Iceland Goes Digital: Countrywide Access to Electronic Resources

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Introduction

This chapter focuses on the development of Icelandic-wide access to electronic databases, e-journals and also the website www.hvar.is (meaning where.is [“is” being the national domain for Iceland]). The project, The Icelandic Consortium for Electronic Subscriptions (ICES) (Landsaðgangur að rafrænum gagnasöfnum og tímaritum) is under the auspices of the Ministry of Education, Science and Culture (hereafter Ministry of Education or Ministry) (Mennta- og menningarmálaráðuneytið) in cooperation with Icelandic libraries, information centres and research institutions. It is operated by the National and University Library of Iceland (NULI) based on a service contract. No laws or regulations apply to the project and it is not an independent legal entity. The idea was originally conceived by librarians and their associations. The Icelandic Government seized on the opportunity presented by these professionals and their organizations as it realized that the project fitted ideally with the concept of the Government’s new information strategy. Since 1996, the Icelandic Government has been pursuing a progressive and ambitious information policy. The first initiative was entitled The Icelandic Government’s Vision of the Information Society (1996). Its chief objective being that:

“Iceland shall be in the forefront of the world’s nations in the utilization of information technology in the service of improved human existence and increased prosperity.”

Country-wide access is based on IP-recognition (Internet Protocol) and extends to every computer in the country but the end-user has to connect to the Internet through an Icelandic local Internet Service Provider. Citizens and residents can access material wherever they are and whenever they wish, as long as there is a computer and an Internet connection. Users can access the
material directly from publisher’s websites or through the website, <www.hvar.is>.

The ICES has been defined as a basic information source and it is a vital part of library services in Iceland. From 2009, the ICES has been defined as a part of the research infrastructure of the country according to the Science and Technology Policy of Iceland (Building on Solid Foundations … [2009]). Library personnel all over the country use the ICES and they introduce and promote it to researchers, students and anyone who has a need for or an interest in using the resources available at <www.hvar.is>. Before the project started some universities and health libraries subscribed to specialized e-journal packages or databases. Many of those subscriptions have continued and in some cases small consortia have been developed but access is limited to the library or institutional premises. Information on these consortia is available at <www.hvar.is>. Also available on this site are links to free Icelandic quality information websites.

The impact of the ICES on the library landscape and on research and the scholarly community in Iceland, its current status and future prospects are explored in this chapter. At the end of 2010, the consortium subscribed to more than 14,500 full text e-journals, the abstracts of 8,000 journals, 12 databases, text from 10,000 analytical reports and 6,000 full text e-books. To place the project in perspective background information on Iceland, its educational system, the research environment and the library network are also provided.

Figure 1: The logo of www.hvar.is

Methodology

Research methodology is based on literature review. Qualitative research methods are used in reviewing and analyzing literature about the ICES, information from the ICES and its website <www.hvar.is>. The study is based on primary and secondary resources. Among the range of sources consulted were laws, regulations, research articles, reports, news, press releases, news articles, summary reviews, contracts, usage statistics, documents from the NULI and the Ministry of Education. By analyzing the literature, the main functions of the ICES were identified as well as its impact on the Icelandic society.

The literature referred to is mostly in Icelandic but English resources were consulted wherever possible. The majority of articles are partially summary reviews where the progress of the project is described and the advantages of
access to the material are discussed. To date, limited research has been done on the ICES. Before countrywide access was initiated, Erna G. Árnadóttir (2001) did a survey on journal subscriptions in Icelandic university and research libraries. The results were used as a prerequisite for negotiations and contracts at the beginning of the project. Þóra Gylfadóttir and Þórný Hlynsdóttir (2006) studied the relationship between increased access to databases and e-journals and interlibrary loans (ILL) in Iceland. The study covers the years 2000-2005 and the results showed that the demand for ILL in NULI had decreased and changed during the period under consideration. Ingibjörg Steinunn Sverrisdóttir (2006) did a case study of the development of the ICES as an entity and made some predictions on the next steps in its development and future prospects of the consortium. Further, Pálína Héðinsdóttir (2008) studied the impact of the ICES and other electronic materials on academic libraries and information centers mostly in the field of natural sciences.

**Environmental factors**

This chapter focuses on the environmental factors which impact on the ICES. The main attributes of the ICES is the small population of the country, a well-functioning educational system, a high demand for scientific material in foreign languages and a cooperative library system.

**Icelandic Society**

Iceland is a large island, 103,000 km² or 39,000 mi², situated in the northern region of the Atlantic Ocean, just below the Arctic Circle. The country is of recent volcanic origin. Three quarters of its surface is wasteland: glaciers, lakes and lava deserts. The total population on July 1, 2010 was 318,006 with a population density of little more than three persons per square kilometer. Iceland is thus a sparsely populated country, with its inhabited areas being located along the indented coastline. Around 65% of the population lives in the capital Reykjavik and its neighboring towns.

For most of its history Iceland was settled by Norway. The year 874 is taken as a starting point of the island’s settlement and 930 for the completion of settlement, when the Icelanders founded a Commonwealth and a general assembly or Parliament (Alþingi) in Þingvellir. The Icelandic Commonwealth lasted for nearly three and a half centuries, until 1262, when the nation came under Norwegian sovereignty. Late in the fourteenth century the Danes took control of Norway and of Iceland with the result that they were under Danish sovereignty until 1918, when Iceland became a completely independent state united with Denmark solely by the monarchy and common foreign policy. In
1944, the modern Alþingi established a republic, severing all formal ties with Denmark. Since then Iceland has been a republic with a president elected for four years by plebiscite; a parliament (63 members) is also elected for four years. A cabinet, led by the Prime Minister, wields executive power.

Icelandic is the national language of the country. It has remained almost unchanged for centuries and it is a unique language. The fact that such a small, relatively highly developed society like Iceland has its own language causes unique problems for the people who live there, especially professionals. Knowledge of foreign languages is required in order to keep abreast of new developments in one’s chosen field and beyond. Therefore, strong emphasis is put on foreign languages in the educational system and foreign languages are compulsory in elementary schools.

