

E-JOURNALS IN GERMANY: EFFORTS, COLLECTIONS AND ORGANIZATION

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The federal system of government and the principle of decentralization poses problems for the consortia approach to e-journal subscriptions and access at national level in Germany. Solutions have been sought through regional and same-type library cooperation. Further progress may be possible through the efforts of various interdisciplinary, multiprofessional interest groups.

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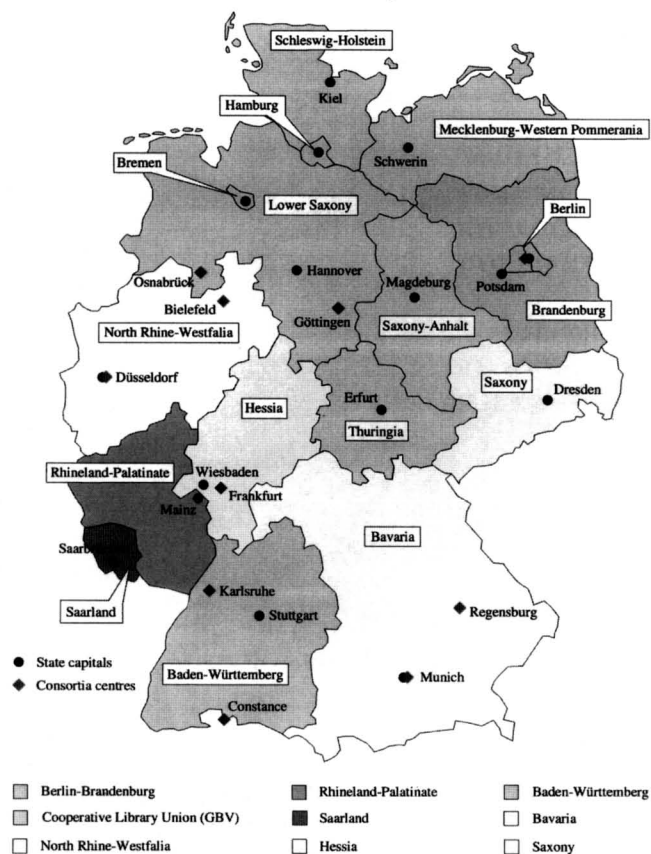
Consortial initiatives for the acquisition of electronic journals

National site licence

Nationwide coordination and consolidation of negotiation efforts has proven fairly successful in Great Britain where these efforts have culminated in the first national site licence for electronic journals. Major factors contributing to this consolidation of efforts include the following: policy makers (JISC and higher education authorities) recognized the importance and potential of the information infrastructure very early after the introduction of public access to the Internet, and several key policy papers have contributed to further development and funding for a developmental phase. These include the Follett Report¹ of 1993. In 1995, the JISC (Joint Information Systems Committee)² was created to coordinate various aspects of establishing a more efficient information infrastructure with regard to Great Britain's universities. The JISC oversees centralized funding for negotiation (NESLI, CHEST), for research and development (eLib projects), for the Pilot Site Licence Initiative since 1996,³ specialized research collections in the humanities, etc. The effort in achieving a national site licence for the electronic journal products of several publishers is only one aspect of a governmental strategy to strengthen the economics of the information society in Great Britain.

In Germany, achieving a national site licence would, at first glance, seem to be almost impossible. The principle of decentralization which prevailed after the Second World War has led to very independent states and a fundamentally competitive, rather than cooperation-based, situation. This affects not only funding and policy decisions, but also blocks any move towards national action. The fear of potential manipulation on a large-scale

Regional Library Consortia for Electronic Journals in Germany



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basis (as had taken place in the period of the 'Weimar Republic') is still quite strong.

In conjunction with the state (Länder) control of educational institutions and thus also of the information infrastructure for the academic scene in Germany, it is the responsibility of each of the 16 German states to plan and start negotiations with publishers and other content-providers. As a result, 16 different licensing agreements with vastly differing conditions could result, giving students, faculty and researchers in the various Länder vastly differing advantages and disadvantages.⁴ This became apparent in September 1997 when the University of Bielefeld, representing 6 of the university libraries of North Rhine-Westphalia, closed a contract for electronic journal subscriptions with Elsevier and, by setting certain precedents in essence, negatively influenced the negotiation efforts thus far achieved by representatives of the Land Baden-

Württemberg (and other regional groups) with the same publisher. Also, because of the limited number of original university libraries, the consortial agreements for all university libraries in North Rhine-Westphalia are currently being re-negotiated in the context of the North Rhine-Westphalian Digital Library Program.⁵

Since then, additional regional and 'same type' library consortia have evolved and are negotiating, usually individually, licensing agreements with publishers for the academic institutions of that particular state or group of states. The possibility of consolidating efforts in achieving a national site licence is not completely ruled out, but is still fairly distant. Yet, some groups have seen the advantages of such a national site licence. These include the funding agencies for larger research institutions and the German Research Foundation (DFG) which funds the national special subject area program at selected German university libraries. In addition, certain groups of researchers and academics – predominately those in the Information and Communication Commission of the German Learned Societies (IuK-Kommission)⁶ – support efforts towards a national site licence to maintain equal access and availability to the electronic information

throughout Germany, although others are sceptical. Other European countries, predominately in Scandinavia, have also recognized the benefits of a national site licence and at least one, Sweden, has succeeded in achieving negotiations for such national site licences. This paper will focus primarily on the situation in Germany.

Regional library consortia in Germany

Since there is no central or national office or commission to finance nationwide initiatives for information provision to higher education and research, librarians in Germany often maintain that the decentralized governmental structures will never allow a national site licence. Thus, many have forged ahead in negotiations for regional library consortia which often serve the same libraries as the state union catalogs, though they are not always identical. In a few cases, the central

office of the responsible state or regional union library catalogs has provided the staff which carried out the coordination and negotiating talks. Formation of other consortia has been driven by the awareness that only group efforts can take issue against the rising journals' costs and effect some sort of leverage in negotiating new pricing structures for electronic journals. Furthermore, because of the nature of electronic journals and the principle of access versus ownership, it is recognized that maintenance of a physical copy of a journal, held simultaneously in several libraries within the same city or proximity, is not only costly in terms of subscription management, binding, shelving space, and preservation, but also no longer necessary.

Berlin-Brandenburg - The Friedrich Althoff Consortium

The Friedrich Althoff Consortium of Academic and Research Libraries in Berlin and Brandenburg was founded in 1997. Prior to that it was known as the Berlin-Brandenburg Library Consortium⁷ which had grown out of a discussion group of Berlin physics libraries (Gesprächskreis Physikbibliothekare) led by Dr. Friedrich Wilhelm Froben of the Physics Department Library of the Free University of Berlin. With the lack of a strong state union catalog in Berlin, and the interests not only of university libraries, but also of several regional research centers in Berlin and Brandenburg, these libraries joined together to form the first legal consortium with a consortial contract between the members for purposes of negotiating for electronic journals (and later also databases and other services). By the end of 1997, the first pilot projects for this consortium were set up and costs distributed among the ca. eight members⁸. The Consortium name honors Friedrich Althoff, a department chairman in the Prussian Cultural Ministry in Berlin, mainly famous for his plans for libraries while in the Prussian ministry.

