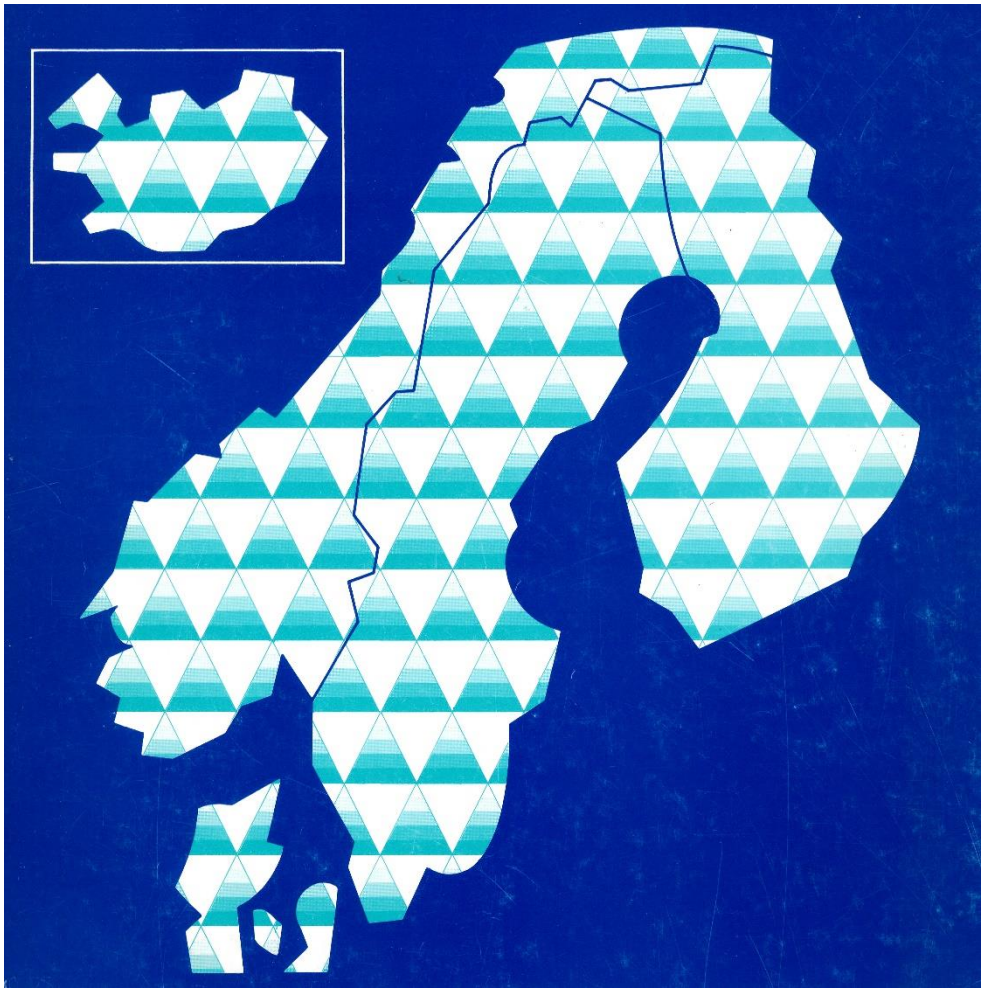
Online development in the Nordic countries

A history of online information from the 1960s to the '00s and NORDINFO's role in its development



Elisabet Mickos (†), Teodora Oker-Blom, Marie Wallin, Lars Klasén, Aud Lamvik and Ulla Retlev (Eds.)

Helsinki 2018

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The publishing process began as a project within NORDINFO - the Nordic Council for Scientific Information. NORDINFO was closed down in 2004 and the editors had to take the responsibility of completing the project by publishing this book.

Some of the contributions to this book have previously been published as manuscripts in 2007. See: URI http://hdl.handle.net/1975/1490

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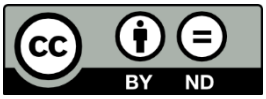

Contents

Foreword

Information and documentation centres in science, technology and medicine in the Nordic countries, Denmark, Finland, Iceland, Norway and Sweden, have collaborated informally and formally for decades. At a personal level the sharing of common interests meant telephone calls, later e-mails, visits and meetings across the borders to discuss new developments and problems and to learn from each other. On a formal level Nordic funding and policy organizations like the Nordic Council for Scientific Information (NORDINFO) enabled joint actions and achievements of impressive results in online development.

This book presents glimpses of the exciting era of early development of online information retrieval (IR) systems and services in the Nordic countries. It covers the period from the 1960s to the '00s.

In the autumn of the year 2000 Elisabet Mickos visited Marie Wallin at the Royal Institute of Technology Library (KTHB) in Stockholm. Elisabet Mickos had just retired from the Finnish Technical Research Centre´s (VTT) Information Service and a final two year period at NORDINFO`s secretariat. Marie Wallin was packing for moving to new premises at the KTH campus. They felt nostalgic about the thought that so much of what they had experienced and enjoyed during their working life as information specialists was going to be forgotten and disappear forever in a never reopened archive. Why not try to revive the memories and write them down.

Many of the persons who participated in the development of online information retrieval services were academics or graduates in science and technology called information specialists or documentalists who provided researchers and other professionals with literature searches. Their experiences of this pioneering practical daily work would be interesting to record. The Nordic countries have participated significantly in the online development and in many cases been forerunners in Europe. It was possible thanks to persons who had enough foresight and determination to make information centres and libraries in our countries the earliest users of computer-based information systems. Their thoughts and memories would also be important to document when it was still possible. It was high time to compile this book.

NORDINFO was going to celebrate its 25th anniversary in 2002. It seemed an appropriate occasion to acknowledge its central role in enabling collaboration and mutual stimulation in the field of scientific information retrieval. According to the practice in Nordic projects and activities this planned book of memories and stories of online development should be collected by representatives from all the Nordic countries working together on their interlaced history. It was easy to get Ulla Retlev from Denmark and Aud Lamvik from Norway to agree on joining the editorial team with Marie Wallin and Elisabet Mickos, the latter as project leader and main editor. Unfortunately no one from Iceland accepted the offer. NORDINFO approved a project plan from the group in April 2001 and Teodora Oker-Blom joined the team.

The aim of the book project was to gather authors from all the Nordic countries, either still working or retired, and ask them to give their personal views on the online history, if possible spiced with anecdotes to make it enjoyable to read. The aim was also to describe NORDINFO´s role in online development. We are very grateful to the authors who, without remuneration, accepted to contribute. The acceptance date of their texts is printed in the book. The task of the editorial team was e.g. to plan and co-ordinate the book project, to assist the authors of the chapters of their responsibility and to comment the manuscripts. Unfortunately NORDINFO, the financer of these tasks and the agreed publisher of the book, was discontinued in 2004.

The 13th Nordic Conference on Information and Documentation (13th Nord IoD) was held in Stockholm in June 2007. It gave the editorial team an opportunity to present a status report of this book project on Nordic online history. To acknowledge the authors who had submitted their manuscripts by then and to distribute examples of the contents of the book at the conference, available texts were posted online in the open digital repository Helda of the University of Helsinki. The manuscripts were left in the repository with the intention to replace them soon with the final version of the book.

Marie Wallin, Elisabet Mickos and Teodora Oker-Blom at the 13th Nord IoD conference in Stockholm, June 2007, posing in front of a poster informing about the book project.

Due to the very sad and sudden death of our project manager and main editor Elisabet Mickos in October 2007, to the discontinuation of NORDINFO and to other unfortunate circumstances the book project was paused and the incomplete example of the book was left pending for a decade in Helda.

At the beginning of 2016 the book project was revived in Finland as well as in Sweden. Lars Klasén, one of the authors, had been referring to the manuscripts in Helda in many of his lectures. He contacted us and wanted to make an effort to complete the publication. We are extremely thankful to him. Thanks to his ability, enthusiasm and gracious work for about two years we have managed to achieve the goal and present this book.

We hope that these glimpses of online history will trigger the memories of our colleagues and remind them of what we in the editorial team remembered as a challenging and pioneering period in Nordic online history. We also think that young people of today will enjoy glances into the past at a time when half of the population of the world is online this year 2018 according to the World Wide Web Foundation.

Acknowledgements

We hereby want to thank all the authors for their patience to wait for this book to finally be published. We also want to honour the memory of the contributors who have passed away during this period.

This project would never have started without the support of many colleagues. Initially and through the years these information specialists have contributed to the project with anecdotes and photos to its mailing list and helped with e.g. electronic publishing. We want to thank them. Very special thanks to Lars Klasén who revived the book project and put in a lot of work these last two years to achieve the goal; he can be said to be the actual motor of this book. We can not forget our respective families who supported the overtime of the editors and often helped with technical practicalities at home or even, as Lars Wallin, Marie's husband, who helped to translate some chapters or parts thereof into English.

Marie Wallin and Teodora Oker-Blom

Stockholm and Helsinki 2018

Acronyms, abbreviations and technical terms

Organizations, services and systems

(Note: Just a few of the many databases mentioned in the book are included and described here. As for online services, those that appear frequently are included. The others are described in the text.)

3RIP ***IR system*** running on DEC-10 computers. Developed by Paralog (Sweden). Predecessor of TRIP and used for online service ***IDC-3RIP***

ABACUS AB Atomenergi Computerized User-oriented System. Batch retrieval program, developed in 1966 by AB Atomenergi (Sweden)

ABM Norwegian Archive, Library and Museum Authority (before 2003: ***RBT***)

ARPA Advanced Research Projects Agency (USA)

ARPANET Advanced Research Projects Agency Network. An early (1960s) packet switched network, initiated by ***ARPA*** of the US Dept. of Defence

BHS Swedish School of Library and Information Science

BIBSYS Library systems unit of ***NTNU***

Bisnode Major Swedish provider of business intelligence operating a number of online services, including ***InfoTorg***. Has some of its roots in ***DAFA***

BMDC Biomedical Documentation Centre of the Royal Caroline Medico-Surgical Institute (until 1968), Biomedical Documentation Centre, Karolinska Institute (1969-1975). *(From 1976: see **MIC, KIB, KIBIC**)*

BRODD R&D Department of Norwegian School of Library and Information Science

BRS Bibliographic Retrieval Service. Online service (USA). Also the name of an ***IR system*** and software

Byggdok Nordic database within building construction and civil engineering. Produced by The Swedish Institute of Building Documentation

CAS Chemical Abstracts Service (USA). Database producer and name of database

CDS/ISIS ***IR system*** and software for local use, developed by UNESCO

CIS Chemical Information System. Database within occupational safety and health from the International Labour Office

COMPENDEX COMPuterized ENgineering InDEX (USA). Major database in engineering science

DAFA National Center for Adminstrative Data Processing. Government-owned computer service centre (Sweden), predecessor of ***Bisnode***. Originator of online service ***InfoTorg***, launched 1988

DANDOK Danish Committee for Scientific and Technical Information and Documentation

Datapak Public packet switched commmunication network in the Nordic countries

DataStar, Data-Star Online service (Switzerland) launched 1981 by RadioSuisse. Acquired by Knight-Ridder 1993, by The Dialog Corp. 1999 and by Thomson Corp. (Canada) 2002

DENet Danish academic network

DFI Delegationen för vetenskaplig och teknisk informationsförsörjning. Delegation for Scientific and Technical Information (Sweden)

DIALOG Online service (and ***IR system***) developed in the 1960s by Lockheed (USA), publicly available 1972, acquired 1988 by Knight-Ridder (USA), 1997 by M.A.I.D (UK) forming The Dialog Corp., 2000 by Thomson Corp. (Canada)

DIANE Direct Information Access Network for Europe

DIMDI Online service of Deutsches Institut für Medizinische Dokumentation und Information, German Institute of Medical Documentation and Information