To a large extent Icelandic people owe their existence as an independent nation to their deep-rooted literary culture and ancient writing tradition. Christianity was accepted by the Alþingi in 1000 and with it came Latin books, the sacred writing of the Catholic Church and the traditions of reading and writing. Nevertheless, the laws, written around 1100, are believed to represent the first works written in Icelandic. Subsequent to that large-scale literary activity began. The Eddas, the Sagas of Icelanders and the Sagas of the Kings are the most famous of these genres. The monasteries were the main centers of manuscript and book production (the first founded in 1133). Printing came to Iceland shortly after 1530. In 1550, the Reformation became a part of the social landscape of the country. Printing was for centuries under the monopoly of the Bishops, with the result that little of the ancient lay literature was printed. The Bible is one of the earliest books translated into Icelandic. The New Testament
was the first book to be published in Icelandic (1540) and the complete Bible in 1584. To have the Bible in the vernacular was important in preserving the language along with the tradition of reading the Icelandic Sagas aloud in households during the long winter evenings.

For many centuries Iceland was a poor peasant society and a Danish colony. During the Second World War the country was occupied by the British (May 1940) and in the summer of 1941 the United States took over the defense of Iceland. The occupation was a period of high employment leading to rapid, radical and irreversible changes to life in Iceland. It was the beginning of a new era in the country.

Today, all Icelanders have access to a computer with an Internet connection, either at home, at work, at school or in a library. More than 90% of Icelandic households have an Internet connection (Statistics Iceland 2010). Icelandic libraries and information centers have developed rapidly during the last decades. Every library is automated and has public access to the Internet.

During the last decade, there have also been changes in Icelandic society due to the many international immigrants who now reside in the county. The society can now be considered multicultural with a growing demand for resources in languages other than Icelandic. At the beginning of 2009, immigrants in Iceland accounted for 9% of the population, compared to 2% in 1996 (Landshagir 2009).

The living standard in Iceland is among the highest in the world, with extensive social security, health service and free education at all levels. This is now endangered because the country was severely hit by a bank crisis in October 2008. Among the consequences of this crisis were increased unemployment and the government cutting the budgets for public services entities, such as schools, health services and cultural institutions. Further, people have been emigrating from Iceland and between the years 2008 and 2009 there has been a population decrease of 0.54% (Statistics Iceland 2010).

The Icelandic Educational System

All education in Iceland is under the jurisdiction of the Ministry of Education but the Alþingi (the Icelandic Parliament) is legally and politically responsible for the educational system and determines its basic objectives and administrative framework (Eurydice National Summary Sheets 2008).

The educational system differs in its organization from the educational system in Europe and the United States. It is divided into four levels (Ministry of Education 2002):

- Kindergarten (leikskóli). Pre-school level up to age 6 according to the Pre-school Act (Lög um leikskóla, 90/2008).
Primary School (grunnskóli). Primary and lower secondary level in a single structure. A compulsory level for 6-16 year olds according to the Primary School Act (Lög um grunnskóla, 91/2008).


Tertiary Education. University (háskóli). Higher education level from age 20 according to the Universities Act (Lög um háskóla, 63/2006).

**Primary Education**

Education is mandatory for children and adolescents between the ages of six and sixteen. Compulsory education is organized into a single structure system and is free of charge (Compulsory Schools 2009). That means that primary education and lower secondary education are parts of the same school level and are usually within the same premises. There are no admission requirements as all children enter school at the age of six. The enrolment rate is thus 100%. Primary education since 1976 is exclusively funded by the local governments.

**Secondary Education**

The Upper Secondary School Act states:

> Any individual who has completed compulsory education, has had equivalent basic education or has reached the age of 16 is entitled to enroll in upper secondary school.

The period of time allotted for secondary education varies, but usually it lasts for about four years. There are two types of upper secondary schools, general academic schools and vocational schools located all over the country. Usually students at this level are between 16-20 years old. In recent years, over 90% of students completing compulsory education have entered secondary schools directly after finishing compulsory education (Landshagir 2009). The number of students in secondary education has increased rapidly over the last few decades. Registered students in the autumn of 2009 were 9.4% of the population (Statistics Iceland 2010b). Some secondary schools also offer education via distance and blended programs.

**Tertiary Education**

In recent years there has been a significant rise in the number of students in higher education programs. More and more people in Iceland are seeking university degrees. Currently there are seven universities or higher education in-
The universities vary greatly in size and funding but all are supported by the Government. The University of Iceland is the biggest and is defined as a research university, offering PhD programs. Two other universities in the country also offer PhD programs. The University of Iceland also operates seven small research and study centres (Háskólasetur) in rural areas. These are venues that facilitate the university’s collaboration with local authorities, institutions, businesses, associations and individuals (Fræðasetur 2010). The availability of university education courses has grown, especially at the master’s and doctoral levels. University students account for about 5.7% of the population of which 62.2% are women. Doctoral students constitute about 0.1% of the population (Statistics Iceland 2010). Another favorable development in tertiary level education has been the establishment of distance learning programs.

As a consequence of the impact of the bank crisis on the country, the Ministry of Education has recently formulated a policy leading to a formal unified network for the four public universities. The organization and division of teaching and research in the schools will be redefined: one quality control system will be in use, one website with an application mechanism for all, one information system (Intranet) for students, teachers, staff, administration and support services. Other institutions offering tertiary education will be able to participate in the network regardless of their management or ownership (Stefna um opinbera háskóla 2010).

Since the University of Iceland was not founded until in 1911 with just a few faculties at the beginning there is a longstanding tradition that Icelandic academics go abroad to study, especially for postgraduate studies. Such study has been mainly undertaken in other Nordic Countries, North America, Germany and France where these students have encountered high quality library and information services. As a consequence, those who have studied abroad have wanted to enjoy the same service standard when they returned to Iceland. Therefore, this group of persons has been very positive about the establishment of the ICES.

The Research Environment

Research in Iceland has been evolving. Moving from traditional studies in history, language and Icelandic studies in literature and linguistics, research in the country now covers a broad spectrum of disciplines. International cooperation is also feature of research conducted by Icelanders.

