch libraries and the introduction of Radio Frequency Identification (RFID). The tasks of subject librarians become more complex: a shift has to take place towards account management and community support. All staff in the public services departments need IT skills. So, while a reduction of library staff is possible, there are growing costs for IT (systems as well as staff) and the costs for the remaining staff will rise because more qualifications are needed (Kollöffel and Kaandorp, 2003).

In addition to this, there is a growing need for training. This can not always be found in existing training programmes. Often seminars and workshops as well as (inter)national conferences offer a useful complement to these. In general, managers have become more selective in sending staff to conferences, and also in giving them time and opportunity for organisational activities in branch organisations during working hours. On the other hand, travelling costs for international conferences and co-operation are rising.

Library buildings

As mentioned above, many branch libraries have been closed unless there is a strong relationship with the learning environment. On the other hand 'central' university library buildings with modern equipment are becoming ever more popular with students. Good IT facilities, good physical facilities such as chairs and a restaurant are valued highly. Since the introduction of the bachelor/masters system there is also an increasing need for group work places. Recently, new university library buildings have been constructed in Utrecht and Wageningen, and drastic renovations have taken place in Maastricht and Nijmegen.

The average number of opening hours is about 80 a week. There is an increasing call for the extension of facilities as well as opening hours in most places.

Conclusion

Although Dutch university libraries have some tradition in co-operation through PICA, this was not really reflected in the initial development of digital libraries. Stimulated by IWI and SURF there were a number shared projects, but the co-operation in most cases remained restricted to the projects. Acting as a consortium in licence negotiations and, especially, the success of the DARE programme meant a new break through in co-

operation. On the basis of these results, the UKB now plans more joint actions in the future, especially to raise the level of the infrastructure for scientific information. An integrated, shared infrastructure will allow libraries to deliver tailor-made local information services which enable the universities to excel in research and education. Vast resources are needed to implement such an infrastructure and these can no longer be generated by individual institutions.

The UKB's objectives for the next years are ambitious and have a strong emphasis on co-operation:

- Jointly improve the delivery of content: the acquisition of content which is not available or easily accessible on the open Internet, the development of a publication infrastructure for the scientific output of the institutions, and the promotion of open access.
- Jointly enhance the infrastructure by developing an efficient, integrated infrastructure for discovery and access, including both open and restricted information resources.
- Jointly support research and learning: developing facilities for e-learning and for e-science: storage, publication and valorization of research output.

The UKB actively seeks co-operation with other stakeholders in the scientific information network (such as the SURF foundation, university staff and students, other organizations in higher education, other library sectors), as well as information and systems vendors. UKB will also actively take part in international developments.

It has often been said that the number and context of the Dutch research libraries are just right for an optimal co-operation. But in everyday life, reality often appears to be more complicated. The recent successes, however, justify some faith in the important steps now being taken towards an outstanding national infrastructure for Dutch education and research.

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