DTB Technological Library of Denmark
DTU Technical University of Denmark
DTUB ***DTU*** Library, Technical Information Center of Denmark
EAHIL European Association for Health Information and Libraries
Easynet International gateway service operated by Telebase, later Brainwave (USA)
ECHO European Commission Host Organization. Online service of the European Commission (Luxembourg)
ENEA European Nuclear Energy Agency
ESA European Space Agency
ESA/IRS ESA/Information Retrieval Service. Online service of ***ESA***. Publicly avaliable 1973
ESA/QUEST Online service of ***ESA***
ESAnet Communication network of ***ESA***
ESRIN European Space Reseach Institute (or ESA Centre for Earth Observation)
ESRO European Space Research Organisation. Predecessor of ***ESA***
EPOS/VIRA ***SDI*** service of ***IDC-KTHB***
Euronet European data communications network
EUSIDIC European Association of Scientific Information Dissemination Centres (1970). From 1977: European Association of Information Services
EXTEMPLO Electronic newsletter within I&D in the Nordic countries, launched 1979
FEK Forskningsbibliotekernes EDB-kontor. The national EDP office for the Danish research libraries
FUNET Finnish academic network
HELECON Online service of Helsinki School of Economics
HUT Helsinki University of Technology
IAEA International Atomic Energy Agency
IANI Intelligent Access to Nordic Information
IATUL International Association of Technological University Libraries
IBM International Business Machines Corp. (USA)
IDC-3RIP Online service of ***IDC-KTHB*** (1979-1980)
IDC-KTHB Information and Documentation Centre at the Royal Institute of Technology Library (Sweden)
IFLA International Federation of Library Associations and Institutions
I'M GUIDE Information Market Guide; directory of databases, online services and organizations
IMDOC ***IR system*** developed by IndustriMatematik (Sweden). Used from 1972 by online services of ***DAFA***, ***Infodata*** and ***InfoTorg*** as well as for ***LIBRIS***. In 1985 renamed to Find-It after main upgrading
IMPACT Information Market Policy Actions. European Commission information services programmes: IMPACT 1 (1989-1990) and its successors IMPACT 2 (1991-1995), INFO2000 (1996-1999) and eContent (2001-2005)
Infodata Part of ***DAFA***, later forming the company Infodata AB which eventually was integrated in ***Bisnode*** group (Sweden)
InfoTorg Online service of company InfoTorg AB, launched 1988. Part of ***Bisnode***, formerly of ***DAFA***, ***Infodata*** and Sema Group (Sweden)
INIS International Nuclear Information System, operated by ***IAEA***
INKA Information System Karlsruhe (Germany)
INSPEC Information Service in Physics, Electrotechnology and Control. Major database of scientific and technical literature (UK)
IOLIM International Online Information Meeting. Arranged yearly in London since 1977, from 2001 named Online Information
IRS/QUEST Information Retrieval Service/QUEST. Online service of ***ESA***
ISNET Icelandic academic network

I/S Datacentralen af 1959 Online service (Denmark), operated by the community and government owned association with the same name. In the 1990s transformed into a company and 1996 integrated in CSC Denmark (Computer Sciences Corp.)
ISI Institute for Scientific Information (USA)
ISO International Organization for Standardization
KB Kungliga biblioteket. National Library of Sweden. Operates ***LIBRIS***
KIB Karolinska Institute Library, former ***KIBIC*** (Sweden)
KIBIC Karolinska Institute Library and Information Center, later ***KIB*** (Sweden)
KTH Kungliga Tekniska Högskolan. Royal Institute of Technology (Sweden)
KTHB Kungliga Tekniska Högskolans bibliotek. Royal Institute of Technology Library (Sweden)
LC Library of Congress (USA)
LIBRIS Joint catalogue of the Swedish academic and research libraries. Operated by ***KB***
Lockheed Lockheed Missiles and Space Company (USA) operated Lockheed Information Services providing ***DIALOG*** information retrieval services
MechEn Mechanical Engineering. Database produced by ***IDC-KTHB*** and launched 1968 for ***SDI***. Online at ***IDC-3RIP*** 1979-1980
MEDLARS MEDical Literature Analysis and Retrieval System. Operated by ***NLM***
MEDLARS-at-MIC Online service of ***MIC***, launched 1972
MEDLINE ***MEDLARS*** online. Major database in medical and biological science. Produced by ***NLM***
MIC Medical Information Center at ***KIBIC*** (Sweden)
MINTTU ***IR system***. Version of ***IMDOC***. Used by ***VTKK*** (Finland) for legal information and other information in online service MINTTU
NASA National Aeronautics and Space Administration (USA)
NASA/STAR Online service of ***NASA*** (USA)
NLM National Library of Medicine (USA)
NOLUG Norwegian Online User Group (Norsk Online Brukergruppe)
Nord IoD Nordic Conference on Information and Documentation
NORDDOK Nordic Committee for Information and Documentation
NORDFORSK Scandinavian Council for Applied Research (until 1974), Nordic Co-operative Organization for Applied Research
NORDGUIDE Nordic Database Guide. Published by ***NORDINFO***
NORDINFO Nordic Council for Scientific Information (1976-2003)
NORINDOK Norwegian Committee for Information and Documentation
Norpak Norwegian academic network
NOSP Nordic Union Catalogue of Periodicals
NTIS National Technical Information Service (USA)
NTH Norges Tekniske Høgskole. Norwegian Institute of Technology, later (1996) ***NTNU***
NTHB Norges Tekniske Høgskoles Bibliotek. Norwegian Institute of Technology Library
NTNU Norges Teknisk Naturvetenskapliga Universitet. Norwegian University of Science and Technology
OECD Organisation for Economic Co-operation and Development
ONE ***OPAC*** Network in Europe
Orbit ***IR system*** of ***SDC***
Pergamon InfoLine Online service (UK)
Polydoc ***IR system*** developed in Norway. Also versions for microcomputers: Micro (Mikro) Polydoc
Questel ***IR system*** and online service of Télésystèmes (France)
QUEST **IR system** of ***ESA***. Also name of search language used for ***ESA/QUEST*** and ***IRS/QUEST***
RBT Riksbibliotektjenesten, National Office for Research Documentation, Academic and Special Libraries, Norway (later, 2003, ***ABM***)
RECON Remote Console. ***IR system*** first used by ***NASA*** (NASA/RECON), later by ***ESA*** (ESRO/RECON, ESA/RECON)

SAFAD Swedish Agency for Administrative Development (later Swedish Agency for Public Management)

SCANNET Scandinavian Network. A packet switched Nordic data network for information services

SDC/Orbit System Development Corporation/Orbit (USA). Online service of SDC, employing ***IR system*** Orbit

SFIS Swedish Association for Information Specialists (formerly ***TLS***)

SIDA Swedish International Development Authority (1965-1995)

SIFT Søking i Fri Tekst (Searching in Free Text). ***IR system*** developed by Government Institution of Organization and Management, Norway. Used for legal information service Lovdata

SINFDOK Swedish Council for Scientific Information and Documentation

SOLUG Swedish OnLine Users Group. A section of ***TLS***

STAIRS Storage And Information Retrieval System. ***IR system*** running on ***IBM*** computers

STN International Scientific and Technical Network. Online service, operated jointly by ***CAS*** (USA) and FIZ Karlsruhe (Germany)

SUNET University network in Sweden

TALI Database with references to technical journal articles in the Finnish language

Telenet American and international commercial packet switched network

Telepak Swedish public packet switched communication service

Terkko Terveystieteiden keskuskirjasto. National Library of Health Sciences (Finland), previously Central Medical Library

TENTTU ***IR system.*** Finnish version of ***TRIP***. Developed and used by ***HUT*** Library, which also operates an information search system called TENTTU providing a number of databases

TINFO Tieteellisen informoinnin neuvosto. Finnish Council for Scientific Information

TLS Swedish Society for Technical Documentation. Predecessor of ***SFIS***

TRIP ***IR system*** running on VAX and DEC-10 computers. Successor to ***3RIP***. Developed by Paralog (Sweden)

Tymnet American and international commercial packet switched network

UNINETT University network in Norway

UNIX Multiuser operating system deriving from the original A&T Unix

VAX Operating system, developed by Digital Equipment Corporation (DEC) (USA)

VTKK Valtion tietokonekeskus, Finnish State Computer Centre. Was in 1996 integrated in IT company Tieto (Finland)

VTT Valtion teknillinen tutkimuskeskus, Technical Research Centre of Finland

Technical terms and abbreviations

API Application Programming Interface

ASCII American Standard Code for Information Interchange. A character encoding standard for electronic communication. ASCII codes represent text in computers, telecommunications equipment, etc.

Batch Automated (as opposed to online) processing of jobs on a computer, e.g. conversion, updating and searching of databases

Baud Symbols (or pulses) per second. May here be regarded as ***bps***. (Note: For rough calculations one character may be regarded as 10 bits, thus 300 baud (or 300 bps) approximately 30 characters per second)

Bps Bits per second. One bps may here be regarded as one ***baud***

Byte Unit of digital information most commonly consisting of eight bits. Historically, a character of text in the computer

CD-ROM Compact Disc Read-Only Memory. Optical disc which contains data, accessible by computers

CCL Common Command Language *(Note: command language is equivalent to search language, sometimes also called query language)*

EDP Electronic data processing

Floppy disk Magnetic disk for storing of data, accessible by computers. Sometimes referred to as diskette

Gopher ***TCP/IP*** protocol and text-based menu-system for distributing, searching and retrieving of documents on the Internet and an alternative to the Web in its early stages

I&D Information and documentation

IP Internet Protocol

IR Information Retrieval

IR system Computer based system (or software) allowing storing, indexing and searching of information. Nowadays often called **enterprise search engine**

LDI Library, Documentation and Information

MARC Machine-Readable Cataloguing. MARC standards are a set of digital formats for bibliographic records

Modem Modulator-demodulator. Equipment that turns the digital data of a computer into modulated electrical signal for transmission over telephone lines and demodulated by another modem at the receiver side to recover the digital data

Online A technology that allows the user to interact, having a dialogue, with the information system (e.g. the ***IR system***)

Online service Service that provides access via telecommunications and computer networks, e.g. the Internet, to limited or broad collections of electronic information stored in databases and made retrievable by means of IT systems. Historically also called **online system, host** or **vendor**. *(Note: The term "online system" was coined in the early times of the online era and reflects the fact that the service as such employed an IR system (software) of their own. Well known examples are Dialog, Orbit and BRS, all of which initially had the same name as the name of the software)*

OPAC Online public access catalogue, or simply library catalogue

Open Access Published research that is free to access and free of many restrictions on use

OSI Open Systems Interconnection. ***ISO*** standard for computer communication in an open environment

Packet switching Method of transmitting data over networks by grouping data into packets

PTT Postal, telegraph and telephone services. Government agencies responsible for postal mail, telegraph and telephone services

R&D Research and development

SDI Selective Dissemination of Information. Also called Current awareness or Monitoring. Automated (as opposed to online) processing of databases

STM Science, Technology, Medicine

TCP/IP Transmission Control Protocol/Internet Protocol

TTY Terminal based protocol. De facto standard for online database access and searching with "dumb" TTY terminals, before the breakthrough of ***IP***

Videotex A technology used to deliver information, usually pages of text, to a television set or a dumb terminal

X.25 ITU-T (formerly CCITT) standard protocol for packet switched communication networks

Z39.50 Standard for communications protocol for searching and retrieving information over a ***TCP/IP*** computer network

1 INTRODUCTION. ONLINE SERVICES – PAST AND PRESENT IN A NORDIC AND INTERNATIONAL PERSPECTIVE

Sauli Laitinen

Manuscript received 2007

1.1 Nordic co-operation

Most of the authors of this book have been following the development of online services for more than a quarter of a century and actively contributing to their development and usage in the Nordic countries. There is a long tradition in the co-operation of information services and libraries dating back at least to the 1950s. Nordic co-operation has been very fruitful in sharing experience and in establishing forefront information services in the Nordic countries.

NORDFORSK the Scandinavian Council for Applied Research, later called the Nordic Co-operative Organization for Applied Research (Nordiska samarbetsorganisationen för teknisk och vetenskaplig forskning), established a committee for information and documentation in 1957. Several Nordic projects emerged from its work. One of the early projects dealing with computer-based information services was a database evaluation in the early 1970s. Furthermore, the SCANNET (Scandinavian Network) project for establishing a packet switched Nordic data network for online information services was initiated in 1975 by NORDFORSK. This non-governmental organization of research councils and academies of technical sciences in the Nordic Countries ended in 1987.