Research in Iceland

Figures from The Icelandic Centre for Research (Rannsóknamiðstöð Íslands – RANNÍS) show that research and development (R&D) expenditure in Iceland...
as a share of Gross Domestic Product (GDP) is relatively high compared to other countries. The figure currently stands at around 2.7% of GDP. The main areas of research are the health sector, industry and fundamental research. A comparison of the impact of publications by scientists in OECD countries, measured by citations to their articles, shows that Icelandic scientists score highly in areas such as medicine and health, biomedicine, fisheries and the geosciences. Icelandic scientific researchers cooperate with colleagues from the Nordic countries, USA and Britain and often publish in foreign peer-reviewed journals (Research and Development 2009). The countries in which Icelanders cooperate with other researchers are also the countries where most Icelanders have pursued their education abroad. Working with colleagues in those countries and having their publications accepted by journals domiciled in those countries indicates that networking continues after Icelandic researchers return home. The number of articles by scientists working in Iceland that have been published in foreign journals has grown considerably over the last decades as shown in Table 1. The majority of these articles are in English to get a larger readership.

Figure 3: Number of articles by scientists working in Iceland published in foreign journals (Thomson ISI) 1981-2007

The number of citations in Icelandic articles and articles where Icelanders are collaborating with foreign colleagues has also grown. The growth has also been considerable in co-publications. In 2008, more than 70% of all Icelandic research publications were co-publications (Ritrýndar birtingar 2010).

In 2009, according to The European Innovation Scoreboard, Iceland has an innovative performance just below the average in Europe but the rate of
improvement is above the average. Relative strengths are in the indicators Finance and Support and Linkages and Entrepreneurship. In recent years, Human Resources; Finance and Support; and, Throughputs have been the main drivers of improvements in innovation performance in Iceland. Performances in Linkages and Entrepreneurship and Economic Effects have worsened, in particular due to a decrease in employment and the bad economic situation which currently exists in the country (European Innovative Scoreboard 2010). Further information indicates that more service is needed by innovative firms and the general support given to this area needs strengthening. The support system needs to be evaluated and developed into a robust service (Frammístaða Íslands í nýsköpun 2009 2010).

In these times of economic downturn, recent policymaking and statistics about innovation performance indicate the importance of a strong and effective support system and infrastructure for education, research and innovation. Statistics show considerable growth in published research from Iceland during the last decades. The numbers reveal how science and the research environment in Iceland have grown. Over the last ten years the growth has escalated because of better and more systematic funding, but also because of better support system, including the ICES.

Policy for Science and Technology

*Building on Solid Foundations: Science and Technology Policy for Iceland 2010-2012,* states that the collapse of the Icelandic financial system in 2008 requires a fresh perspective on the structure and development of the Icelandic community [2009]. As a way out of the crisis it is considered necessary to prioritize the allocation of funding and coordinate the work of the public and private sectors. It is also recognized that public support for both sectors and intersectoral cooperation can enhance efficiency and lead to financial and economic benefits. The policy was prepared by the Science and Technology Council (Víslnda- og tækniráð) of Iceland in an extensive consultation with stakeholders. A committee appointed by the Council developed a roadmap for strengthening research infrastructures in Iceland. The most important facilities in the academic and research communities were identified and it is recommended that extra efforts should be put into the development of the main agencies that support research such as the continuation of the ICES.

Financing the ICES has not been the strongest side of the project (Sverrisdóttir 2006). As a result, the policy clearly states that continued national access to e-journals and databases is a crucial part of the infrastructure needed to maintain high impact research and innovation activities in the country. Other important elements to support research and innovation were identified as high-speed Internet connections to Europe and North-America, the organization and maintenance of national scientific databases and improved access to the data,
use of eScience and the development of a policy of Open Access for findings from publicly funded research (Building on Solid Foundations ... [2009]).

The Library Environment

Although Iceland has an enduring literary culture and an ancient writing tradition it does not have a long library tradition as this concept is understood today.

Historical Overview

The first Icelandic reading society was founded in 1790; this was shortly followed by others (Óskarsdóttir 2002). During the second half of the nineteenth century, reading societies were to be found all over the country. Volunteer work ensured that the societies flourished and the desire to further one’s knowledge and education severed as personal motivators. Between 1790 and 1982, as many as 431 reading societies and public libraries were in existence (Sverrisdóttir 1997). In 1937, a law was passed about their activities and in 1955 the first public library law was passed. In the same year, the Directorate for Public and School Libraries (Bókafulltrúi ríkisins) was established in the Ministry of Education. The role of the Directorate was to supervise libraries and their activities and to enhance and contribute to there being more professionalism among Icelandic libraries and librarians.

Many of the reading societies have merged and transitioned into modern public libraries. During the last decades, the role and status of the public libraries have rapidly developed in a positive way and their usage increases every year (Þórarinsdóttir 2006b). The Public Library Act was reviewed in 1963, 1974 and 1997 and the Directorate was discontinued in the last review, although the decision to disband the Directorate was taken in 1994. The rationale behind this decision was that the National and University Library had become the coordinating body for the profession with responsibility to promote the standardization of work practices in Icelandic libraries, provide professional consultation services and carry out cooperation on the widest scale (Pétursdóttir and Júlíusdóttir 2010; National and University Library Act, 71/1994).

The National and University Library

The National Library of Iceland was founded in 1818 due to donations from beneficiaries from abroad. The first librarian appointed was Jón Árnason who
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served the library 1848-1887. In 1886 it became a legal deposit library and has published the Icelandic Bibliography since 1888. In 1846, a manuscript department was established. During the period 1881-1909, the National Library and two professional schools, Theology and Medicine, were housed in the Parliament building in Reykjavík. The Library was moved to a new building in 1909 and in 1911 the professional schools became faculties of the new University of Iceland. The faculties soon established their own collections and in 1940 when the University moved to new premises, the University library was founded and faculty collections became a part of it (Sigurðsson 1997a; Guðmundsson 1997).

The National Library and the University Library were amalgamated in 1994 and both libraries were moved to a new building. The new NULLI received its own legislation stating that the library is both the National Library and the library for the University of Iceland. The library is a research library which shall maintain effective and comprehensive information services in the fields of science and scholarship, government and industry (Sigurðsson 1997b; The National and University Library Act 71/1994).

Several other research and university institutions have also founded libraries. The strongest national research institutions such as the Marine Research Institute (Hafrannsóknastofnun Íslands), Landspítali University Hospital Library (Heilbrigðisvísindabókasafn), the National Energy Authority (Orkustofnun) and the Meteorological Institute (Veðurstofa Íslands) have considerable physical collections in addition to relying heavily on e-resources.