Members of this consortium give their agreement to a contract for the framework of the individual negotiations, but they are free to decide to participate in the individually negotiated contracts with various publishers.⁹ Individual non-consortial members may also participate in the consortial license for certain journals, if the consortial members and publisher agree to this.

Cost sharing is based on the number of journal subscriptions to be included and the costs according to the previous year's subscription volume of the consortial members. Consortium members can choose which publishers' journals they want to have in electronic form. They are not obligated to subscribe to any services, but when they do, they benefit from the broad spectrum of journal titles already in the repertoire of the participating libraries (cross access). The financial distribution of payment is carried out by subscription agents, for example, Lange & Springer, who were involved in some of the consortial agreements.

Interlibrary loan services are maintained by the Consortium: Individual member libraries obligate themselves to function as the region's interlibrary loan library for certain journal titles and thus agree to maintain the print version and provide copies for all interlibrary loan requests. In some cases, storage on proxy servers is allowed and in one contract, a contingency of 15,000 articles from journals of that publisher which are not subscribed to by the members of the consortium are included at no additional charge.¹⁰

The Friedrich Althoff Consortium has carried out negotiations with Elsevier, Springer Verlag, and Academic Press and are in negotiations with HighWire Press, Kluwer, subscription agents and database providers. Currently, approximately 1000 electronic journals are available in full text to the members of the Friedrich Althoff Consortium.

Cooperative Library Union 'Gemeinsamer Bibliotheksverbund (GBV)'

Twenty-five university libraries and libraries in research institutions in seven German Länder¹¹ have joined together to form a consortium within the GBV¹² in order to start negotiations for electronic journals with Springer Verlag. The negotiations have been led by the director of the State and University Library of Bremen, Annette Rath-Beckmann, the libraries representative in the Lower Saxony Ministry of Science and Culture, Dr. Uwe Drewen,¹³ and Uwe Rosemann, the director of the University Library and Technical Information Library in Hannover. The first contract, a pilot installation for full use of all Springer-Verlag electronic journals, started on January 1, 1999, for one year. This is based on a fixed sum which is paid for by an additional

amount of central funding, namely, 10% of the subscription prices. At the moment, commercial users of the library consortium will not be allowed access at cost, as was originally planned.

Interlibrary loan using the electronic version of an article is not allowed. Commercial users will pay US \$20.00 for any printed document provided. It is expected that the succeeding contract will evolve with a different algorithm for payment distribution (most likely according to the percentage of print journals at a particular library and in relationship to a set percentage of the entire cost).

Currently (June 1999), the GBV has a total of 4,500 electronic journals. Additional negotiations are being conducted with Elsevier, Kluwer, Academic Press and Swets. Each of the negotiations seems to pose different use restrictions, facilities such as remote access, and cancellation prohibitions. Interlibrary loan using electronic or print copies, as well as services for commercial users of these libraries, are the most frequent cause of difficult problems. Pricing strategies almost always depend on the current or last year's subscription volume and some require contracts binding the consortium to a three or four-year contract with built-in price increases. At present, only the city-state of Bremen is interested in contracting with Elsevier for electronic journals for reasons of the cancellation policy demanded by Elsevier or for other reasons. Bremen has now secured a contract as an individual library outside of the GBV consortium.

Germany is represented in the International Coalition of Library Consortia (ICOLC) by the Cooperative Library Union (GBV).

North Rhine-Westphalia

North Rhine-Westphalia, one of the largest and most densely populated states of Germany, was the first state to negotiate for licensing agreements for all of its university and research libraries and their patrons. As early as 1997, additional funding from the Ministry of the Land was obtained for negotiating the 'full set' of electronic journals for eight North Rhine-Westphalian university libraries from Elsevier and Springer.¹⁴ Part of the money was planned for computer equipment for accessing electronic journals and this was also part of the North Rhine-Westphalian Digital Library

Project (IBIS). The contracts with Elsevier and Springer are still in effect, since neither contract allowed cancellation of the print subscriptions.¹⁵ As of 1998, all the electronic journals of Academic Press have also been licensed. To provide ease of use and also to integrate various levels of payment schemes, the University of Bielefeld has developed an access system which allows ease of access to different publishers' electronic journal servers, as well as to and from databases, CD-ROM databases, and library catalogs including the article catalog JADE, which serves as the basis for the JASON document delivery system. The development of the module for payment scheme integration is in progress within a Global-Info project (SFM 9)¹⁶. The central funding for obtaining electronic journals came from the North Rhine-Westphalian Ministry of Education, Science, and Research and also corresponds to the goals of the North Rhine-Westphalian program for a digital library.¹⁷ Negotiations for the electronic journals are conducted by Dr. Karl Wilhelm Neubauer, Director of the University Library of the University of Bielefeld, and Dr. Werner Reinhardt, Director of Central Services (cataloging and acquisitions) of the University Library of the University of Siegen.

Saarland and Rhineland-Palatinate

Although one of the smallest German Länder, the Saarland has negotiated pilot installations of the Springer electronic journals for a period of one year. Prof. Dr. Bernd Hagenau of the University and State Library of the Saarland, and representing all academic libraries of the Saarland, conducted the negotiations.

In the Rhineland-Palatinate, 19 university libraries, polytechnic libraries, and libraries of other research institutions, will also have a pilot test phase using 190 Springer electronic journals. Dieter Johannes, representing the academic and research libraries of the Rhineland-Palatinate, conducted these negotiations. Both contracts are similar and have the added advantage that in each Land, electronic journals which would usually only be available in the other Land will be available in both Länder to the participating institutions. The pilot phase includes using the LINK information system for electronic journals from Springer.