The Nordic Council of Ministers founded an organization, NORDDOK, the Nordic Committee for Information and Documentation, in 1970. This was followed by NORDINFO, the Nordic Council for Scientific Information, which was founded in 1976. NORDINFO financed several research and development projects related to online services. They continued to support database co-operation within SCANNET. Later on, in the mid 1990s they established three centres of excellence for contributing to the development of the library and information sector. The centres were the Nordic Centre of Excellence for Networked Information Services (or Nordic Net Center) located in Lyngby, Denmark, which was a joint venture between Lund University Library in Sweden and the Technical Knowledge Centre and Library of Denmark (DTV), the Nordic Centre of Excellence for Electronic Publishing located at the Technical Research Centre of Finland (VTT) and the Nordic Centre of Excellence for Digital Handling of National Library Collections located at the National Library in Norway. The work of NORDINFO ended in 2003.

Nordic users have been very active in taking into use computer-based information systems. This has also been proven in international surveys on online usage during many years. Nordic meetings are being arranged and users from the Nordic countries participate in international conferences for sharing experience and getting new information and ideas. The Nordic Conference for Information and Documentation, Nord IoD, jointly organized by the national Associations for information services is being held every third year. It is obvious that online services have had an important part in the programmes of these conferences for a number of years.

The largest international online conference in the world, the International Online Information Meeting in London (IOLIM) attracts participants from a great number of countries. When counting the number of participants per country and comparing with the population in these countries the number of Nordic participants has always been on the top (not including the local participants from the UK). International associations such as the International Federation for Information and Documentation (FID), the International Federation of Library Associations and Institutions (IFLA), the International Association of Technological University Libraries (IATUL), the European Association for Health Information and Libraries (EAHIL) and the European Association of Information Services (EUSIDIC) as well as the International Coalition of Library Consortia (ICOLC) have had a strong support from the Nordic countries.

1.2 Birth of bibliographic database services

Electronic publishing actually started when scientific secondary publishers took computers into use for producing printed abstract and index journals in the beginning of the 1960s. This was a necessity because of the so called information explosion, which was due to the boom of scientific research after the war. The state of the art of electronic data processing allowed bibliographic data elements to be stored in machine readable form and to produce an output for photo-composition.

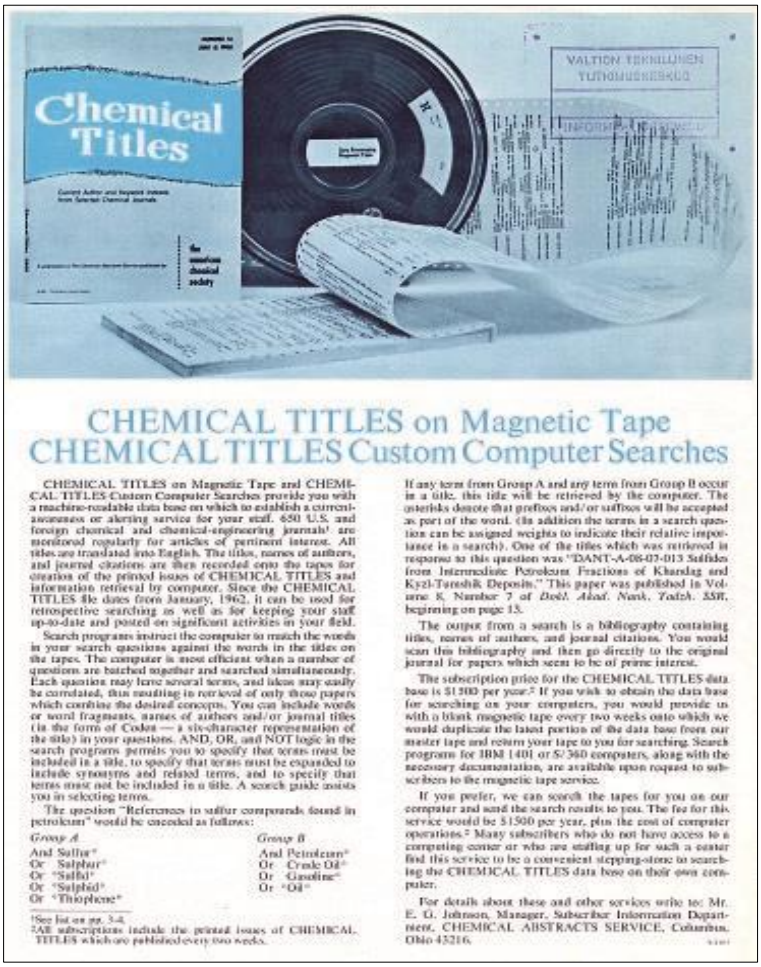

Figure 1.1 A leaflet advertising Chemical Titles, one of the first bibliographic databases available on magnetic tape.

As a by-product a magnetic tape file was obtained, which could be used for information retrieval by computer. Secondary publishers at that time were only interested in producing the databases and encouraged other information centres to run the search services for end users (i.e the people needing the information). So, they leased the tapes to information centres, which then offered selective dissemination of information, SDI services, to end users.

American information providers such as Chemical Abstracts Service (CAS), the National Library of Medicine (NLM), the National Technical Information Service (NTIS), Engineering Information (EI) and the Institute for Scientific Information (ISI) began to deliver bibliographic databases on magnetic tape in the mid 1960s.

Information centres in the Nordic countries were among the earliest users of the tapes. The Biomedical

Documentation Centre (BMDC) of the Karolinska Institute (KI) and the Information and Documentation Centre at the Royal Institute of Technology Library (IDC-KTHB) in Sweden and the Technological Library of Denmark (DTB, Danmarks Tekniske Bibliotek) started running SDI services in the middle of the 1960s.

These services were used also in Finland. Later on, in the beginning of the 1970s, two Finnish organizations, the Helsinki University of Technology (HUT) Library and the Finnish Pulp and Paper Research Institute, also acquired databases for SDI. The Central Medical Library of Finland co-operated in the same way with BMDC-KI in Sweden.

Figure 1.2 Bibliographic reference output on cards at the IDC-KTHB SDI service. These cards could be used for document ordering. Some of the databases of the service, such as CAS, were provided by MIC (successor to BMDC-KI).

The number of databases grew rapidly as described in figure 1.3.

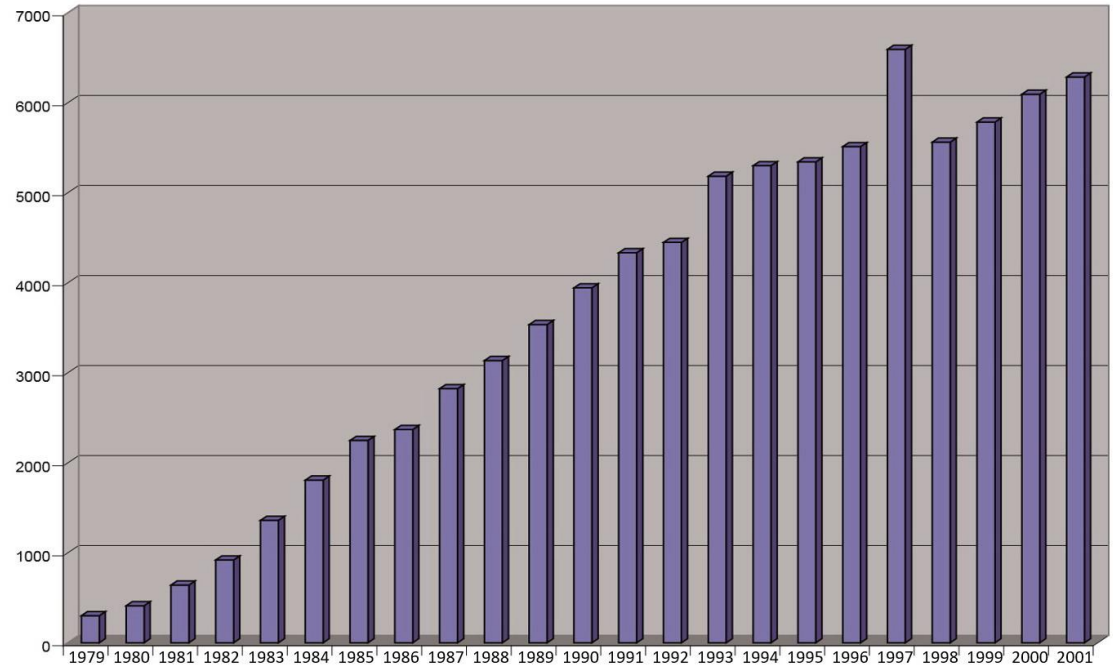

Figure 1.3 Growth of the number of databases based on the figures collected by Martha Williams and published in the Gale Directory of Databases.

1.3 Birth of online services

Owing to the development in mass storage and telecommunications technologies it became possible to hold large databases in direct access memories and access them by using remote terminals in the early 1970s.

Lockheed Missiles and Space Company (Lockheed Information Services with its DIALOG information retrieval service) and System Development Corporation (SDC Search Service) in the US started marketing public online services. Packet switched telecommunications networks, such as Tymnet and Telenet were extended from America to a number of European cities and it became possible to reach the American online systems in Europe.

Lockheed offers a simple, low-cost way to search major bibliographic data bases. Online.

It only takes a purchase order to start using the Lockheed online, interactive retrieval system for searching significant bibliographic files. You can use a variety of terminals and communications to access the Lockheed Computer Center.

Data bases include: 1. Complete National Technical Information Service file, 350,000 citations and full abstracts; 2. Educational Resources Information Center files, 150,000 citation abstracts; 3. PANDEX/TRANSDEX Current Index to Scientific and Technical Literature, 530,000 citations; 4. Psychological Abstracts, 125,000 abstracts; National Agricultural Library CAIN file, 200,000 citations. Other major data bases in the hard and social sciences are being added.

You can use any teletype-compatible, dial-up terminal from 10 to 120 characters per second, as well as certain high-speed CRT terminals up to 480 cps.

Several forms of communication are available, including the Tymshare national communications network with local number access in over 40 cities; Lockheed's own high-speed network; or any voice-grade telephone line.

Search charges are $25 per terminal hour for ERIC and NAL/CAIN; $35 for NTIS and PANDEX/TRANSDEX; and $50 for Psychological Abstracts. Offline prints are 10¢ per abstract. You will not have to pay any minimum usage, or subscription, or membership fees.

A typical search costs $5 to $10 and rapidly puts at your fingertips the billions of dollars in research undertaken in this country. The Lockheed system is already being used by federal, state and local agencies; school systems; industrial and research libraries; and professional associations and individuals to augment their knowledge and also prevent costly duplication of effort.

For more information, contact one of the following offices.

LOCKHEED INFORMATION SERVICES

Dr. R. K. Summit
Dept. 52-08-5
3251 Hanover St.
Palo Alto, Calif. 94304
(415) 493-4411

R. Donati
Dept. 15-50-5
405 Lexington Ave.
New York, N.Y. 10017
(212) 697-7171

You are invited to have a search run in the Lockheed booth at the 36th Annual Conference of the American Society for Information Science, Oct. 22-24, Los Angeles.

Figure 1.4 A journal advertisement from the mid 1970s of Lockheed Information Services.

The users in the Nordic countries were among the first in utilizing these services. Nodes of the telecommunications networks had not been installed in the Nordic countries but the services could be reached by making a telephone call to the nodes in Belgium, France or Switzerland.

Later on other access points outside the Nordic countries also became available.

The first information retrieval network within Europe based on remote use of online systems was established by ESRO-ELDO (European Space Research Organization - European Launcher Development Organisation), later known as the European Space Agency (ESA). Sweden was a member of the space organization and the network was extended to IDC-KTHB in Stockholm.

First the service was open only to dedicated terminals in information centres in the member countries. Later on it was made publicly available.