Libraries and Information Centers

In Iceland a network of public, school, research and institutional libraries is in operation. In the Public Libraries Act of 1997 there is an emphasis on access to information for everybody, i.e. “libraries shall promote free and uninhibited access by the public to information and repositories of knowledge” (Lög um almenningsbókasöfn 36/1997). There are public libraries in nearly all municipalities, some of them also provide services to schools or are school libraries as well. The tendency has been to merge municipalities into bigger and stronger entities with better services, and the number of public libraries has therefore decreased within the last couple of decades.

For over 30 years, it was mandatory for primary schools to operate school libraries but in the current Primary School Act (Lög um grunnskóla 90/2008) there is no mention of a school library. The primary schools are now operated by the local municipalities as well as the public libraries and many of them operate combination libraries for schools and the public in an effort to use resources more effectively and also to give better services.

In secondary schools the current situation is different. From 2010, according to an amendment to the Upper Secondary School Act (Lög um fram-
secondary schools shall operate a school library. The Act states:

The activities of the school resource centre shall emphasize the training of pupils in independently seeking information and using data banks.

All the universities operate libraries but the one at the NULI is by far the largest. Many of them rely on e-resources on a wide scale but students and library staff use NULI as a reserve for material on paper and for interlibrary loans.

Library and Information Science Education (LIS)

In 1956, courses in library science were introduced at the University of Iceland under the supervision of the University Librarian, the first one being Björn Sigfusson. Specialized programs were later introduced, like School Librarianship and Records Management. From 2004, an MLIS program (Master of Library and Information Science) has been offered for students with BA degree in other fields of study (Pálsdóttir 2009). In December 2002, a new branch of study was established in secondary schools for library assistants and technicians (Þórarinsdóttir 2006a). Thus, there are now good opportunities to study library and information science in the country.

Professional Associations in Library and Information Science

The Librarians Association in Iceland (Bókavarðafélag Íslands) was founded in 1960 and within the Association librarians formed special interest groups such as research librarians, public and school librarians. In 1973, the Association of Professional Librarians (Félag bókasafnsfræðinga) was founded. It is noteworthy that in both cases, membership of these associations was limited to individual professionals, there is no provision for institutional membership as can happen in other countries. As a consequence, in Iceland, libraries are not strong financial supporters of these associations as is the case in some other countries. Thus, personal membership is the major source of support for these associations (Þórarinsdóttir 2009). In 1999, the two associations merged into Upplýsing – the Icelandic Library and Information Science Association (Upplýsing – Félag bókasafns- og upplýsingafræða). Further, an Association of Public Library Directors (Samtök forstöðumanna almenningsbókasafna) and the Association of Librarians in Secondary Schools (Samstarfshöpur bókasafnsfræðinga í framhaldsskólum) have been created. All associations of librarians have had a considerable impact on the development of professionalism in libraries and on enhancing library services, such as on the establishment of the ICES.
Library Cooperation

Cooperation among libraries and librarians in Iceland has a long history. These activities have either been on a small scale, involving few libraries or specialists, or big projects that have become a part of the national infrastructure of education and culture. Some of the projects have turned into businesses, like the Icelandic Library Bureau (Pjónustumiðstöð bókasafna) founded by associations of librarians in 1978 (i.e. The Librarians Association in Iceland and the Association of Professional Librarians). Originally, the Library Bureau produced and sold catalogue cards and later electronic records for Icelandic publications. Subsequent to the establishment of the union catalogue Gegnir, which serves the whole country, the Bureau now focuses on organizing and designing libraries and sells furniture and special equipment for libraries (Eiríksdóttir 1997; Þórarinsdóttir 2009). Several years before, in 1972, the Reykjavík School Library Centre (Skólasafnamiðstöð Reykjavíkur) was established. Its aim is to operate a centralized center for the acquisitions, cataloguing and processing of material for school libraries in the city (Björnsdóttir 1997). Some other local governments have also established similar centers for public and school libraries (Eiríksdóttir 2007). Established in 2000, *The Icelandic Web Watch* <www.vefbokasafn.is> serves as an example of a partnership project between a group of Icelandic public libraries. The goal of this partnership is to help members to locate quality Icelandic websites without having to rely solely on search engines, which sometimes return too many results, many of which are irrelevant. Experienced librarians choose, collect and organize the resources (Vefbókasafnið 2000).

Another extensive collaboration project is Gegnir, operated by the Consortium of Icelandic Libraries Inc. (Landskerfi bókasafna hf.). Gegnir is a *Union Catalogue for Icelandic Libraries* available at <www.gegnir.is>, it also includes the *National Bibliography*. Founded in 2001, the Consortium is a company that is owned by the Icelandic Government and a number of municipalities around the country. Its purpose is to operate a central, web-based library system for libraries in Iceland. About 300 libraries, information centers, institutions and private bodies use the system today, all library types included (Landskerfi bókasafna 2010).

The Road to Electronic Resources

When Icelandic libraries started to use electronic information, a new forum for cooperation emerged. Online searches were introduced in Icelandic research libraries in the seventies and courses for online searching were offered in the Library and Information Science (LIS) education at the University of Iceland from 1981. Icelandic libraries began to use the Internet in 1986 and soon databases on CD-ROM became available. Licensing science e-journals started in
the nineties and small consortia were formed. Medical libraries were the pioneers in subscribing to electronic journals and established the first consortium in the country (Pálsdóttir 2002). Automation of library catalogues was the main concern of libraries in the nineties. The Government’s strategy on the Information Society states that:

“Libraries should be developed into comprehensive information centres that ensure all their customers easy access to information in electronic form, among other means, through links to domestic and international educational centres and data banks (The Icelandic Government’s Vision 1996).”

In 1997, the Association of Research Librarians (Félag bókavarða í rannsóknasöfnum) in cooperation with the NULI took the initiative to organize a conference on Information on the Internet (Upplýsingar á Interneti). On the agenda were Internet information issues and the development of collaborative strategies to acquire access to e-journals and databases (Pálsdóttir 2002; Þórarinsdóttir 2006b). Librarians, scientists and representatives from Government participated and proposed that the Icelandic Government would appoint a committee to organize access to electronic resources (Pálsdóttir 2002). The conference was a turning point in the discussion of access to electronic resources and the Association commenced negotiations on the matter with the Government and Ministry of Education. In 1998, a Task Force (Gagnasafnsnefnd) was established to make recommendations regarding electronic access. After two years of preparations and committee work, the Ministry licensed Britannica Online and national access was made available in April 1999. It was the first time that access to electronic resources was extended to a whole country based on IP-recognition (Gylfadóttir 2003). The first contract was promising and the library and research community in Iceland was optimistic that more would follow.