Bavaria

In Bavaria, the consortial negotiations are being carried out by Dr. Rolf Griebel of the University Library of Munich and Richard Mai of the Bavarian State Library on behalf of all Bavarian academic and research libraries. To date, only one contract with Academic Press has been signed because the spectrum of disciplines covered by Academic Press journals corresponds much more to the university needs than those of other publishers of electronic journals. Negotiations with Elsevier have been broken off as the Bavarian libraries felt that the business model proposed by Elsevier was not advantageous to libraries.¹⁸ If central funding is available, libraries will not be quite as cost conscious as when the costs of the electronic journals are distributed among the subscribers. Since in Bavaria, libraries are paying for their participation in the consortium individually, they are looking for more value-added services. Furthermore, Bavarian libraries found that the licensing policy of both Springer and Elsevier was based on the parallel print and electronic versions, with the primary focus on libraries committing themselves not to cancel print subscriptions when electronic versions were available.¹⁹

Baden Württemberg

Although, representatives from Baden-Württemberg libraries were some of the earliest in Germany to start negotiations with publishers of electronic journals, there is no additional funding for electronic journals and libraries are unable and unwilling to pay additional prices for the electronic and the print version of the same journal. Thusfar, no licensing contracts for electronic journals have been signed for this Land alone. The representatives, however, are now looking at joint consortial licensing contracts with database providers and electronic journals to provide not only individual services, but also to guarantee cross access. Negotiation partners from this Land are Stephan Wolf at the Southwest Library Union Catalog in Constance and Ms. Barbara Schubel of the University Library in Karlsruhe.

Saxony

In Saxony, representatives of the State and

University Library of Dresden have begun negotiations with several publishers of electronic journals, although no contractual agreements have been made to date.

Bavaria, Saxony, Baden Württemberg

In addition to the individual licensing negotiations being carried out, the southern Germany Länder of Bavaria, Saxony and Baden-Württemberg are discussing joint negotiations both with publishers of electronic journals and other content providers such as database hosts.

Hesse

The Hessian Ministry for Science and Art has reserved 2 Million DM of an original 11 Million DM for scientific publications. The negotiations regarding use of this funding are subject to the recommendations of a working group consisting of Prof. Dr. Bernd Dugall (State and University Library in Frankfurt am Main), Ms. Klein (Polytechnic of Wiesbaden), Prof. Dr. Rudi Schmiede (Dept. of Sociology, Technical University of Darmstadt), Dr. Steenweg (Library of the Gesamthochschule in Kassel), Prof. Wachter (Polytechnic of Frankfurt am Main). To date this group has concentrated primarily on negotiations for databases, but since electronic journals are considered databases under the new copyright law this has been expanded to include electronic journal negotiations. To date, central funding has been used for certain database hosts, CD-ROM databases, SWET's online offerings (via GBV), some daily newspapers in electronic form, and for the full set of Academic Press electronic journals (176 journals).

The electronic journals of Academic Press are available to all institutions of higher education in Hesse. In addition, negotiations have been made for ACM publications, *Nature*, *Science*, three online journals with German mirror servers in Hesse, Beilstein, EBSCO journals, Karger medical journals (including backfiles as PDF and all print journals which were not available in Hesse), etc. Some of these contracts are based on the number of subscriptions in Hesse in 1996 with the clause of no cancellation and an annual price increases of 5-13 % guaranteed over two years. The physics journals offered by Springer Verlag have been negotiated for five of the universities in Hesse for

two years.

The server for electronic journals for the entire state of Hesse is located at the University Computer Center at Kassel, which also archives the materials (in part on CD-ROM). As of 1999, all files are searchable under a uniform search template. Mr. Schnelling at the Computer Center of the University of Kassel is responsible.

'Same type' library consortia

Library consortia of 'same type' libraries - libraries with similar areas of collection emphases - have begun to form with the purpose of negotiating suitable licensing agreements for electronic journals for their special clientele. These include the consortium of the larger research institutions in Germany which belong to the Hermann von Helmholtz Association and the consortium of the Max Planck Society libraries. The Helmholtz Association encompasses sixteen research institutions in the areas of physics, energy, biotechnology, medicine, and computer science. The Max Planck Society is dedicated to basic research in all disciplines and has approximately 84 Institute libraries plus additional working groups needing information provision, though not always served by a library. In some cases, members of both of these groups had first started by being included in the regional consortia for licensing of electronic journals. Although certain advantages, such as access to basic titles, titles of other disciplines not otherwise subscribed to, are available through membership in a regional consortium, other advantages, such as reduction of overlap or duplicate subscriptions, thus cost-saving, are only available when libraries with similar collection emphases join together. In the case of the Helmholtz Society, there is a high level of overlap of titles, since many of these institutions focus on physics and computer sciences. In the Max Planck Society, where a great deal of interdisciplinary research is done, a broad spectrum of journal titles attained via the cross access possibilities has cost-saving advantages for the researchers who have direct access instead of needing to order articles from non-subscribed journals. From 15 April to 15 May 1999, an electronic survey was taken of the Max Planck researchers on their use and acceptance of electronic journals.²⁰

At the time of writing this article (June 1999),

libraries and information provision services in the Fraunhofer Gesellschaft²¹ are also considering joining the two above research societies for the purpose of electronic journals negotiations. The Fraunhofer Society consists of 49 applied research institutions, almost all with libraries and information research facilities, many of which work under the cost recovery structures of the ISO 9000 regulations.

Negotiation goals and factors inhibiting achieving satisfactory licensing agreements

Licensing negotiations and contract content often differ with each publisher and even within negotiations with the same publisher for different libraries and library consortia. Although there are legitimate reasons for confidentiality regarding the negotiations and contractual agreements, this situation often leads to advantages and disadvantages for researchers and students in different institutions or different regions of the country, who could only rely on the librarians and others in the negotiation teams to obtain the best possible terms, prices and use conditions for them.

In many negotiations, librarians have found that the licensing policy of both Springer and Elsevier was based on maintaining the parallel print and electronic versions, with the primary focus on libraries committing themselves to keeping the print subscriptions in addition to the electronic version for up to three years.²² This is simply not economical for libraries faced with budget constraints. Furthermore, in certain regional negotiations, Springer and Elsevier have wanted to 'bundle' all of their electronic journals into one contract, even though not all consortial members were interested in obtaining the 'full set'. Griebel/Mai have pointed out that 375 of Elsevier's 'full set' of ca. 1100 electronic journals are not even listed in the central periodicals database in Germany (Zeitschriftendatenbank - ZDB) and most of these are abstract journals and newsletters. Springer Verlag's collection also includes journals which are not always appropriate for general university libraries and which none of the consortial members will use. Sens makes similar conclusions when looking at actual use of physics journals²³ and points out that basically 1/3 of the Elsevier journals in physics are not being used at all, but must be paid for. Other consortia, for instance, the Berlin-Brandenburg

consortium, only subscribe to those electronic journals which are deemed necessary. The advantages of cross access use of the journal titles, subscribed to by other libraries within the consortia, are then evident.

Negotiation baselines use print subscription volume from as much as three years prior to subscription to the electronic version to determine the additional subscription price for the electronic version. Many opponents of this policy maintain that this is not in accordance with the actual cost of producing the electronic journal, while some publishers maintain that the start-up costs for an electronic journal are extremely high and justify the higher subscription rates for the electronic versions.