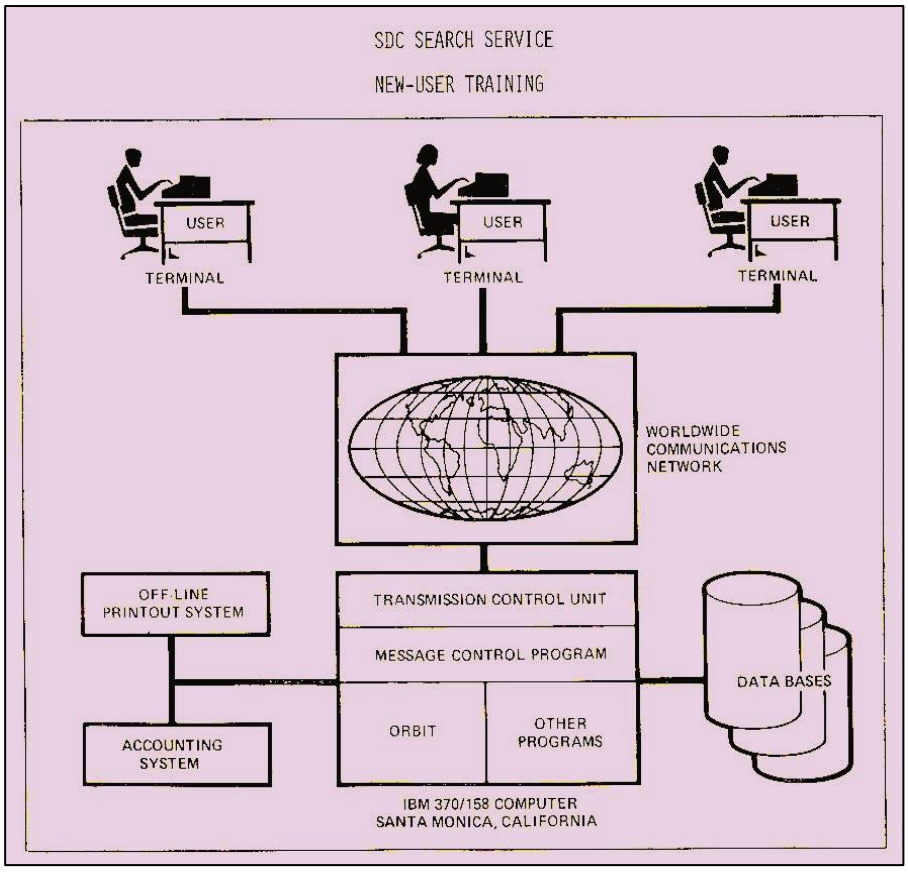

Figure 1.5 Picture from an early SDC Search Service training manual showing the components of an online service.

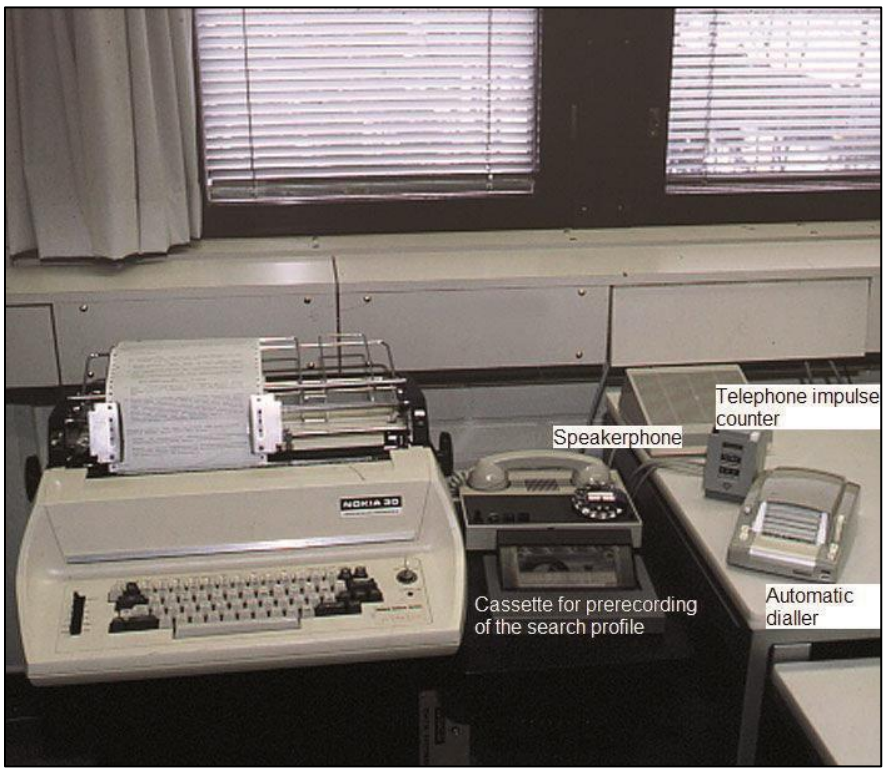

Figure 1.6 A terminal with accessories for accessing online services at VTT Information Service at VTT Technical Research Centre of Finland in the 1970s.

The number of online systems grew rapidly. Large, national online services were established in major European countries. These include Questel in France, Pergamon InfoLine in the UK, INKA and DIMDI in Germany and DataStar in Switzerland. Users in the Nordic countries also started to use these services in addition to the major online hosts in the US. In addition to big online hosts with dozens of databases specialized services with a small number of databases also emerged.

Figure 1.7 Online use at VTT Information Service in the early 1980s.

In order to be able to offer comprehensive coverage for information needs to serious research and development projects it was and still is necessary to use several databases, which can be in different online systems. For an information specialist this requires thorough familiarization with a number of search languages and conventions used for compiling databases.

Attempts were made to standardize the search language and a common command language, CCL, was created. However, it was adapted only by a few European online hosts.

Packet switched telecommunications networks were being used for information exchange in research. The Commission of the European Communities had realized the importance of packet switched telecommunications networks in information retrieval and founded the Euronet project in 1971. The network became operational in 1979.

Of the Nordic countries Denmark was the only EEC (European Economic Community) member country. Sweden and Finland joined Euronet by special arrangement in 1982.

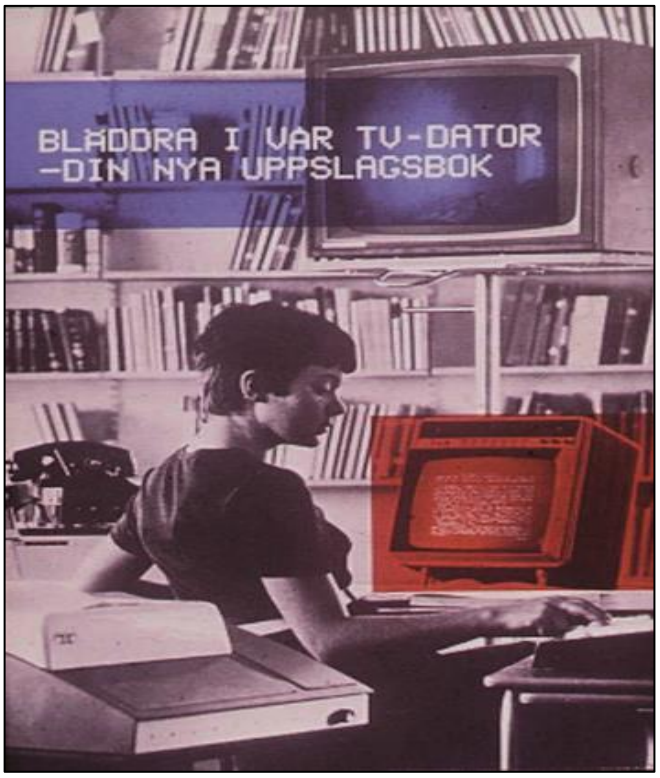

Figure 1.8 A brochure of IDC-KTHB from the 1970s advertising access to the ESRO-ELDO online system (Featuring Kerstin Wessgren under the headline "Scroll through our TV-computer - your new encyclopedia").

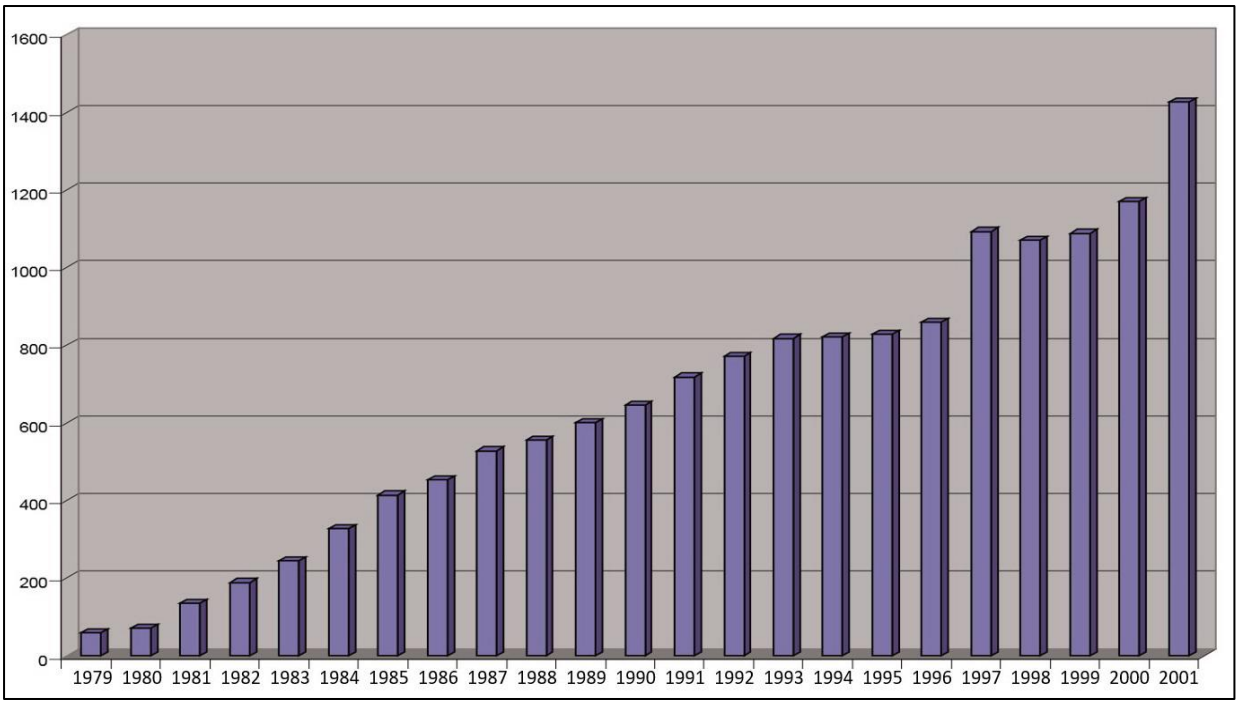

Figure 1.9 Growth of the number of online services. The graph is based on the figures by Martha Williams in Gale Directory of Databases.

NORDFORSK founded the SCANNET project for establishing a packet switched network for information services in 1975. The network became operational in 1976 with nodes in Copenhagen, Oslo, Gothenburg, Stockholm and Espoo in the greater Helsinki area.

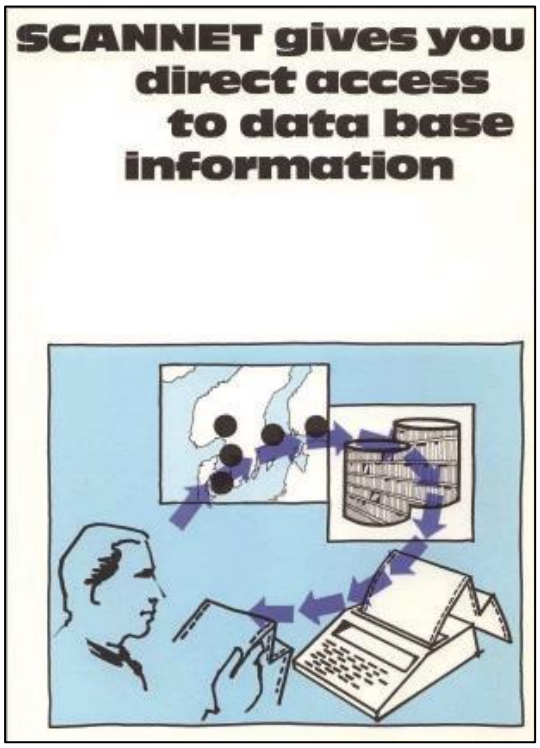

Figure 1.10 A brochure for marketing SCANNET.

Figure 1.11 The SCANNET node, a NORD 12 Computer at theFinnish State Computer centre (VTKK) in Espoo in the 1980s.