ICES – Establishment of the Organization

In 2000, after the success of countrywide access to Britannica Online, the Ministry of Education appointed a three year Project Management Group (Verkefnisstjórn) to work towards national access to more electronic resources. Among the tasks of the group was to gather information on current subscriptions for electronic and printed formats and also to explore the interest of libraries and the research community in being partners of national consortia (Sverrisdóttir 2006). In 2001, a study was conducted and a questionnaire was sent to 37 libraries. At that time, these libraries subscribed to 3,900 scientific journal titles, of which 660 were in both electronic and printed formats and 14 were in electronic format only. The survey showed that there was an over-
whelming support for the idea of negotiating on a national basis for access to these resources (Árnadóttir 2001).

It was made clear from the very beginning that libraries would have to finance the major part of the project, with a contribution from the Ministry. The group continued to negotiate access to reference and bibliographic databases on a countrywide basis. The contract with Britannica Online was used as model. On the other hand, publishers of e-journals were rather hesitant about such a scheme, not knowing how such access would work. A pioneering contract for Science Direct from Elsevier was signed in 2001 and soon other providers agreed to use this approach to provide access to electronic resources across Iceland. In 2001, the daily operation of the project was moved to the NULI and the first project manager, Þóra Gylfadóttir, was employed. The web site for the project <www.hvar.is> was launched in 2001 and other services such as user education and promotion were initiated (Sverrisdóttir 2006). The years 2000-2002 were defined as the experimental phase. If the experience of the project was satisfying, a more formal and secure structure would follow.

Service Contract and Continued Development

At the end of 2002, when the period of the Project Management Group came to an end, a service contract for the implementation of the countrywide licenses was made between the Ministry and the NULI. The NULI received a yearly contribution from the Ministry and according to the contract the Library continued to operate the project and was made fully responsible for it. An advisory Purchasing Committee (Innkaupanefnd) was appointed consisting of representatives from the main groups of stakeholders. It was considered important to gain as broad a consensus as possible with respect to the licenses and secure the necessary consultation and cooperation between all parties (Þjónustusamningur 2002). The contract laid the foundation for the development of the project as an organization and as a consortium.

The service contract was revised in 2006 and it is still valid. The financial contribution from the Ministry was increased because more material was licensed. A novelty in the contract was the establishment of an annual general meeting, where the annual report and annual accounts are presented as well as key statistics. A five member advisory Steering Committee (Stjórnarnefnd) is appointed by major stakeholders and approved at the annual meeting. The mandate of the former Purchasing Committee was changed towards more emphasis on policymaking and financing instead of expertise on electronic material and representatives with stronger financial mandate were selected. The goal of the changes was to strengthen the ICES, improve its financial base and to make the ICES a more formal entity.
It took considerable effort on the part of the different stakeholders to reach consensus on the material to be licensed and to develop a fair pricing model. Now, some ten years later, the Consortium subscribes to a collection of resources that meets the needs of most users. Thus, the majority of the libraries in the country are willing to pay their share to the ICES, even if it is on a voluntary basis. To date, no contracts have been made to individual libraries.

Present Situation – Effects of the Bank Crisis

As mentioned before, Iceland was hit severely by the bank crisis of October 2008. The main focus of the NULI and the Steering Committee since then has been to keep the Consortium intact and secure enough funding. Immediately after this crisis, it became obvious that the future of the ICES was in great danger because of the 50% devaluation of the Icelandic króna. As a consequence of a joint effort between all stakeholders: publishers, libraries, the NULI and the Ministry, continued access was secured for 2009. All libraries in the country have cut their budgets. However, in order to keep the ICES functioning, they have reduced services, cut individual electronic subscriptions and paper resources. Most of the contracts ran out at the end of 2009, but a new series of contracts have been negotiated for the years 2010-2012. The statement of ICOLC (International Coalition of Library Consortia) on the global economic crisis from January 2009 was of great help to all parties in order to better understand how the financial crisis affects the information community worldwide; also, suggestions of different approaches were helpful in order to continue the contracts (ICOLC 2009). Whether circumstances will allow the continuation of the ICES, in its previous form is to be seen, but definitely there is great deal of interest among the stakeholders to ensure that it survives.

Organization and Structure of the ICES

The organization of the ICES has become more formal as time has passed. At the beginning it was an experimental project initiated by enthusiastic librarians. Today, it is an important part of the library system and the infrastructure of the science and research community in the country. In 2006, the development of the ICES and its future prospects were examined in the case study by Ingibjörg Steinunn Sverrisdóttir. The study was conducted with reference to theories of the development of organizations and organizational life cycles. Pnina Shachaf’s (2003) model for the development of library consortia guided the research. Shachaf compares six different criteria from several specialized nationwide consortia and finds a developmental pattern. She outlines four stage life cycle sequences and suggests disbanding as the fifth stage. The study of the ICES shows a parallel development, i.e. that the consortium has devel-
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oped as an organization, the beginning stage and the first steps in the life cycle were completed. In 2006, it was in the developmental or growth stage. All prerequisites were in place for progressing to the maturation stage where the organization is fully developed and operates smoothly. But, in order to do so, the ICES needed to be strengthened, to gain better connection with its environment, form a clear policy and set goals. It also needed to improve its governance and operations to be more effective and efficient.

In 2006, work began along these lines and the revision of the service contract was a part of the overall development of the ICES. The first annual meeting was held in 2007. The Steering Committee had policymaking on its agenda in the autumn of 2008 when the bank crisis unfolded. Since then, all efforts have been directed towards fundraising and negotiations to keep the ICES afloat.