Cancellation policy is a grave detriment to negotiations for electronic journals. This involves not only the prohibition of cancelling print subscriptions for the next subscription year, but often for two or three years. If the library's goal in subscribing to electronic journals also includes saving costs, then it is not feasible to maintain both the print and electronic versions, often at 115-125 % of the original print price plus, physical storage costs. As mentioned above, several library consortia have discontinued negotiations due to the non-cancellation policy of certain publishers. Others have discontinued negotiations or refused to enter into negotiations on the basis that the electronic version is only available in addition to the print version at a 15-25 % price increase and their budgets simply do not allow *additional* costs for the same content.

Some publishers require subscription to the 'full set' of electronic journals in their selection ('bundling'); others allow a selection of their journal titles. Certain others set the consortial price at a minimum of five to six times the individual price - which is legitimate when more than the five or six libraries which want to obtain licensing to the same journal are participating in that consortium, but this is not always the case among consortia consisting of vastly heterogenous libraries. Here, again, the 'same type' library consortium offers definite advantages.

Remote access is important for researchers and faculty who travel a great deal and need continuous access from all points of the globe. This is only available with certain publishers, as

identification mechanisms do not usually allow any other methods than IP-number recognition or IP-number recognition in combination with passwords.

Interlibrary loan is usually not allowed by the licensing contracts, unless a print version is also available. Similarly, distribution of printout or electronic copies of files by a consortial member to non-consortial members (such as necessary for faculty involved in distance learning projects or other teaching commitments) may be prohibited. Electronic reserves may be possible, but it may be necessary to stipulate the terms for this in the contract. Currently, model contracts for electronic journals subscriptions (both in consortia and for individual libraries) have been formulated.²⁴

Access via a library in-house computer for non-members of a licensed institution is usually not allowed and responsibility for monitoring lies, according to the licensing agreement, with the library staff. In contrast to this, in the Anglo-American contracts, 'walk-ins' (non-institution users) are allowed.

Metadata for individual articles, including bibliographic metadata, abstracts, rights management metadata, etc., should be provided in an easily retrievable, standard form by the publisher and must be easily integrated into the chosen access system.

One last, more or less political factor inhibits both negotiation and acceptance of electronic journals, namely, an undercurrent of fear that if the negotiations and contracts for electronic journals are carried out at the state or even national level, individual faculty and university library directors would lose their influence on the actual selection of titles available, conditions of use and price. The present two-tiered model allows certain independence of the individual libraries, but relies in some cases on double subscriptions within the same university which is financially no longer feasible.

Access systems, retrieval, and licences for 'click-through' links

'Click-through' links from database to full text or from reference in one article to the full text of the cited article) must be regulated by the individual licences between the user and the publisher. However, in the case of an integrated access system, double or triple licences may be necessary.

If the producer of the access system could integrate click through links without additional costs and licensing agreements (such as has been done between the Institute of Physics (IOP) and the INSPEC database), this would be advantageous for the end user. Ideally, the licensing details for click through links not only to other electronic journal texts, but also other texts, databases, factual databases, etc., could be handled by the access system producer. This may cost more in the end, but would save hours of negotiating time for the individual libraries and library consortia.

Access systems are also expected to have housekeeping mechanisms which recognize licensed users and non-licensed users. Ideally, non-licensed users should be able to access individual content items at cost, with the cost for specific user groups (such as those designated as 'walk-ins') also being part of the immediate rights management metadata for that particular file. In addition, for such cases, means of payment (credit card and verification, deposit accounts, billing to verified address, etc.) must also be built into the access system.

Access systems include ISI's Web of Science, SwetsNet, EBSCO, the University of Bielefeld's access system, the GBV Pica union catalog, Springer LINK, L@ser from Lange & Springer, Blackwell's Navigator, the WebDOC system in Göttingen and the OCLC electronic journals offerings. The University of Regensburg has developed an access system for its own library and for other libraries in Bavaria, which has a hierarchical structure to prohibit access to unlicensed participants, and does not allow outsider users to log in and pay-per-view or use licensed journals. This access system has attracted consortial users from other regions, such as Berlin-Brandenburg, by virtue of its user-friendly overview structure for full texts.

Access versus ownership

The problems of terminating access and not having any ownership of the data licensed during the licensed access time, will become acute when library budgets necessitate further reductions. This, too, would speak for a nationally-organized site licensing authority which could assure that adequate access to scholarly information did not suffer due to financial cutbacks in individual

libraries. The solution preferred by the publishers in this case is the purchase of individual content units (articles, images, data sets, etc.). Another solution would be an electronic archive. The information provision infrastructure in Germany already has a tiered system to assure access to the print versions of scientific literature. At the state level, university libraries register their literature (journal and monograph) holdings in the state or regional central union catalog to facilitate interlibrary loan. At the national level, there are four central subject libraries for medicine, agriculture, technology and engineering, and economics. Literature for other subject areas, especially journal literature from foreign countries is collected at a specific university or supra-regional library for the individual subject areas, according to the distribution plan of the German Research Society Special Subject Collections (Sondersammelgebietsprogramm²⁵), originating in the time after the First World War and expanded after the Second World War. This program has not only given clear guidelines for collection policy and access to journal literature, held only once but available to all, but it has also provided additional funding for this special, and often expensive, acquisition feature of the individual libraries with a national responsibility for information provision.

This two-tiered system assures adequate provision, but is dependent on financial support from the German Research Foundation. With rising journal costs, it would seem likely that even this program, especially in view of the restrictions from publishers for using electronic versions for interlibrary loan, would be less feasible in a new model of information provision for electronic journals in Germany.

Archiving requirements and back issues digitization, etc.

Some publishers have digitized back issues of journals offered in the current subscription price in order to make it more attractive. The digitization of back issues is not usually done with the intention of setting up an electronic archive for that particular journal. A rather small number of publishers recognize not only the archiving of electronic journals, but also the availability of back issues and archived information as a commodity of interest to the user. The JSTOR-Project²⁶ is a

good example of the success of such an endeavor whereby the scanned information attains not only higher visibility in the electronic form, but is also used more frequently. Archiving the electronic journals will not be enough: the individual units must be retrievable and ideally integrated into the larger information infrastructure, so as to be used as springboards to further information. This necessitates not just an archival server, but a large-scale server which has all the retrieval mechanisms that the normal information server can offer. In addition to these, certain archival metadata (date of versions, date of archiving, use restrictions, copyright clause, etc.), will have to be stored and available in the file itself at the time of retrieval.