Later on both Euronet and SCANNET were replaced by interconnection of national packet switched networks operated by the telecommunications authorities in the European countries. In the Nordic countries the networks were called Telepak (Sweden), Norpak (Norway) and Datapak (Finland).

These networks offered access to American, European as well as to Nordic online services from the beginning of the 1980s.

Figure 1.12 A host computer with databases linked to SCANNET at NSI - Norsk Senter for Informatikk, Norway.

Internet was developed in the United States, with its background in packet switched networks such as the ARPANET in the 1960s (ARPA = Advanced Research Projects Agency). The Nordic countries were among the most active in Europe for providing efficient network services for higher education. TCP/IP-based NORDUnet was initiated as early as in 1985 extending the Internet to Scandinavia. According to published statistics the Nordic countries have been leading for many years as to the number of Internet connections and users.

The use of the Internet for distributing scientific papers and its possibilities for information retrieval was attractive for researchers, librarians and information specialists in the Nordic countries already at a very early phase resulting in a number of Gopher (a text-based menu-system for searching of documents on the Internet and an alternative to the Web in its early stages), WAIS (Wide Area Information Server. A client-server text searching system that uses the Z39.50 protocol for searching distributed databases) and WWW services in the early 1990s.

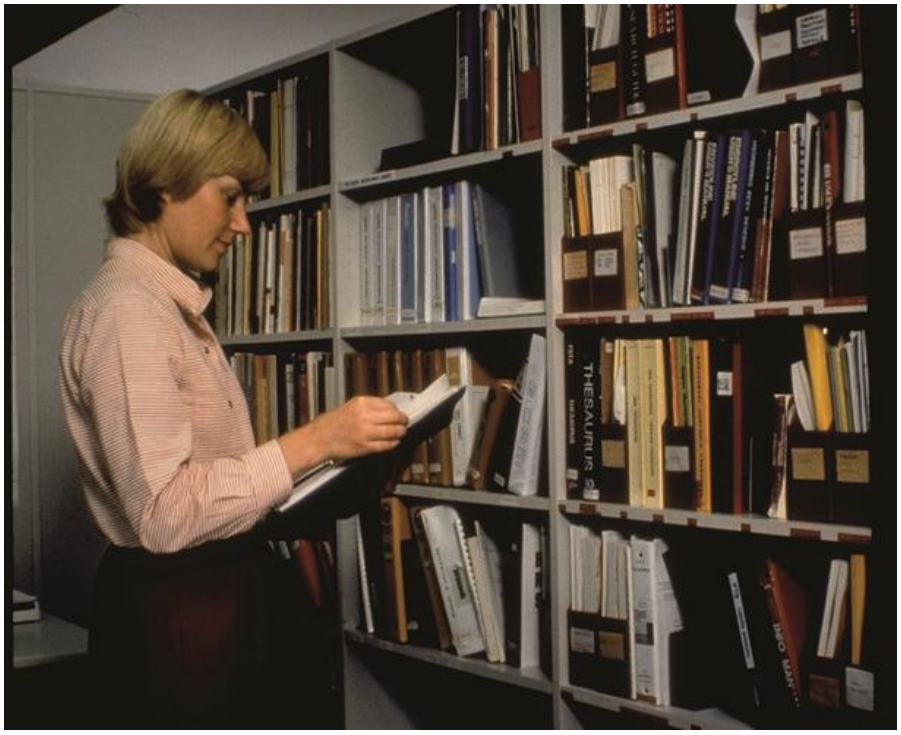

Figure 1.13 Pirjo Sutela in front of the shelf for manuals for online search systems and databases at VTT Information service in the 1980s. VTT Information Service had contracts with 60 different online hosts with more than 200 databases.

Packet switched telecommunications networks based on the X.25 standard and operated by the telecommunications authorities, the PTTs (Postal Telephone and Telegraph) in the Nordic countries were gradually replaced by the Internet in accessing online services abroad. The change, however, did not happen immediately as the actual speed of the connection and quality of the network services were not good enough to justify its use owing to the relatively high hourly price paid for the access to the commercial online services. The reliability of the PTT networks was also poor in the early stages and caused a lot of concern among the online users. Special 'monitoring weeks' were arranged for reporting and conveying the message to the telecommunications authorities.

1.4 Pricing and usage

The rapid growth of the use of online services from the middle of the 1970s was very much due to the right pricing model chosen by the information providers. Charging for computer applications was earlier based on complex algorithms including the use of such resources as central processing units and the number of input-output operations. So, the cost of a computer session was hardly predictable by a user. In addition, there were initial fees and monthly fees for the use of a service.

Providers of bibliographic online services introduced a very clear pricing scheme included in a simple user agreement, no initial fee (or a very modest fee for the manuals) and no monthly fees. Charging for the service was based on the time at the terminal, where the hourly rate was dependent on the database used.

Later on, when the telecommunications speed in the X.25 networks was increased, the connect time model was not appropriate any more and it was gradually replaced by the "pricing for information" model, where the determining factor was the amount of information output from the database.

The pricing model based on actual usage was well received by information service units in industry and research establishments, used to account for the costs on special projects. Academic libraries, however, were accustomed to the subscription model and the online services were not always enthusiastically received.

The situation changed when bibliographic databases became available on CD-ROM as the pricing was based on subscription or purchase. International databases on CD-ROM were well received in the Nordic countries, especially by university libraries. The databases on CD-ROM were networked, at university libraries, to large CD-ROM networks allowing comprehensive database availability within the libraries. Also a few Nordic databases were transferred to CD-ROM. Later on the CD-ROM networks were replaced first by servers and later on by access to publishers'services.

In the early years of online the information providers outside the Nordic countries were concentrating on the market in their own countries and there were no presentation of the large international services. University libraries and information centres, especially in the technical and medical fields, provided the education and training.

They hosted training courses inviting representatives of the online services and database producers to come and explain search languages and database structures for the end users. They also arranged training courses of their own. In addition, active online user groups were formed in each of the Nordic countries. They published news leaflets informing about new services and numerous new features in the systems under constant development.

The usage of online databases was monitored and measured in various projects in the Nordic countries and internationally. The studies show that the usage per capita in the Nordic countries has been very high.

1.5 Access to primary documents

The awareness of existing documents for satisfying information needs increased radically as literaure references were distributed on the basis of SDI and online services. This created a new form of business called document delivery. In the US the university libraries were there for serving students and faculty mainly and had limited capacity for outside customers. Some librarians, who had insecure future prospects in their career owing to the economic crisis in the early 1970s, saw there a business opportunity and founded small companies called information brokers to satisfy the need for documents. They hired "runners", mostly students, who went to large university libraries for copying journal articles on demand.

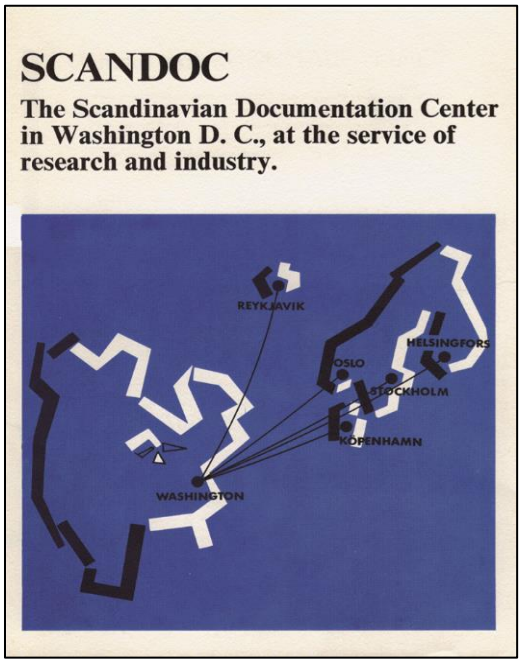

Figure 1.14 A brochure for advertising SCANDOC.

This development did not take place in the Nordic countries, apart from a few exceptions in Sweden in the 1980s. University and research libraries, especially in technology and medicine had a long tradition in serving outside customers. So, their collections and services, including interlibrary loan and document delivery from other libraries, became important also among users in industry. Resources from other Nordic libraries were also used and the Nordic Union Catalogue of Periodicals (NOSP) was an important tool for locating documents in the Nordic libraries. The Scandinavian Documentation Center (SCANDOC), which had been established by NORDFORSK in Washington DC already in 1960, was used for hard-to-find material from the US. Among the development projects supported by NORDINFO several were related to electronic document delivery.

Library automation systems offer locators to documents held in the libraries. The planning of larger scale library automation to include library routines such as acquisition, cataloguing and lending was started in the beginning of the 1970s. The ALIS system for cataloguing holdings of the DTB was one of the first operational library automation systems. Many specialists from other libraries in Scandinavia participated in seminars arranged by DTB to familiarize themselves with the new possibilities offered by the use of EDP (Electronic Data Processing).

LIBRIS was the library automation system of the National Library of Sweden (KB, Kungliga Biblioteket) in the 1970s, an ambitious project, the original goals of which could not be fully achieved with the technology and resources available at that time. Today, LIBRIS is the joint catalogue of the Swedish academic and research libraries. In Finland the Ministry of Education decided to finance a common automation system for all 20 university libraries in the country. In Norway the library automation is being developed by BIBSYS, a unit at the Norwegian University of Science and Technology (NTNU). Currently more than 100 libraries are using their services.

Publishers started to offer primary scholarly journals in electronic form in the middle of the 1990s. The first services were based on the use of CD-ROMs to deliver page images to be uploaded to the customers' computers.

Access to the publisher's server soon became an option. The services are now called electronic libraries. Electronic material can be primary journals, books or other documents such as patents or standards in electronic form. Bibliographic and other referral databases can also be included. The business model is leasing access for an annual fee.

In order to fully utilize the available offerings and to be able to afford the high prices involved, libraries formed consortia for negotiations with publishers. The idea of a Nordic consortium was put forward in some of the early contacts with publishers. The publishers, however, in this early phase of a new business were reluctant to include such a wide consortium in their agreements.

In addition to individual libraries signing contracts with publishers, a number of library consortia were formed in the Nordic countries. Large national licensing programmes were also introduced. E.g. in Finland the Ministry of Education financed the service the Finnish Electronic Library (FinELib), for the university libraries. Libraries of the polytechnical schools and a number of research institutes also participate in FinELib with their own financial contribution.

Copyright restrictions hamper delivery of individual journal articles. Journals are sold by annual subscriptions. Only recently some publishers have made the purchase of individual articles possible.

The constantly rising price of journals both in printed and electronic form has led to new publishing models. The Open Access Initiative (OAI) with its roots in the open access movement encourages researchers to publish via alternative channels. The number of open access journals is increasing, but still the well established scholarly journals by commercial publishers remain the main publishing channel for scientific research.

1.6 Online today

Internet has made a great change in publishing and information searching. The free sites on the Internet have become the most frequently used source of information in everyday life for everyone. In spite of the lack of sophisticated functionalities developed for the specialized search systems a rapid "googling" is enough for many information needs.

An important feature in today's electronic sources is hypertext linking. It offers remarkable added value compared to printed publications. Links can be added between different parts of a document and especially between different documents. A link can be established from the list of references to the cited article, if that is available in electronic form or to a corresponding abstract in a bibliographic database and vice versa. An extensive network with links between journal articles has been made by collaborating publishers. Connections to library automation systems are also being developed to allow retrieval of items in the subscribed electronic sources.

Documents can contain text, graphics and images in their layout. Also animation, sound and moving images can be added to presentations. In addition, it is also possible to include computer programs in electronic documents allowing users to run simulations and to test data in their own way. It is obvious that multimedia presentations have a potential of changing the scientific publishing process in the future by transferring the publishing phase as an integral part of the research.

In spite of the search functions of the Internet and electronic libraries a comprehensive retrieval of published information still requires a search to be made using well established specialized databases and sophisticated search functions of the traditional online systems.

2 INFORMATION POLICY

Introduction

Teodora Oker-Blom

Manuscript received 2007

This chapter provides an interesting description of the emergence of the intergovernmental co-operation in scientific and technical documentation in the Nordic countries. This coincided with the prosperity of industry and technology which resulted in an exponential growth of research information. A need sprung up for efficient systems for acquisition and dissemination of this information, foremost within STM (Science, Technology, Medicine).

Information technology emerged and important computer advancements and database developments foreboded the evolution of online retrieval systems.