Management and Decision-making

A service contract with the Ministry of Education is the financial basis of the ICES project and its management. The NULI runs the project and has two FTEs (full time equivalents) staff members to manage the project on a daily basis. One project manager for day-to-day operations and several people in the library who assist with licensing activities, negotiations, fee collection from libraries and institutions, the payment of invoices from providers, web management, computer services among other activities. The NULI is responsible for policy-making and the implementation of plans. As previously indicated, the Steering Committee consists of five members and it usually meets once a month with the National Librarian and the project manager. Members of the Steering Committee do not receive payment for their services to this body. The committee consists of representatives from the biggest stakeholders in the project, these are: the University of Iceland, other university libraries, health libraries, public and college libraries and research libraries. The Steering Committee participates in policy planning regarding licensing of databases and e-journals, makes budget proposals, decides the pricing model and approves contracts (Þjónustusamningur 2006). It also discusses trial offers, system operations, utilization of new technology, foreign relations and follows developments in the field, such as new services, preservation of electronic journals and repositories.

Licensing and Negotiating

At the beginning of the project, publishers and vendors were rather hesitant to enter into such an unusual contract. Vendors were reluctant because they were afraid of losing sales and markets. However, the experience in 1999 with Britannica Online, the first such arrangement in which access was opened to an entire nation could likely have laid some of their fears to rest.
Licenses are usually secured on a three year basis. A special Negotiating Committee (Samninganefnd) with three to five members is appointed each time a contract is to be drawn up or an existing one extended. This is a specialized task and it is important to have a group of people with the required knowledge and experience undertaking this responsibility. Knowledge about contracts and the negotiating process must also be shared with new members and others. Documenting the process is also very important. The Negotiating Committee must also have a clear sight of what it wants to achieve. In winter 2009-2010, the Negotiating Committee revised and prolonged all the existing contracts for the period 2010-2012.

Financing and Pricing Models

There are different pricing models for databases and e-journals: these have been developed over the years. At the beginning, the license fee for e-journals was based on the number of subscriptions each vendor had in Iceland during 2000 based on a survey conducted by Erna G. Árnadóttir (2001). This information created a base fee. Then, on an annual basis, an additional fee was negotiated for all the new titles and additional volumes to existing titles placed in the packages. Thus, the total fee consisted of the following three components:

1. Base fee (grunngjald) – based on existing subscriptions in 2000;
2. Additional fee (viðbótargjald) – for new titles and volumes after 2000;
3. Special additional fee (landsaðgangur) – for countrywide access.

The licenses covered both print and electronic subscriptions. Vendors charged individual libraries for the base fee but the Ministry and later NULI paid the additional fee and the special fee for the national access and collected it from the libraries. This was complicated and the procedures were not transparent to the libraries involved (Sverrisdóttir 2006; Hannesdóttir 2005).

When the contracts were renewed in 2003, an e-only arrangement was negotiated and libraries could cancel their printed subscriptions (Hannesdóttir 2005). As usage statistics cannot be used to determine payments of participating libraries, a pricing model based on the evaluation of the usability of each database or e-journal package was developed. Libraries and institutions were grouped into sectors and within each sector different criteria were used to calculate the fee. It was also decided that vendors would send only one invoice to NULI, which then billed libraries and institutions for their portion of the invoice. This simplified the management and cost control of the project and the libraries could save money, staff and space by canceling subscriptions to print versions.

In 2006, a new pricing model was developed based on categories of libraries that pay for a certain proportion of the total amount. This model is still in use. More criteria are used to calculate the rate within every group in order to
be as fair as possible to everyone. The figures for the criteria used are based on official statistics from Statistics Iceland (Hagstofa Íslands). Thus, there is transparency in the model. The model can easily be adapted to reflect changes in the institutional structure of the country.

The yearly contribution received from the Ministry under the service contract is used to support the daily operations of the project (staff, website, promotion, travel, etc.). However, the larger portion goes towards the payment of licenses for databases and e-journals. Based on the pricing model, the Ministry’s contribution is approximately 20% of the fee for licenses, the remainder coming from the approximately 200 libraries, information centers, institutions and private bodies that participate in the project.

Databases account for approximately 20% of the cost and e-journals 80%. Nearly all the participating bodies pay for databases, but only about 60 participants pay for e-journals. University and health libraries are the largest subscribers. No formal contracts have been made with libraries and institutions, but a general agreement has been obtained based on an understanding of the importance of the project for the library community, education, the research environment and the development of the Icelandic society. It is obvious that individual libraries do not have the finances to buy such extensive access on their own, but through this joint agreement they are able to provide their users with access to these resources. The fees are graduated so that the bigger libraries pay more than the smaller ones. The lowest fees are between 13-15 Euros for public libraries in the smallest municipalities but the University of Iceland, as the biggest single contributor, pays 225,000 Euros. Table 2 shows the number of contributors to the ICES who pay for databases and e-journals each year.

<table>
<thead>
<tr>
<th>Year</th>
<th>Databases</th>
<th>Journals</th>
</tr>
</thead>
<tbody>
<tr>
<td>2001</td>
<td>103</td>
<td>33</td>
</tr>
<tr>
<td>2002</td>
<td>189</td>
<td>31</td>
</tr>
<tr>
<td>2003</td>
<td>178</td>
<td>33</td>
</tr>
<tr>
<td>2004</td>
<td>174</td>
<td>37</td>
</tr>
<tr>
<td>2005</td>
<td>177</td>
<td>33</td>
</tr>
<tr>
<td>2006</td>
<td>175</td>
<td>45</td>
</tr>
<tr>
<td>2007</td>
<td>185</td>
<td>48</td>
</tr>
<tr>
<td>2008</td>
<td>183</td>
<td>61</td>
</tr>
<tr>
<td>2009</td>
<td>177</td>
<td>58</td>
</tr>
</tbody>
</table>

Table 1: The number of contributors paying for access from the ICES
The number of contributors changes each year due to various reasons. At the beginning about a hundred libraries and institutions paid for the access. In 2002, many new contributors joined the project. However in 2003, some municipalities were merged, leading to an overall decrease in the number of institutions that belong to the project. In 2006, when the most recent pricing model was finalized many small research and study centers began to contribute to the cost for having access to e-journals. An amendment was made to the model in 2008 resulting in payments from private firms for access to e-journals. It is anticipated that in the future the number of libraries and institutions in the country will decrease because of budget cuts, changes in the official structure and amalgamation of institutions and libraries, partially due to merging of municipalities.