The Göttingen Digitization Center (Göttinger Digitalisierungszentrum - GDZ)²⁷ is doing this type of work at the University of Göttingen. In addition to digitizing key German texts, this Center (and the University Library at Göttingen) is the project leader of a working package for the development and determination of specific metadata for archival purposes within the CARMEN (Content Analysis, Retrieval, Metadata and Effective Networking) Project of Global-Info, the German Digital Libraries Programme.²⁸

In addition to these, archival digitization of the German Yearbook of Mathematics (*Jahrbuch der Mathematik*) for the issues from 1910 to 1996 is being carried out at the Technical University of Berlin, with funding from the German Research Foundation and from the STN office of the Subject Information Center for Chemistry, Physics and Mathematics in Karlsruhe. In contrast to the issue by issue digitization, the procedure for digitizing this journal, which has been published as a CD-ROM since 1996, includes digitization sequencing according to references which refer to back issues. In this way, the database of these articles is enhanced for the purpose of linking the development of scientific ideas.

Research projects and special sites for electronic journals in Germany

University Library of the University of Regensburg

Since April 1997, the University Library of the University of Regensburg, together with other university libraries, has offered the widest selection of electronic journals in its Electronic

Journals Library (Elektronische Zeitschriftenbibliothek EZB).²⁹ It currently lists over 3800 journals, of which 485 are pure electronic journals and ca. 700 are free of charge. From the beginning, the Library of the Technical University of München was a partner and today, over 20 libraries all over Germany, as well as the Friedrich Althoff Consortium, participate in the Regensburg Electronic Journals Library. For the first three years funding for the project has been provided by the Bavarian State Ministry and the Regensburg University Library. An access system developed by the University Library of Regensburg functions supra-regionally, so that libraries in the Bavarian library union will have access to the full texts of only those titles listed in their Website to which they subscribe. A set of red, green, and yellow dots is used to distinguish access restrictions for the individual titles and subscribing libraries. The journals are listed according to subject area and then alphabetically by title. User instructions and licensing and access conditions are available for all users. In addition, journal titles are downloaded into the Bavarian Union Catalog (BVB-KAT) and listed in the local OPACs of the individual Bavarian libraries, contributing to the virtual Electronic Library of Bavaria (EBB) which is the so-called 'front door' for using these electronic journals.³⁰ Participating libraries must enter their journal titles into the database via a Web form. Titles of the electronic journals are also to be registered with the Central Periodicals Database (Zeitschriftendatenbank - ZDB) in Berlin. Currently, plans for the first downloading of bibliographic data (from IOP) at the individual article level into the Regensburg database are being realized.³¹ Publisher provision of metadata for individual articles to download into the library access system is seen as the most feasible means of integrating this information in the future. The electronic journals are integrated into the library system as well as into the Bavarian union catalog and the central periodicals database.

University Library of the University of Osnabrück

Within the Electronic Library Project³² of the University of Osnabrück, funded by the German Research Foundation and the Lower Saxony Ministry for Science and Culture (MWK), an ELib for electronic journals has been established with a comprehensive listing of electronic journals

according to subject area. Despite overlap between subject areas, the following 13 subjects³³ are represented:

Social Sciences	545 journals
Women's Studies	106
Psychology	448
Business & Economics	146
Medicine	128
Biology	439
Chemistry	261
Computer Linguistics	112
Computer Science	226
Physics	242
Teaching Methods	29
Mathematics	505 ³⁴
Law and Jurisprudence	436

Different lists separate full text electronic journals from journals with only tables of contents and abstracts. Separate lists also include freely available full text electronic journals and those for which licensing agreements for University members are necessary. All titles are clickable in the OSIRIS online catalog of the University Library of the University of Osnabrück, although there is no direct integration into the library system. The lists have been compiled using Internet search engines, as well as by using manual searching and integration of licensed subscriptions from the University Library. The project will continue until 2000. Provision of metadata at the journal title level and at the article level is fully automated using a Harvest search engine and an extracting program to fit to Dublin Core elements. This is primarily a technical system using metadata from Internet sources and automatic indexing.

A cooperation agreement between Osnabrück and Regensburg is under discussion. One primary discussion point is the differing opinions on fully automatized content indexing. Through the use of the Harvesting gatherer, the Osnabrück system has its own indexing instrument, whereas in Regensburg, indexing must be entered individually. Up to the beginning of 1999, cataloging and subject classification of the titles has been done primarily by the University of Regensburg, but other libraries including the Bavarian State Library have now also been involved.

Cooperation between GBV and Osnabrück is

also being discussed. The goal of this cooperation is to have all electronic journals registered simultaneously in the combined catalog, as well as in the Central Periodicals Union Catalog (ZDB). At the title level, all title entries and title changes will be distributed from the title authority file in ZDB to the Elib & PICA systems – to make use of shared cataloging, maintain consistency, and make this available for the Internet database. At the article level, supplementary indexing metadata will be entered by both partners to complement the existing online contents purchased from SwetsNet. In this way, both printed and electronic journals can be indexed down to the level of the individual article and made accessible. The cooperative projects are funded by the Lower Saxony Minister of Education.

In addition, Dr. Bernhard Eversberg of the Technical University of Braunschweig has also established an electronic journals catalog for downloading (containing ca. 8000 journals). This catalog uses metadata and has been made freely available.³⁵

DFG Research Project - use and acceptance of electronic journals

Three projects, to test the acceptance and usability of electronic journals for university libraries in Germany, are being funded by the German Research Foundation (DFG) for a two-year period which started in 1998 and will extend into the year 2000. This is in line with the extension of the DFG's model for supraregional information infrastructure and literature provision.³⁶ The projects include:

- ♦ The development of licensing and usage models for articles in electronic journals is being carried out within context of the supraregional literature provision services of the Technical Information Library (TIB) in Hannover.³⁷ All electronic journals in the technical and natural sciences have been included in the project. Journals with only print versions are being scanned. As negotiations with publishers often define restrictions for this procedure, this service is only available to the local university students in Lower Saxony, but through interlibrary loan, articles can be ordered from all over Germany. The project plans to have its facilities accessible to the public, including pay-per-view access to

subscription electronic journals. Different pricing classes will be available for students, other libraries, private and commercial users. The goal of this project is to provide a prototype model for nationwide access to fee-based access to electronic journals of various publishers through the TIB. At present, licensing contracts only allow access to the immediate campus-wide user group. Furthermore, new methods for multi-site maintenance of electronic journals metadata and holdings information are being tested.

- ♦ A study of the electronic journals offerings in the humanities is being conducted by the Bavarian State Library (BSB), in particular in the fields for which the BSB has special subject collection responsibilities within the Special Subject Collections (SSG) program of the German Research Foundation (DFG). The subject areas include music, early history, classical antiquity, and history of Germany, Austria, Switzerland, Italy, and France. A market analysis, including a survey of print journal publishers with regard to their plans to convert to electronic versions, was carried out. Electronic journals in these fields have been searched, classified, obtained and placed in the supranational information infrastructure. Processes for archiving are currently being investigated.
- ♦ A survey of the use of electronic journals with regard to determining the base journals and those which are only needed by a select few (Grund- und Spitzenversorgung) is being carried out by the University Library of the University of Düsseldorf under the name Project ACCELERATE for Access to Electronic Literature.³⁸ The distinction between the two categories of journal literature will be determined using several criteria such as belonging to a specific publisher or provider, quality, scientific discipline, availability and rapidity of access, price, availability of parallel print version, etc. This project will also contribute a business model which should include request-oriented costing models for local services which in turn can be based on various subscription models from consortial licensing contract to individual per-unit payments. User studies for both the print version as well as evaluation of log files of use

of the electronic versions are being carried out.