Strategic Nordic co-operation in the field with funds to co-ordinate national information policies and to support joint practical and cutting edge projects made information centres and research libraries in the Nordic countries among the earliest users and suppliers of online information retrieval systems and their precursors.

The first contributor, Elin Törnudd, also the first civil servant of NORDFORSK, belongs to the pioneering figures in scientific information with broad international contacts and enough foresight and determination to foster Nordic co-operation. She tells enthusiastically about early developments in information retrieval and the body for co-operation NORDDOK as well as how its successor NORDINFO came into being.

The second paper describes NORDINFO´s goals and policy and principles for funding co-operative Nordic projects and activities, especially in online development. Access to information was the main focus of NORDINFO during its life cycle. The Nordic Council of Ministers (NCM) decided to close it down in 2003 despite the next contributor Inge Berg Hansen's positive view of its future role.

Inge Berg Hansen has actively been influencing the policy of NORDINFO as a member of the plenary board and the steering groups of SCANNET and IANI. She has evaluated NORDINFO on behalf of the NCM and the Nordic Council for Research Policy. She finds that NORDINFO has fulfilled its goals and used its fairly limited funds strategically. She especially discusses NORDINFO´s role in an international context. She sees the organization as a focal point for the Nordic countries in relation to EU, UNESCO and other international organizations. She fears that the budget constraints as a result of diminished political importance of institutionalized Nordic co-operation in favour of co-operation within EU will effect NORDINFOs existence.

2.1 Early online promotion by Nordic intergovernmental organizations

Elin Törnudd

Manuscript received 2002

NORDFORSK - the Scandinavian Council for Applied Research

The first Nordic intergovernmental organization to foster co-operation in scientific and industrial research and related documentation, NORDFORSK, was founded in 1947 by the academies of engineering sciences and national research councils for science and technology.

The Executive Board of NORDFORSK chaired by Edy Velander convened the first Nordic symposium on documentation in Tällberg, Sweden, in November 1954. Kajsa Hällström also of the Royal Swedish Academy of Engineering Sciences was responsible for the arrangement. It gave a flying start to joint projects in documentation including library services in science and technology. A Liaison Group for Documentation was established to foster co-operation and to organize Nordic I&D symposia at regular intervals. (1)

As the first Nordic civil servant I was in 1956 recruited from the main chemical information service in Finland to serve as secretary of NORDFORSK and its working groups and committees. It goes without saying that I did not neglect the Liaison Group for Documentation.

Online had not become a reality, but it was envisaged in bold future forecasts. A Nordic “database” on current research projects on punched cards was developed at the end of the 1950s. (2)

In 1960 the Scandinavian Documentation Centre in Washington, D.C., SCANDOC, was established to serve as a clearing house for government research reports that were difficult to obtain for science and industry in the Nordic countries. At an OECD (Organization for Economic Co-ordination and Development) meeting the White House Science Advisor, Dr. Hornig, mentioned: “*Why is it that only Nordic countries are able to join forces to solve problems?*”. Our men in Washington: Arne Sverdrup, Nils Gram and Sinikka Koskiala kept for more than a decade the NORDFORSK Info Committee, as it was now called, à jour with developments of computer-based information services. SCANDOC was closed later, when its mission was taken care of by the U.S. Government Printing Office.

Nordic 2-week and 3-week courses for documentalists were organized during the years from 1959 to 1964, when no national post-graduate training was available in the region. Computer-based services were in their infancy and were a part of the courses curricula.

The Nordic documentation symposia organized by NORDFORSK every third year were esteemed state-of-the art platforms. In 1967 SDI services were recommended as co-operative projects, because the Nordic study of communication of information within 400 industrial enterprises had found a substantial need for these tape services. From 1970 the documentation symposia were replaced by conferences organized by the national documentation societies in turn. The first one in 1970 held in Norway highlighted SDI and off-line retrospective searches, while the second one held in 1973 in

Finland “went online” discussing both “home-made” systems and services by the European Space Agency, ESA. (3)

Two Nordic seminars on computer-based information were offered in the mid-1960s and a conference in 1968. At this time our experience was limited to index compilations, off-line searches and SDI services.

Nordic conferences were convened for university professors and library directors on teaching information competency in universities in 1967 and 1968. One of their conclusions recommended training courses to be offered by university libraries to students as well as to the teaching staff in the use of computer-based information retrieval.

Within NORDFORSK and its Info Committee where national information centres were represented, the consensus was that acquisition and operation of tape services should not be duplicated in order to achieve the largest possible selection of SDI services for the whole Nordic region. This policy was not accepted by all centres involved - national and institutional as well as personal interests led to some unnecessary duplications.

In 1968 the following five centres offered SDI service:

- DTB (The Technological Library of Denmark)
- FOA (The Research Institute of National Defence, Sweden)
- BMDC-KI (The Biomedical Documentation Centre of the Royal Caroline Medico-Surgical Institute – later Karolinska Institute), Sweden
- SNI (Norwegian Industries Development Association)
- KTHB (The Royal Institute of Technology Library, Sweden)

In Finland, Helsinki University Technology Library, after some economically less successful experiments adopted a parasitical role, or “symbiosis”, acting as an agent for KTHB and DTB, the above listed centres. Later this model was recommended for developing countries by UNESCO (4). In parallel the Central Medical Library of Finland co-operated in the same manner with BMDC-KI in Sweden.

Already at this stage co-operation in database production started a.o. between DTB and SNI as well as between The Central Medical Library and BMDC-KI. In 1969 all Nordic countries joined in the input into INIS, The International Nuclear Information System of the International Atomic Energy Agency.

The report of a commissioned inquiry by Karl Stenstadvold was a long-range plan of action for NORDFORSK and was, in January 1968, submitted to its ninth plenary meeting. Plenum endorsed the plan and increased budget. The following two fields of co-operation were given top priority: environmental protection problems and computer-based information services (5).

After 1968 my engagement in NORDFORSK faded as I resigned and became a Finnish librarian. I only served as a chair of the Info Committee. We established in 1971 a division of labour with the newly created NORDDOK. Co-ordination of participation in the work of OECD’s Scientific and Technical Policy Group stayed with us simply because I served as its vice chairman and later chairman. This group had in the 1960s been instrumental in gaining access to the most important USA databases for European use (6).

The telefax experiment of the national resource libraries in technology of Denmark, Finland, Norway and Sweden was exciting - the only problem was technological: the transmission of one A4 page required four minutes staff attendance.

SCANDOC's Nordic steering group consisting of the heads of the Nordic contact centres, called bridge heads, and the Local Administrative steering group in Washington DC, consisting of the science attachés of the Scandinavian countries and of Emerik Olsoni representing Finland reported to the NORDFORSK Info Committee.

In 1972 a thorough inventory of EDP programs for processing bibliographical data was carried out and published.

In 1973 the evaluation of information retrieval systems and functions was a timely project and in 1974 a study was made to clarify the need for a "SCANDOC" for Japan and another to evaluate the use of ESRO's databank in Darmstadt (6).

SCANNET - the first packet switched international data network for information services - was under planning. This is reported on in another section in this publication by Björn Grönlund, the member of NORDFORSK's secretariat who was responsible for the project.

The key persons in the information programme of NORDFORSK during 1954 to 1974 included in addition to the NORDFORSK Executive Board, Plenum and secretariat the following members of the Info Committee (6):

- Denmark: Vibeke Ammundsen, Arne. J. Möller, Kjeld Klintø
- Finland: Elin Törnudd, Eeva Wartiovaara
- Norway: Anton Disch, Nils L. Gram, Knut Thalberg, Valgerd Aaen
- Sweden: Kajsa Hällström, Björn Tell

Nordek - the Nordic Committee of Senior Civil Servants to institute an inquiry into a Nordic Economic Union

The idea of a common market of the Nordic countries was lively debated in the late 1960s, and in 1968 a committee of ministerial officials from the four countries commissioned an inquiry. This committee, Nordek, dealt early in its work with scientific and technical information. Their preliminary report dated on January 3, 1969 (7) contains the following paragraph.

> Establishment of an organization for documentation and information in the field of science and technology.
>
> The need for an efficient system for acquisition and dissemination of S&T (Scientific and Technical) information is increasing. Nordic co-operation in this field has already been started within NORDFORSK.
>
> The Committee proposes the appointment of a Nordic co-ordinating body to
>
> - follow the operating services
> - promote the use of national services to industry and research in the Nordic countries, and facilitate the use of international documentation and information services by national information services.

A working party chaired by Hans Håkansson of Sweden was formed to draft a detailed proposal. After a couple of meetings, this group submitted a proposal for a Nordic co-ordinating committee for information and documentation - NORDDOK.

The Nordic economic union proposed by Nordek in 1969 did not materialize, but NORDDOK was created as probably the only institutional product of the Nordek negotiations. (8)

In January 1970 a Nordic working party was appointed to draft a proposal to the governments of the Nordic countries for NORDDOK statutes, and the ministries of trade and industry appointed the following members to serve in this working party:

- Denmark: Vibeke Ammundsen and Kjeld Klintø
- Finland: Martti M. Kaila and Elin Törnudd
- Norway: Anton Disch and Harald Tveterås
- Sweden: Hans Håkansson and Nils-Erik Svensson.

The proposal by the working party follows. NORDDOK was to become a vehicle for co-operation between the national councils for S&T information, each represented by two members. The task of NORDDOK was to develop and co-ordinate S&T information services in the Nordic countries with special attention to the co-ordinated use of international information systems and harmonized pricing policy, and to take care of its part of the standardization of primary publications and of co-operation in the input of Nordic material into international information systems. Further the tasks involved promotion of research and development in the field of information and documentation and the training and education of information specialists and users. This plan was endorsed by the Nordic governments in 1970 (9).

NORDDOK -the Nordic Committee for Information and Documentation

NORDDOK held its founding meeting in Oslo in January 1971. It consisted of two members from each country with their personal substitutes, all appointed by the national governments on the motion of its national central body for information and documentation. One of the national members was to represent S&T information.

The first elected chairman of NORDDOK was Harald Tveterås, national librarian of Norway, and vice chairman Anton Disch. The secretariat for the two first years was accordingly housed in the Royal Norwegian Library Service in Oslo (10). Nils Gram was secretary. The delegates of the remaining countries were:

- Denmark: Vibeke Ammundsen and Kjeld Klintø (Chairman 1973-1974)
- Finland: Henrik Schauman to 1974, Eeva-Maija Tammekann from 1974, and Elin Törnudd
- Sweden: Sune Bergström and Hans Håkansson.

NORDDOK became subordinated to the Nordic Cultural Agreement and its annual grant for development projects and administration was paid from the Nordic cultural budget.

The chairmen of the national policy bodies on information and documentation established between 1967 and 1970 were members of NORDDOK, and it was natural, that these organizations became instrumental in the drafting and follow-up of project proposals. These organizations were:

- DANDOK - Danish Committee for Scientific and Technical Information and Documentation
- TINFO - Finnish Council for Scientific Information
- NORINDOK - Norwegian Committee for Information and Documentation
- SINFDOK - Swedish Council for Scientific Information and Documentation.

NORDDOK rules for decision making required consensus - each national delegation having one vote. Especially in the beginning this retarded the development of a balanced programme, as the principal delegates of Norway and Sweden often had different opinions. Dissonances might have stemmed from the fact, that the Swedish delegation consisted of a distinguished scientist, later Nobel prize winner, and a ministerial civil servant, while delegates from the other countries were directors of research libraries and other information centres.

One of the stumbling blocks was the Swedish proposition to create a permanent star-shaped network for Nordic use of the Swedish online library system LIBRIS. Denmark was opposed to the configuration on the grounds that online databases were offered for Nordic use by all Nordic countries.

Among the most successful NORDDOK projects were experimental offers of SDI services and retrospective searches within psychology and education by the respective national resource libraries. This was a pioneering study of computer-based information services in social sciences financed by NORDDOK and later by NORDINFO.

Within science and technology corresponding experiments had been carried out before NORDDOK was established. Another programme within social sciences was the creation by the parliamentary libraries of a Nordic computer-based database and catalogue of current and concluded public inquiries.