Content of the ICES

The ICES now subscribes to more than 14,500 full text e-journals, abstracts from 8,000 journals, 12 databases, text from 10,000 analytical reports and 6,000 full text e-books. Because of the broad spectrum of user groups emphasis is placed on material that can serve the interest of many user levels. Several main user groups can be identified, i.e. students, academics, the scientific community and the general public.

In 2000, the first Project Management Group analyzed the wishes and needs of different types of library and their patrons. It was found that the strongest demand was for material in the social sciences, health sciences, education, natural sciences, engineering, computer science, business and economics (Þorsteinsdóttir 2001). The choice of databases and journal packages reflects these interests. There have been some changes in the subscriptions, some databases have been cancelled but other databases have been taken. The material covers all disciplines, but there is an emphasis on the health and social sciences plus generalities, the arts and music. One Icelandic database, an article collection from Morgunblaðið, a local newspaper, forms part of the content of ICES. It is heavily used but not accounted for in the numbers of downloads in Table 3. A list of titles currently taken is available at <www.hvar.is>.

User Education

User education, workshops and training are part of the activities at the ICES. At the beginning, librarians had to learn how to search and use the material in order to promote it to users. Every year the project manager of the ICES gives training sessions in Reykjavik and beyond. User guides are on the website <www.hvar.is>, as PowerPoint slides with instructions in Icelandic. There are also traditional search guides from vendors, some of which have been translated into Icelandic. Further, libraries can order printed user guides. Vendors
also send representatives to Iceland to introduce new products and organize training sessions. Promotion in the media, at meetings, in library publications and conferences are some of the user services that are delivered. User education is also provided through promotions in the media and in library publications and also through presentations at meetings and at conferences. Many libraries offer training sessions for users, on both a group basis or to individuals. In schools many librarians cooperate with teachers in facilitating courses that are based on retrieving material from the ICES in order to enhance information literacy.

Website and Dissemination of Information

The website <www.hvar.is> and the listserv Skrudda (meaning old book), which is a listserv for library personnel and library interest groups in Iceland, are seen as the means to promote and disseminate information about the ICES. An intranet has been developed for the advisory Steering Committee and the ICES staff. The Web also serves as an information source about the project and related material such as Open Access, material that is free on the Internet, etc. The following components can be identified on the website:

- Links to the resources;
- Information about the management of the ICES;
- Links to selected free material and Open Access;
- Information about small local/closed consortia.

The e-journals to which the ICES subscribes can be accessed directly by links to publishers or vendors and also through an SFX link resolver. SFX takes the user directly to the full text article, where possible. SFX offers additional services where full text is not available and it provides an alphabetical list of journals that the ICES provides. All university libraries in the country have information about their individual electronic subscriptions to e-journals in SFX. The current search engine for meta-search is Searcher-Analyzer from TDNet, which can search all the journal collections in the ICES at the same time in a federated search. Plans for including e-journals into Gegnir, the Union Catalogue, are in preparation as is the implementation of an integrated search system for Gegnir, Icelandic digitized material and licensed material, in cooperation with the Consortium of Icelandic Libraries Inc. (Landskerfi bókasafna).

User Statistics

Information on the project to its stakeholders is important and the data should be presented clearly. Usage statistics are critical in order to show the benefits of access. As access is on a national basis, user statistics for single libraries or
institutions are usually not collected. It can be done but those numbers do not tell the whole story, because end users can and do use the ICES at work, at home or wherever they need. Therefore, statistics for individual libraries or institutions cannot be used in the pricing model. Publishers present usage statistics four times a year online and the Project Manager and specified library staff members have privileges to this data and present it to stakeholders. The numbers are COUNTER compliant, i.e. vendors use COUNTER standards and protocols to collect and present statistics on online usage. Usage numbers are presented in the annual report of the ICES and on the website <www.hvar.is>. According to the statistics, overall usage has risen each year as shown in Table 3.

![Number of downloaded articles in ICES 2001-2009](image)

Usage increased most at the beginning of the project but a leveling out seems to be occurring in the years 2007-2009. Currently, compared to the beginning, more material is available as the number of e-journal titles that are available is increasing over the years. In this period, 2007-2009, approximately three articles are downloaded per capita each year. The growth in usage can partially be explained by growing number of students in colleges and universities. The establishment of new universities as well as research and study centers in Iceland’s rural areas is also seen as a reason for increased usage. Many factors, such as the usage reports from publishers, indicate that the biggest user groups are university students and faculty members. Other groups that can be identified as high users are doctors, other health service personnel and academics in research institutes. Another strong factor indicating students as the biggest user
group is the usage statistics of the website <www.hvar.is> as shown in Table 4. The usage follows clearly the cycle of the school year with most usage at the beginning of the semesters and dropping in the summer time and during Christmas holidays.

![Figure 5: Number of visitors each month on the website <www.hvar.is> for the years, 2007-2009](image)

There is a growing demand for scholarly articles and the ICES has acquired the status of being a reliable source for quality material. Statistics indicate that scholarly articles are more than half of all the material downloaded. In 2009, articles downloaded from journal collections were 53.1% of all full text articles downloaded; from blended collections, downloads were 39.2% of items retrieved; and, downloads from databases accounted for 7.7% of items that were retrieved.

<table>
<thead>
<tr>
<th>Type Of Material</th>
<th>Number Of Downloads</th>
<th>% Of Downloads</th>
</tr>
</thead>
<tbody>
<tr>
<td>Journal collections</td>
<td>473,650</td>
<td>53.1</td>
</tr>
<tr>
<td>Journal and blended collections</td>
<td>349,920</td>
<td>39.2</td>
</tr>
<tr>
<td>Databases</td>
<td>68,707</td>
<td>7.7</td>
</tr>
<tr>
<td>Total</td>
<td>892,277</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 2: Downloaded full texts in ICES 2009 by type of material

Impact on Interlibrary Loans (ILL)

The NULI is the center for ILL document supply in the country according to the National and University Library Act, 71/1994. Statistics reveal that ILLs
declined during the first years of countrywide access to electronic resources. A 2004 study, with an update in 2006, shows that parallel to an increase of downloads of the material in the ICES, interlibrary loans from the NULI declined (Gylfadóttir and Hlynsdóttir 2006). Statistics in the Annual Report of the NULI (Landsbókasafn Íslands – Háskólabókasafn 2000-2009) show that the number of articles ordered by library patrons has decreased considerably by between 50-60% since 2001. The demand for books and other material has been more stable. This is a consequence of more journal titles being available and also easier online access. Despite these changes there will still be demands for ILL material that is more difficult to obtain, such as reports, conference papers and books. As a result of the decline in ILL requests, less staff is needed in that department of the NULI and some former ILL staff members have been assigned to work in other areas of the library.