In all three projects, the bibliographic data for the electronic journals, and in the case of the TIB Hannover also the bibliographic data for individual articles, is being integrated into the library catalogs with active links, as well as extra catalogs and lists of the electronic journals (alphabetically according to title and according to subject areas and classification schemes). The DFG project requires bibliographic and subject cataloging at the level of the individual article. In particular, the three projects also have the task of establishing viable licensing models to guarantee supra-regional information provision within the programme, models for individual per-unit access by persons and institutions outside the subscription jurisdiction, and payment models for various groups of users.

The various stakeholders and interest groups

The stakeholders and their views

Publisher policies

The entire realm of electronic scholarly journal publishing poses changes in the financial basis for many publishers.³⁹ On the one hand, the publishers feel threatened by authors publishing themselves on the Web and by the challenges of licensing agreements with consortia and even national site licences. Licensing agreements also demonstrate many 'controls' and indicate the 'crisis-like'⁴⁰ dilemma of the publishers.

Second to a full licence, publishers seem to prefer a per-unit price regardless of length of the content unit. This may be a per-view or per-print unit and may be negotiated in terms of large contingencies of units (i.e., 1500 per-unit views or printouts). The DOI (Digital Object Identifier⁴¹) will play an important role here. Furthermore, the publishers will be most significant in setting metadata standards - which is closely connected to the DOI issue and to rights management metadata, such as the INDECS project.⁴² The service provider (for instance, the TIB Hannover) then also adds a service charge, making the per-unit pricing structure often less desirable in comparison to an open use licence for full access to the journal title or to all titles of a certain publisher.

Subscription agents

Subscription agents and other aggregators are defining new roles and relationships for themselves in the field of scholarly electronic publishing as their previous roles and relationships are diminishing. In addition to developing or enhancing more comprehensive access systems, they are often serving as negotiators and licensing managers for multiple units such as consortia. This could take on greater significance when negotiations include 'click-through' licences to use non-subscribed databases, full texts of non-subscribed electronic journals on publishers' servers, etc., for which existing licensing agreements and conditions have not already defined terms, or for which individual terms (number of free articles/transactions, etc.) have been negotiated.

Database hosts

Similar to the subscription agents, publishers and other aggregators, database hosts are offering new licensing agreements which, in certain cases, are offering added value by linking the references in electronic journals to the corresponding database entries - including literature citations, abstracts and factual data. Since database costs are rising annually, new licensing agreements, such as 'click-through' licences coordinated with electronic journals may be ways of gaining market niches or possibly avoiding market loss. New linking structures and effective metadata will enhance current offerings, as will linking structures between different databases and journals of the same or neighboring content areas.

The Central Periodicals Database (Zeitschriften Datenbank - ZDB)

The Central Periodicals Database (ZDB)⁴³ has been the periodicals union catalog for Germany since 1978, having grown out of a periodicals cataloging system developed in the mid-seventies. It contains virtually all journal titles held in German libraries with holdings information for interlibrary loan purposes. Libraries register their holdings regularly with the ZDB which is available as a CD-ROM (with semi-annual updates)⁴⁴ and online. As of 1998, the ZDB began adding title information for electronic journals. With the advent of library consortia, new policy decisions have had to be made. Discussions on whether

titles held in a regional consortium would have to be registered for all participating libraries or whether a new identifying abbreviation (in German 'Sigel') for the consortium itself should be used, resulted in the latter. Differing opinions have also been heard concerning registering electronic titles held in a specific consortium or library, as their integration into the interlibrary loan system is usually forbidden by the licensing contract and use is restricted to the members of that specific institutional community. The status of walk-in users, allowed in some contracts, however, will increase the significance of registration in a central union catalog.

The ZDB has not only served as a union catalog for interlibrary loan purposes, but also as a serials authority resource for Germany. Although the Corporate Names Authority File (Gesamt-Körperschafts-Norm-Datei - GKD) is maintained by the Deutsche Bibliothek in Frankfurt, cataloging entries for titles (including title changes, changes in publication place and publisher, etc.) are verified in the ZDB. This has been done largely on a cooperative basis. When libraries registered their holdings and especially new titles, the cataloging department of the ZDB would check the application of cataloging rules applied or in the case of missing or incomplete title entries, supply a new title entry. This would then serve as the standard entry for that title in Germany (including the use of the corporate name authority form). The title entry would then be sent back to the registering library and to all further libraries registering holdings for that title. In many cases, this was done electronically, depending on the compatibility of the library automation system in the individual libraries. Hence, German libraries use the ZDB regularly as a cataloging authority to maintain the integrity of their own catalogs. This role becomes even more important as the shift to electronic journals increases the access but restricts holdings to licence-bound duration. Thus, new status indicators for permanent holdings and licensed, time-bound access may have to be indicated in the ZDB. Furthermore, the ZDB is investigating the development of new services to adapt to the changing paradigms of serials in libraries.⁴⁵ Since the German Library Institute (Deutsches Bibliotheks-institut) will be closed at the end of 1999, the ZDB will be integrated into the State

Library of the Prussian Cultural Properties (Staatsbibliothek Preußischer Kulturbesitz) in Berlin. Currently, the ZDB is making the transition to a new automation system (Horizon) which has also been chosen for the Staatsbibliothek.

Librarians' point of view

Feeling the effects of the changing paradigms perhaps most acutely, librarians are caught between the rising costs, dwindling budgets, shifting of emphasis within the internal library structure due to redundant jobs, etc. At first, not seen as a real competition to cataloging, metadata is now taking on new meaning. Decisions are to be made as to what the new (and often very individual) definition of library collection is and what the library catalog is to include. Electronic journals in particular, but also other electronic content resources, raise new issues of archiving, status of pre-prints and pre-print servers, unique and durable identification and verification of non-possessed items in the catalog, etc. Librarians are also challenged by the broader need for structured user training, especially in the academic setting in which electronic content is being used for learning processes more and more.

Researcher's point of view (including IuK-Fachgruppe E-Journals)

Alternative forms of journal publishing have already entered the field: the author-paid publication (for instance, of the *New Journal of Physics*, free of charge to users); new copyright regulations; author-retained copyright, or negotiations to ensure the right to put their article on their own or an institutional server and offer free distribution from this server. Author-created metadata, either in word processor format or by using a template, or by automatic indexing programs, mean changes for the researchers, as well as for librarians. Preprint servers are offering changes in the existing paradigms for citation frequencies and evaluation purposes. They are providing availability and visibility of ideas and research, and also serving in some ways as archival servers. In support of the researchers and faculty, the Information and Communication (IuK) Commission of the German Learned Societies was formed in 1995 and continues today,

devoting a working group to the problems surrounding electronic journals (see below).