First MEDLARS (MEDical Literature Analysis and Retrieval System), later MEDLINE (Medical Literature Analysis and Retrieval System Online), from NLM (National Library of Medicine, USA) searching was offered by the BMDC-KI in Sweden to all medical resource libraries in the Nordic countries free of charge. NORDDOK helped the client libraries to pay their telecommunications bills.

A study was carried out concerning information requirements within occupational health by libraries of the national institutes of occupational health. Within library administration a study was initiated to develop a system for measuring performances in libraries and other information centres.

There were no projects in physical sciences or technology, nor any projects carried out outside libraries. Therefore it has surprised me as one of the “guilty” delegates to learn about the criticism that NORDDOK neglected the problems of research libraries.

In parallel the national libraries and other major research libraries established a non-governmental Nordic committee for co-operation, the NFBS (Nordiska ForskningsBibliotekens Samarbetskommitté). Its programme included the Scandia Plan - a Nordic version of the famous American Farmington Plan, NOSP, a computer-based Nordic union catalogue of periodicals, and a harmonization project concerning library statistics. NFBS was recipient of grants from the Nordic culture budget. They were modest: scarcely more than a tenth of NORDDOK’s budgetary grants. In the beginning of 1974 NFBS proposed association with NORDDOK.

NORDDOK was not opposed to the “marriage” but considered its own resources too small to share with NFBS. Therefore an inquiry was proposed to the Secretariat for Nordic Cultural Co-operation, Nordkult. This resulted in the appointment of NOSIF, the Group for an Inquiry into Nordic Co-operation between Research Libraries (11).

In June 1974 Nordkult decided to appoint a group to examine suitable forms for co-operation between research libraries in Nordic countries and their national central bodies. Financial support for this activity as well as drawing boundary lines between NORDDOK’s programmes and those of research libraries were also to be included in the investigation. Members of this group were:

- Denmark: Martin Korst and Karl V. Thomsen
- Finland: Henrik Schauman and Elin Törnudd
- Iceland: Finnbogi Gudmundsson (Iceland represented for the first time)
- Norway: John Brandrud and Karl Stenstadvold
- Sweden: Paul Almefelt, Chairman and Hans Baude

Sten Berglund from SINFDOK was secretary of the group. The Finnish members were the only ones with a history from NORDDOK and were able to speak about intricacies in the formulation of Nordic information policy. Our chairman, a university administrator from Linköping and of Finnish descent was a layman as was Martin Korst of the Royal Danish Research Secretariat. Karl Stenstadvold was managing director of SINTEF, the contract research centre established to operate in symbiosis with the Norwegian University of Technology and chairman of the Norwegian Committee for I&D. All other members were directors of research libraries. Our secretary Sten Berglund was SINFDOK's lawyer.

This group met five times in 1974-1975 and reached rather soon a consensus on the desirability not to draw boundaries but to integrate the programmes of NORDDOK and those of NFBS. The last sceptic was Karl Stenstadvold, who envisaged a domination by national libraries and university libraries in the formulation of co-operative programmes leading to negligence of information technology including the exploitation of international online developments and resources. The Finnish members of the group worked hard to convince him of the prospect of a balanced programme between the different disciplines and the promotion of the latest within IT.

NOSIF submitted its unanimous proposal to establish NORDINFO and its statutes before midsummer 1975, and NORDINFO became reality in the beginning of the year 1976 (11). Following the rotation praxis adopted by NORDDOK the chairmanship and secretariat was moved from Denmark to Finland. Accordingly the Finnish delegation, Esko Häkli, Marjatta Okko, and Elin Törnudd had the pleasant duty to draft the agenda for the founding meeting of NORDINFO (12).

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2.2 NORDINFO and its policy

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Foundation of NORDINFO

NORDINFO, The Nordic Council for Scientific Information and Research Libraries, was established in 1976 by the Nordic Council of Ministers (NCM) as an intergovernmental organization for co-operation between Denmark, Finland, Iceland, Norway and Sweden. Its purpose was "*to promote co-operation and development within the fields of research libraries and scientific information and documentation to the benefit of research and of other activities founded on the application of science*".

Non-governmental and governmental Nordic committees had actively promoted the development of scientific information and documentation from the mid 1950s as described by Elin Törnudd and of research libraries in the 1940s. NCM proposed an integration of the fields by replacing the Nordic Committee for Information and Documentation NORDDOK and the Committee for Co-operation between the Nordic Research Libraries NFBS with one organization NORDINFO. It was granted money from the Nordic cultural budget (1).

NORDINFO is mentioned as an initiator, co-ordinator and funding agency in nearly all the sections in this book. During a life cycle of 28 years it has fulfilled its purpose as an active development organization by having economically supported and initiated projects that have resulted in improved services. It has brought together professionals from the Nordic countries and enabled them to discuss developments and problems, to learn from each other and to take joint actions on many fronts. Achieved results in terms of Nordic value in online development and adjacent areas are well documented in this book.

NORDINFO´s goals and policy

NORDINFO´s goals and organization were defined in its statutes. It should

- follow the development in the Nordic countries and abroad
- promote and co-ordinate communication of recorded information on a national, Nordic and international basis
- initiate and run investigations and projects on development of methods and systems and on education
- give advice and information to national and Nordic organizations

These original goals stated that the activities should be the development of access to information for the benefit of research and other activities founded on the application of science.

The dramatic changes in the information and knowledge society resulted in a broader formulation in the final strategy of NORDINFO for the early 2000s: Scientific and technical information should be so easily accessible that all Nordic citizens can make use of this information in their work and daily life. It also reflected NORDINFO´s purpose to at each point in time be in the forefront of the development

in its field of responsibility and an ambition to take into consideration Nordic policies recommended in NCM´s policy documents and the EU-policies.

NORDINFO´s policy responsibility was mainly that of a catalyst. It had no formal power over national authorities or institutions. It was a free actor and participant in the information world. It worked through the members of its board, the secretariat and the national library and information science councils in each Nordic country. NORDINFO`s policy making power was that of allocating grants and finance initiatives of its own. Ways to strengthen the policy was by formation of co-operative partnerships with Nordic and international information centres, research libraries and other participants in the library and information sector as well as with other types of institutions with related activities. A late example was a Nordic Forum on information policy with representatives from the university administrations and ministries arranged by NORDINFO in 2001.

NORDINFO's funding principles

NORDINFO presented a strategy and a work plan to NCM and received an overall budget for its operations. The funds were allocated annually.

There were changes in the principles of funding projects and other activities during the years. In the beginning NORDINFO resembled a research council. The substantial part of the funds was announced as calls for proposals within defined programme categories. The other part was reserved for two supra-national projects that NORDINFO had inherited from its predecessors. These were SCANNET, the Nordic information service network, and NOSP, the Nordic union catalogue of periodicals.

A special effort was made to support development where co-operation would give better results than what could be achieved by one country alone and where this co-operation was estimated to be of greatest benefit.

The projects and activities getting support did not necessarily have to involve all the five Nordic countries, as in the very early days, but the results or the findings of a project should be of value or useful to all of them.

NORDINFO gradually changed its funding principles and became a more active development organization. The co-financing of long-term supra-national projects remained while a larger amount of the funds were reserved for projects initiated by NORDINFO itself within named priority areas stated in the actual work plan. The results of these projects were used by NORDINFO for co-ordination and policy decisions. The co-operation had still to be partially financed and executed by the participating institutions.

When NORDINFO in its final years again funded projects on the basis of call for proposals, the participating institutions had to put up at least half of the costs. The seed money provided by NORDINFO has, according to numerous evaluations, been of importance to the development in the field. The initial support has many times been sufficient to attract more financial support from other Nordic institutions. One example was the co-financing of the intelligent tool for information retrieval IANI with the Nordic Senior Executives´ Committee for Industrial Policy.

Management of NORDINFO

When NORDINFO started its work in 1977 its decision-making board was the plenary assembly of 14 members, three members each from Denmark, Finland, Norway and Sweden. Iceland had two. They represented the interests of the research libraries, the information and documentation centres and the users. The two sectors were seen as a whole and the user aspect was emphasized. The members, and a substitute for each delegate, were appointed by the Nordic Council of Ministers on the recommendation of the Ministries of Education and the national councils for research libraries and scientific information and documentation. The contact between NORDINFO and these national policy councils was vital. The chair of the board circulated between the countries.

The assembly decided upon the main policy and principles of work, adopted the work plan and based on it received a budget for NORDINFO´s operations. An executive committee made up of five members from the board, met four times a year to make major decisions for the institution. According to the rotation praxis Finland was in turn to serve in the chair 1977-1979 and the secretariat was permanently established in Finland (2).

The members of NORDINFO´s first board launching the new organization 1977-1979 were:

D: Vibeke Ammundsen, Palle Birkelund and Kjeld Klintø
F: Esko Häkli (chairman), Marjatta Okko and Elin Törnudd (vice-chairman)
I: Finnbogi Gudmundsson and Jon Erlendsson
N: Anton Disch, Gerhard Munthe and Lars Strand
S: Sixten Abrahamsson, Gert Hornwall and Hans Håkansson

In the beginning of the 1990s the administration was facilitated by reducing the membership of the board to nine and abandon the executive committee. At the end of the 1990s the board was down to one person per country and an observer from Greenland and the Faroe Islands respectively.

The secretariat with 3-4 full-time officials was administering NORDINFO. It was permanently stationed in Finland, for nearly two decades at HUT Library. I succeeded Mariam Ginman as secretary general and had the great opportunity to work at NORDINFO from 1980 up to and including 1987. Maria Schröder was my professional colleague for most of this time.

NORDINFO´s main focus was during these years on online development. The task of the secretariat was to establish a comprehensive network of specialists and seek advice from them in analysing the project applications before presenting them to the board for decisions. We were available for support and advice to the project managers during the lifetime of the projects, also in publishing the results.

Another rewarding duty was to make NORDINFO and its projects visible at Nordic and international meetings and conferences either by arranging them or by presenting papers. It gave the secretariat ample possibilities to follow and influence the online development and interact with the developers and other actors.

When the SCANNET co-ordinator Elisabet Mickos, with her service oriented work profile moved to the same premises in 1985 it improved networking (3, 4).

The vacancies at NORDINFO´s secretariat were over the years held by professionals from Finland, Sweden and Iceland.

Figure 2.1 Secretariat of NORDINFO summer 1987. From left to right: Maria Schröder, Mona Weckström, Linnea Holm, Teodora Oker-Blom and Elisabet Mickos. Source: NORDINFO-Nytt (1), 1987.

NORDINFO's work plans, priority areas and online related activities

NORDINFO has for 28 years annually supported about 25-50 activities and projects in accordance with its work plans. They have marked the development in the field and many times been in the forefront thanks to innovative project applications alongside NORDINFO´s initiatives. NORDINFO´s role as an important promoter of common Nordic online activities can be exemplified by the support to e.g. directories, guides, manuals, database production, development of generally applicable methods and standards, pilot projects and testing, surveys, organizational solutions, conferences, meetings, mobility scholarships and educational events. Many of these are described in this book.

NORDINFO allocated funds to some long- term projects that have improved the Nordic infrastructure and that could not have been financed by one country alone. SCANNET, IANI and SR-Net are some examples.

In NORDINFO´s 25th anniversary publication work plans and priorities from different periods are highlighted and commented on (5).

1977-1984

The programme areas in the work plans from 1977 to the mid 1980s were:

- *policy development and co-ordination,*
- *library resources and document delivery*
- *databases and networks,*
- *education and training of users and information personnel*

Databases and networks received over 50% of the project budget available. SCANNET got regular support from NORDINFO. First as a physical communications network dedicated to computerized information retrieval services until the PPT´s of the Nordic countries took the responsibility for the telecommunications. It continued to be financed as a co-operative venture to provide services to users of databases, database hosts and database producers.

The Nordic database production was influenced by SCANNET and highly prioritized by NORDINFO. It initiated and supported their production and funded numerous projects related to the development of information retrieval systems, their harmonization and use.

The SCANNET co-ordinator, financed by NORDINFO, worked with user assistance and marketing in conjunction with online user groups and centres.

Online related projects were supported in the three other programme areas as well. Examples are the directory of online databases, the textbook on searching in databases and other manuals for information specialists, Nordic meetings for the national online groups and for information specialists teaching information literacy, various training courses and seminars etc. The traditional Nord IoD conferences regularly got financial support from NORDINFO. Presentations at the IOLIM and other database conferences got support as well.