The Impact of ICES

The changes in information dissemination and use in Iceland were evident after the establishment of the ICES. The impact of the ICES can be traced to many levels of the Icelandic society and by reviewing the existing documents and research the following can be inferred. However, research is needed to provide documented evidence.

More Material

The number of times that scientific material has been accessed by people in Iceland has grown from approximately 3,900 paper and 674 electronic subscriptions in 2000 (Árnadóttir 2001) to more than 14,500 quality e-journals, several databases, reports and e-books in 2010 (Hvar.is 2010). Apart from the ICES, some libraries and institutions have individually accessed specialized e-material, some paid for by small consortia (Samkaup háskóla 2010).

Easy Access

In 2000, journals were available in small closed consortia or on paper within a given library. Now, all journals in the ICES are available via the Internet to the whole nation on 24/7 basis and independent of the opening hours of libraries. The impact of unrestricted access cannot be measured easily but it opens new potential and possibilities for using the material. This also saves a lot of time and effort for users as it had been estimated that it could take a person more than an hour to go to the library to photocopy or print a journal article (Visindamenn og almenningur 2006).
Necessity for Education

The number of students in secondary and tertiary education has grown during the recent times (Statistics Iceland 2010a). More programs are now being offered at the master’s and doctoral level (Statistics Iceland 2010a). Distance education and lifelong learning programs have been established and are quite popular. It could be inferred from the statistics that students are the largest single user group of the ICES and clearly this group benefits tremendously from having this type of access to information. Tertiary distance education in its present form would be nearly impossible without the ICES (Fjarnámið gerlegt 2007).

Support to the Research Community

The number of articles published by scientists working in Iceland has grown during the last couple of decades. So too has the number of citations of research articles by Icelanders as well as those in which persons from Iceland have collaborated with other colleagues (Research and Development in Iceland 2009). Many factors contribute to these achievements such as policy planning, increased and more systematic funding and a stronger infrastructure where the ICES plays an important role (Building on Solid Foundations … [2009]). The figures have increased at higher speed after the access to e-journals and databases was opened, Table 1.

Necessity for Rural Research and Study Centers

Several research and study centers have been established in rural areas as well as many projects connected to travel and tourism (Fræðasetur 2010). The study and research activities are usually tied to local resources. Many of the specialists and academics working in these centers claim that access is a necessary condition for their work.

Usage

It is evident from the user statistics that the Icelandic nation seems to be satisfied with the level of access that is available nationwide and new ways to use the material are constantly being explored, Table 3. Elementary school children can learn how to use the e-resources at a young age and that gives them an advantage as they progress to later studies. Iceland has increasingly become a multicultural society (Landshagir 2009) and the ICES provides support to immigrants by giving access to a variety of quality material in English. As mentioned before the demand for quality foreign and scholarly material has increased among Icelandic scientists.
Changes in Library Operations

End users are not dependent on library opening hours and they do not need to go to the physical premises of the library as often as before. Work processes in libraries have changed, the acquisition of paper journals has decreased and cataloguing, filing, shelving and ordering missing issues required less time to do than they did before. The need for housing and shelving space for the storage of back issues of printed material has been reduced. The demand for scientific articles in interlibrary loans has also decreased (Gylfadóttir and Hlynisdóttir 2006). As a result, staff formerly occupied with these tasks can be redirected to other tasks like information literacy instruction, end user services and digitization projects.

Support to Public Policy

The ICES strengthens the national infrastructure for education and research. It also underpins the Icelandic Government’s strategy for creating an Information Society (The Icelandic Government’s Vision 2006). The project is an important medium in gaining equality and democracy in the country and for free access to information for the general public.

Conclusion

There has been a growing demand in Iceland for information and access to scientific journals and research results. The idea of having access to electronic resources that is national in scope received, from the very beginning, positive support from all stakeholders in Iceland, namely the library and the research community. The ICES answered this demand and the access to information that it provides supports research and scholarly activities at universities and research facilities around their country. There is the research output of the country has been strengthened and the number of researchers has grown. Further, the ICES gives small libraries and libraries in secondary schools access to material that they would never be able to buy from their own resources, but through their contribution to the ICES persons in these institutions have the same access to information as any other citizen.

Undoubtedly, the impact of the ICES and its website <www.hvar.is> has been and continues to be significant. The changes are evident but more research is needed to improve the project – it is perhaps timely to conduct additional research on the ICES, its impact, benefits and future developments. For example, no systematic survey has been done on the usage of individual e-journals in the ICES, whether the titles subscribed to before the inception of the ICES are used, used more or whether it is the new titles that are most frequently used.
Studies on the impact of the ICES on the educational system are needed, cost-benefit analyses and how to enhance the usage of the material.

In small countries like Iceland, cooperation at all levels is very important. In the field of library service and dissemination of information it is vital to join forces in order to maximize the utilization of the resources available. The ICES has grown into a viable project and it is acknowledged as integral component of the infrastructure for education and research. Online information dissemination in Iceland now consists of three strong pillars:

- First: One a national library system with a union catalogue and a national bibliography;
- Second: A national licensing consortia; and
- Third: Access to digitized Icelandic heritage collections. Under preparation is access to all online material through one national portal.

It has taken considerable effort among the different stakeholders to reach consensus on the material to be licensed and arrive at a fair pricing model. But, the library community used the experience it had acquired from former cooperation projects and it managed to build a good and solid service for the benefit of the country. The process has strengthened the libraries and the librarians as a professional group.

Credits

Map sourced from: <www.lonelyplanet.com/maps/europe/iceland/> and adapted by Paul S. Gibbs, Educational Media Services, UWI, Cave Hill.

Figure 3: Research and Development, 2009
Figure 4: NULI
Figure 5: NULI
Table 1: NULI
Table 2: NULI

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