Faculty & students' point of view

Among faculty and students, as well as among researchers, awareness-raising must be furthered, as many individuals of these groups are oblivious to the pricing structures of databases, especially those obtained as end-users and often accessible without sufficient training. The full scale of pricing structures, licensing negotiations and conditions of use, are often of no interest at all to faculty members until it becomes clear to them that these services are being threatened. There is great need for closer cooperation between librarians and their users. Librarians need these users for advocacy purposes, as well as for determining the exact needs of the users with regard to adequate licensing negotiations and archival methods. In addition, users will be the greatest source of information on what is truly being used and what is not. Since new paradigms for subscriptions will place more emphasis on actual use as opposed to anticipated use or other evaluation procedures, close contact to the users will be of utmost importance as the shift to electronic information resources broadens.

Corporate and business users

Corporate and business users of academic libraries are often few, but not at the Technical Information Library (TIB) in Hannover, the patent libraries, and those technical libraries which can still afford many resources not otherwise available. The TIB and other libraries are exploring new payment methods for providing this information by appropriate methods. There are new pricing structures and user paradigms. Costs may burden research here, and may mean new alliances with other libraries. In general, although in some ways considered to be the most economic 'on demand' strategy, pay-per-view or pay-per-print may in the long run induce new problems and uneven market structures. Nevertheless, this group of users may become more prominent, simply because of the changing payment paradigms in Germany, in response to the structures of the Global-Info Program and the current interests of the Federal Ministry of Science, Education and Research (BMBF).

Interest groups

luK Fachgruppe overview of e-journals offerings and pricing policy

In September 1997, the general assembly of the Information and Communications (luK) Commission of the German Learned Societies decided to include the problems associated with electronic journals in the plan of activities. A first workshop⁴⁶ for researchers and librarians was planned and held in December 1997, at the State and University Library of Lower Saxony in Göttingen. The speakers included publishers, researchers familiar with the field and especially with the growing discrepancies between pricing policies of publishers and production costs for electronic journals, and librarians. The audience included researchers, faculty, librarians and publishers. A larger, international workshop was held in February 1998, in Berlin⁴⁷ and, as a result of this workshop, a working group for e-journals was founded with co-chairs, Hans Becker and the author of this article. The mission of this working group is to represent and preserve the interests of the researchers and learned societies in the realm of scholarly publication, especially with regard to electronic journals. This also includes attempts to achieve transparency in licensing negotiations with publishers, libraries, consortia and regional library union catalogues, including the Central Periodicals Database in Berlin.

Topics for sub-working groups were defined as follows: (i) an overview of collections of electronic journals under the leadership of Dr. Evelinde Hutzler of the University Library of the University of Regensburg; and, (ii) a survey of business models and new publications models under the leadership of Prof. Dr. Bernd Wegner of the Technical University of Berlin and Dr. Friedrich Wilhelm Froben of the Free University of Berlin. Survey results and papers describing the collections and research projects in German libraries for electronic journals can be found on the Web-site of the third workshop of this working group, which took place in Regensburg in February 1999.⁴⁸

In March 1999, the working group was expanded to include a sub-working group on copyright issues and authors' rights under the leadership of Hans Becker of the State and University Library of Lower Saxony in Göttingen.

Furthermore, the working group is also collecting and collating a set of guidelines for producing electronic journals. The working group will also continue to investigate possibilities for joint ventures between the learned societies and publishers and also continue to investigate and develop the methods of presentation, indexing and service aspects of e-journal offerings and related services for researchers, faculty and students from libraries and related information services.

German-speaking Serials Interest Group (GeSIG)

In contrast to the initiatives of the Information and Communications Commission of the German Learned Societies' Working Group on E-Journals (above), the German-speaking Serials Interest Group (GeSIG) represents primarily publishers, subscription agents and librarians who are interested in achieving enhanced understanding of the sometimes conflicting marketing and purchasing / licensing issues concerning periodicals in general and especially in the field of electronic journals. A first meeting for interested parties was held at the Frankfurt Book Fair in 1998, with a founding meeting in Regensburg on February 4, 1999, as a satellite event in connection with the above Regensburg Workshop. A board of officers was elected, including Hartmut Walravens of the ISSN Office in the State Library of the Prussian Cultural Properties (Berlin), Anne Bein of Swets (Frankfurt), Dr. Werner Stephan of the University Library in Stuttgart and Klaus Bahmann of Springer Verlag (Heidelberg). A web-site has been established⁴⁹ and the kick-off meeting was held on 28 May 1999 at the German Librarians' Conference in Freiburg. The meeting focused on twelve statements presented by representatives of all professions affected by electronic journals: publishers, subscription agents, database providers, learned societies representing authors and users, librarians, etc. A final version of the constitution of the GeSIG has been submitted to the German Registry of Associations and is awaiting approval. The next meeting will be held at the Frankfurt Book Fair in October 1999.

Summary and outlook

Consortial efforts in Germany are still in a formative phase, although some regional consortia

have progressed with considerable success. Pricing policies are still showing great signs of fluctuation and diversity. Methods for determining prices for electronic journals are still being tested and evaluated by the publishers and rejected by libraries that resist bundling contracts, non-cancellation contracts, and unreasonable prices. Publishers seem to want a per-unit price or a base subscription often with restricted use, and also with the stipulation of subscribing to the full set of electronic journals offered by that publisher. Current consortial negotiations indicate that some libraries are not willing to pay the high prices. North Rhine-Westphalia and the TIB Hannover are seeking charge-back, cost[recovery structures with additional service charges. This is legitimate with respect to prices, but may have negative effects if used to support outdated organisational structures in libraries which have led to researchers seeking to establish their own pre-print and e-journal servers. Hence, new paradigms require rethinking organizational structures and services in libraries as well.

Irina Sens (GBV) has suggested considering nationwide consortia of 'same-type' libraries or libraries with similar collections, to subscribe to electronic journals in specific subject areas.⁵⁰ A variation of this would be if the German Research Foundation (DFG), in its continued support of the distributed, special subject area collections, would consider supporting national site licences for scholarly electronic journals - since this is essentially the same principle which has hitherto covered collection development and nationwide access to these journals in print format. Such a program should not be wholly financially supported by the DFG, but rather coordinated and the cost shared by the Länder ministries and in cooperation with the major research societies (Helmholtz, Max Planck, etc.). Obviously, administrative costs would be reduced, equal access facilities would be guaranteed to every researcher and student regardless of his place of employment or study, and both financial and personnel resources would be set free to be allocated to other aspects of improving information provision and services in libraries.

In conclusion, just as in other countries, librarians, researchers, and publishers will need new models for licensing and pricing policy. Perhaps, a national site licence is indeed possible

despite the political structure in Germany. Greater cooperation between publishers and libraries would be to the advantage of all partners involved in the scholarly community. Ideally, greater involvement of researchers, faculty and students would heighten the awareness of the problems with electronic journals and perhaps bring more understanding or even play an advocacy role in negotiations. Archiving policy and procedure are still unresolved and must be organized in a satisfactory manner. The provision of standardized metadata at the article level may bring publishers, database producers, indexing services, and libraries into even greater competition with each other. Furthermore, the development of innovative electronic journals at the university or research institution may provide a substitute to existing difficulties or even have a balancing effect on the marketing strategies of publishers of electronic journals. Perhaps more cooperative production efforts between learned societies and university presses, computer centers, and libraries could relieve some of the budgetary pressures and some of the tension produced by price pressure politics of some of the larger publishers.

Changing paradigms can be observed not only in library work, with the subsequent shift of information sources from print medium to electronic, but also in the procedures connected with scholarly publication and scientific research methods. Furthermore, there are also changing paradigms in building adequate business models for information provision. These factors, together and individually, may necessitate closer cooperation among the stakeholders and unified structures in order to achieve and maintain the quality of service and efficiency being demanded of libraries by their user communities.

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2. See <<http://www.jisc.ac.uk/progs/index.htm>>

3. See also the Evaluation of the UK Pilot Site Licence Initiative - Phase II. December 1998. <http://www.niss.ac.uk/education/hefce/pub98/98_22.html>
4. At the moment, 12 of the German Länder (states) are involved directly in negotiations for electronic journals. The others are either considering joining existing consortia or are not yet negotiating for electronic journals.
5. See <<http://www.digibib-nrw.de/>>
6. See the IuK Website: <<http://elfikom.physik.uni-oldenburg.de/IuK/>> and the Website for the IuK Task Force for Electronic Journals <<http://elfikom.physik.uni-oldenburg.de/IuK/ej/index.html>>
7. This should not be confused with the Cooperative Berlin-Brandenburg Library Consortium (KOBV) which since late 1997 has had the task of developing an interface and common library catalog basis to integrate the library catalogs of Berlin and Brandenburg.
8. Library of the Free University of Berlin, Humboldt University Library, Library of the Federal Institute for Materials Research, Library of the Fritz-Haber-Institute, Library of the Max Planck Institute for Human Development, Potsdam University Library, University Library of the Technical University of Berlin, WIAS, and the Central Environmental Library of WISTA. The executive board of the Friedrich Althoff Consortium includes Dr. Friedrich Wilhelm Froben (Free University of Berlin) as Chairman, Dr. Helmut Voigt (Humboldt University, Research Libraries, Adlershof) as Second Chairman and Michael Rieck (University Library of Potsdam) as Secretary-Treasurer.
9. Consortial agreements in Germany usually regulate general conditions for the member libraries and only for these. Other libraries within the region or state may only participate under agreement with the publisher and the university or other 'mother' institution as libraries are not the legal signing partner, but usually the institution itself (i.e., the university, research institute, etc.). Special conditions may be individually negotiated by the individual libraries which then require individual contracts, signed again by the legal representative of the 'mother' institution.
10. See Froben, F. W., Das Friedrich-Althoff-Konsortium. Workshop: Elektronische Zeitschriften an wissenschaftlichen Bibliotheken, 4-5 February 1999. <<http://www.bibliothek.uni-regensburg.de/iuk/berl.html>>
11. The participating Länder include Lower Saxony, Hamburg, Bremen, Mecklenburg-Western Pomerania, Schleswig-Holstein, Thüringen and Saxony-Anhalt.
12. The GBV includes a larger number of libraries (255) than those participating in the consortium for negotiations for electronic journals.
13. Dr. Drewen is now head of the library and information section of the German Research Society (DFG). He is succeeded in the Ministry of Lower Saxony by Michael Labach (Landesbibliothek in Hannover) in the negotiating committee and Prof. Dr. Elmar Mittler of the Niedersächsische Staats- und Universitätsbibliothek in Göttingen has also been delegated to the negotiating committee.
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15. In his description of the North Rhine-Westphalian consortial licences, Dr. Werner Reinhardt states that future licensing agreements will probably not be accepted if cancellation of print subscriptions is not possible. See Reinhardt, Werner, [Summary] Workshop: Elektronische Zeitschriften in wissenschaftlichen Bibliotheken. <<http://www.bibliothek.uni-regensburg.de/iuk/nrw.html>>
16. See <www.global-info.de> projects (SFM)
17. See Bode, Friedrich, Die Digitale Bibliothek Nordrhein-Westfalens. In: *Innovation durch Kooperation - neue Projekt, neue Partner, neue Perspektiven*. 6. GIB-Fachtagung vom 29.-30. Oktober 1998 in Soest. Eds. A. Botte, D. Rusch-Feja, R. Theers. Berlin: Gesellschaft Information Bildung, 1999, pp. 50-54.
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19. See Griebel, Rolf, and Mai, Richard, Konsortialvertrag mit Academic Press.

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20. It is expected that the results of this survey will be published in *D-Lib Magazine* in September 1999.
 21. See <<http://www.fhg.de>>
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 28. See Global-Info: SFM Inhaltserschließung: CARMEN: Content Analysis, Retrieval and Metadata: Effective Networking, vom 31.7.1998 <<http://www.mathematik.uni-osnabrueck.de/slot3/ContentAnalysisConsortium/carmen.html>>. For further details on the German Digital Libraries Programme, see <<http://www.global-info.org>> and also the English overview and status report of the Global-Info Programme: Rusch-Feja, Diann and Becker, Hans, Global-Info, The German Digital Libraries Project. *D-Lib Magazine*, Vol. 4, no. 5, April 1999.
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 29. See <<http://www.bibliothek.uni-regensburg.de/ezeit/fl.phtml>>
 30. See Freitag, Elisabeth, and Hutzler, Evelinde, Elektronische Zeitschriften im Bayerischen Verbund: ZDB - BVB - EBB - EZB. Presentation at the IuK Workshop Elektronische Zeitschriften an wissenschaftlichen Bibliotheken, 5 Februar 1999. <<http://www.bibliothek.uni-regensburg.de/iuk/ezbzdb.htm>> [25 March 1999]
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 32. See <<http://elib.uni-osnabrueck.de/>>
 33. Basically, these subject areas are identical with the subject areas covered in other Consortia, such as the Berlin-Brandenburg, GBV, etc., with perhaps some slight differences in the volume of journals in the various subject areas.
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