1985-1989

In the new work plan from 1985 to the end of the 1980s NORDINFO strived to strengthen its database policy and co-ordinating power by initiating studies on possibilities to create databases and other information services in the social sciences and the humanities expressively modeled for Nordic needs. It launched and co-financed the intelligent interface project IANI with the aim to develop easy and uniform access to the small and specialized and underused databases in the Nordic countries. A goal was also to serve users in business and industry. A third of the budget was allocated to these initiatives by NORDINFO

Another third of the funds were continuously reserved for SCANNET and NOSP and the rest were free for call for proposals.

1990-1998

In an article about NORDINFO´s project register NordProj, Elisabet Mickos describes how in the beginning of the 1990s the implementation of new technology is reflected in projects covering networking, and gradually digitisation, electronic publishing, metadata, and World Wide Web (6).

The breakthrough of the World Wide Web and the explosive growth of Internet changed the online information market effectively. NORDINFOs new strategy to stimulate libraries and information centres to make use of the most recent technological development was to fund three centres of excellence for three years.

The task of these competence centres, which already had the required expertise, was to develop and test new technical achievements in networked information services (Nordic Net Centre), electronic publishing (NordEP) and digital handling of national library collections (NDLC). They were obliged to distribute information about their results and inspire or help other institutions in the Nordic countries to apply them. This was accomplished through consultancy, courses, seminars and other types of promotion.

An example of a successful project at a time when the databases migrated to the Web world was the Nordic Web Index. It was created by the Nordic Net Centre with the aim to provide tools and methodologies for e.g. distributed information retrieval and a WWW search service to the general public.

1998-2005

The work plans for 1998-2005 comprised the categories:

- *Policy issues and co-ordination*
- *Research and development*
- *Competency development*
- *Publication and information activities*

These categories are in line with NORDINFOs first work plan and so general that they admit other co-operative partners than information providers and users and can take into account the rapid changes in the information or knowledge society.

To be able to consider Nordic policies and national information and IT- policies NORDINFO for instance financed an investigation and comparison of information policy documents in each country.

Policy issues were important because NORDINFO focused on projects to strengthen different aspects of the Nordic electronic or virtual research library in the second category and the national electronic libraries had been created as part of the infrastructure of their mother organizations. A good example of one cornerstone of the Nordic virtual library was TIDEN, the Nordic Digital Newspaper Library with historical newspapers digitized from microfilm and searchable on Internet via the Web. This large long-term project was partially financed by NORDINFO with the aim to in the future create a powerful full-text search tool. A spin-off product was the digitizing of Icelandic, Greenland and Faeroe historical newspapers called VESTNORD.

The Scandinavian Virtual Union Catalogue SVUC and the Nordic Metadata project were other NORDINFO supported research and development projects.

Competency development had through the years been of major interest to the active information specialists and librarians in the Nordic countries. NORDINFO supported about 20 seminars, courses, conferences and summer schools each year during this period as well as mobility and research grants to individuals also in the Baltic countries. Information literacy, the new name for user education, became a special focus area and got NORDINFO's support within the NORDINFOLit umbrella.

NORDINFO published information about its projects as well as of topics of interest to the field in the journal NORDINFO-Nytt (1978-2003), the NORDINFO publication series 1-48, the NORDINFO report series 1995-2003 and NORDINFO express 2000-2003.

NORDINFO is closed down

The thorough evaluation of NORDINFO in 1998 stated that it had made a substantial contribution toward upgrading and maintaining the professional standards of Nordic information specialists and research librarians and the information centres and libraries.

In a later evaluation by the NCM of its many institutions and programmes it was decided that the economic support to institutions like NORDINFO should be discontinued and regained in Nordic research co-operation. This reorganization resulted in closing down NORDINFO in 2004. This left a vacuum in terms of a formal body and funding for collaboration between Nordic research libraries and the information and knowledge dissemination industry. A funding programme called Nordbib, limited to only a couple of years, was launched 2006 under the NordForsk umbrella. The redefined NordForsk is from 2005 a Nordic research board with responsibility for research and researcher training in the Nordic region. Nordbib's focus area was electronic publishing, especially Open Access and it carried out an investigation and some conferences on Open Access of publications and data.

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2.3 NORDINFO in Europe and the world

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Background

NORDINFO and its predecessor, NORDDOK, were both created as results of international inspiration. With the introduction of computers in the library and the information world in the late 1960s and even more with the appearance of online technology in the early 1970s it became clear not only that

libraries would not remain tools for leisure entertainment and the ivory tower scientists, but it was also anticipated that scientific information would be a factor for industrial growth. Based on recommendations e.g. from OECD many countries established advisory committees for scientific and technical documentation; this happened also in the individual Nordic countries as well as at the Nordic level with the creation of NORDDOK in 1970.

The early focus on scientific and technical documentation was natural in a period where there still was a general belief in the so-called "linear model" for transfer of scientific results from the laboratory to application in industry and thus ultimately generating technical development, industrial growth and employment. But the introduction of computer-based documentation was also a response to a need for more efficient methods for handling the information explosion in the post-Sputnik period that started in the STM-disciplines (Science, Technology, Medicine).

NORDDOK was, however, in the first half of the 1970s not the only Nordic committee working for this objective of facilitating access to scientific and technical information. Also the Scientific information committee, called the Info Committee, under NORDFORSK had an intensive focus on computerized information and its value for the potential users; a direct link to NORDINFO is the SCANNET initiative which started as a technical development project under NORDFORSK and later continued as a more content and user oriented project under NORDINFO. Among the indirect links from NORDFORSK to NORDINFO were the members of the database evaluation group (1970-1972) which included several of the authors in this book (Hjerppe, Retlev, Laitinen, Berg Hansen) (1).

There was solid library representation in both NORDDOK and NORDFORSK's information committee, but first with NORDINFO, the scientific libraries became a specific target as explicitly stated in the NORDINFO objectives: the broad coverage of I&D interests in the first version of NORDINFO, where representation of libraries and users were ensured, should in principle have resulted in a fruitful dialogue between all the parties involved in the transfer of knowledge from research community to user community.

In the 1990s the broad representation of interests was, unfortunately, gradually reduced as the original three members per country was reduced to two and in 1999 to only one (but now supplemented with observers from Greenland and the Faroe Islands). The last reduction practically almost eliminated the user element of NORDINFO, and one can only guess if the narrowed participation has had any influence on the low visibility in the Nordic research communities as well.

The special issue of NORDINFO-Nytt 10(1987)1 celebrating the 10 years' anniversary presents a clear and unanimous picture of a successful organization fulfilling its goals and delivering a lot of value for a fairly limited amount of money. During the subsequent 15 years NORDINFO has been subject to several evaluations as part of the routine procedures of the Nordic Council of Ministers who has been under constant pressure to reduce the number of institutions partly due to budget constraints, partly due to changing political views regarding the importance of the Nordic co-operation during the period where Sweden and Finland have become members of the EU and Iceland and Norway have got status as associated countries participating fully e.g.in framework programmes for research and technical development.

All these evaluations have confirmed the satisfaction with NORDINFO, only pinpointing that the visibility of all the good work is too low in the Nordic research communities and – also to a large extent - in the Nordic LDI (Library, Documentation and Information) institutions not directly related to people or institutions involved in NORDINFO-activities.

Fulfilling the international goals

The international objectives of NORDINFO have from the outset been to

- *keep abreast of developments in the field of research libraries and scientific information in the Nordic countries as well as internationally and give advice and information to international and Nordic bodies*
- *promote and co-ordinate transfer of information within and among the Nordic countries and on a wider international basis*

The activities of NORDINFO as well as its image in the international LDI community provide ample documentation for the fulfilment of these goals. NORDINFO has been present at a vast majority of the central international LDI events in the past 25 years as participant, speaker, sponsor or exhibitor depending on the focus of the event and for many years NORDINFO has had the character of a LDI focal point for the Nordic countries in relation to e.g. the EU, IFLA and international LDI-organizations.

With a budget of approximately USD 0.5 million/year NORDINFO actually succeeded in being a respected partner in the international LDI-environment and has often been seen not only keeping abreast of the international state-of-the-art but as an actual sponsor of cutting edge activities.

Persons, projects and publications

In general the success of an organization has some kind of relation to the size of its budget. In the case of NORDINFO we rather see a good example of “small is beautiful”! The budget was and is small and the number of people working in the secretariat about five. This said it must, however, be borne in mind that the budgets in the surrounding library world in the early days of NORDINFO and those of NORDDOK were generally not impressive either. There was money available for innovative developments in the technical libraries, but this did not necessarily apply to other library sectors in most of the Nordic countries, and the central planning or co-ordinating committees generally did not have much money before the last part of the 1980s and the 1990s. Therefore, even small grants from NORDINFO could make a measurable contribution to the LDI-development at national level by bringing the joint Nordic expertise and knowledge together if used strategically and intelligently and also, in many cases, ensure Nordic participation in new international initiatives (databases, networks etc.).

Looking at NORDINFO’s achievements over the 25 years it is obvious that the money has been used strategically and intelligently, the main reason being that NORDINFO has benefited from a highly qualified staff with talent for diplomacy and sense of maneuvering in the relevant arenas and that there always among the members of NORDINFO have been persons with flair for initiating and selecting projects and activities at the frontier of LDI-development. For the recruitment of staff and the interaction between the secretariat and the general LDI-environment it should not be forgotten that the location in Finland – most of the time at the HUT Library – has been an invaluable asset for the performance of NORDINFO. A homage to one of the central persons in the Nordic and international library world during almost half a century may here appropriately be paid to Elin Törnudd, who has been a key NORDINFO figure as member, as host of the secretariat and thanks to her extraordinary talent for attracting the right people as secretaries, project officers etc. The post-NORDINFO-careers of former NORDINFO employees and members speak for themselves! Although the various NORDINFO evaluations have shown that the impact of NORDINFO definitely has been greater in Finland than in the other Nordic countries the permanent location in this Finnish environment has on the whole been a clear advantage for the performance of the organization.

Even the most perfect secretariat could, however, not alone have achieved the respected international position of NORDINFO without a platform of highly relevant projects. And the Nordic LDI-environments have so far always been able to provide ideas for activities which for a period could act as Nordic flagships – some of the key activities like SCANNET and IANI (Intelligent Access to Nordic Information Systems) may actually have been too much cutting edge for their time – and provided material for NORDINFO presentations in international audiences. The major individual projects are presented elsewhere in this book, but just a brief look through the list of annual NORDINFO papers earlier presented in NORDINFO-Nytt gives an idea of the visibility value of projects like SCANNET, NOSP, IANI and, more recently, the NORDINFO competence centres (NNC, NordEP and NDLC) and the Nordic Web Index.

With the changing budget situation up through the 1990s where the information society and the appearance of the Internet has attracted new money to LDI-development, most of the Nordic countries have been able to initiate and fund activities which earlier required seed money from NORDINFO in order to get off the ground, and in the international context it is not always clear if experts are seen wearing a Nordic or a national/institutional hat by the international community. However, many of the Nordic experts of today started their international life on behalf of NORDINFO and its predecessors and many of the future experts from the Nordic countries will probably be found among the receivers of the NORDINFO mobility scholarships: this is a way of getting experience outside the national environment which is a lot easier and more flexible than going through the more bureaucratic and complicated way through e.g. the EU system.

Also the summer schools supported by NORDINFO will help to ensure the future international position by bringing young LDI-people together and introduce them to become leading actors on the international library scene. The close contact over the years between NORDINFO and the Nordic schools and university faculties of library and information science has played an important role in this connection.

NORDINFO has from the start taken an active interest in promoting and supporting development and application of international standards. It has supported arrangements and participation in meetings dealing with UDC, MARC, ISO and OSI standards and recently in Z39.50, SGML metadata and the Dublin Core. These activities are clearly reflected in the NORDINFO publications which include several publications which at their time of publication could act as manuals or cookbooks in the area concerned. Examples are given with a number of the early NORDINFO publications mentioned here: Universal Access to Publications (UAP) in the Nordic countries, 1982 (2), Search aid software packages and services, 1987 (3), A retrieval language for Nordic databases: language requirements for the IANI facility, 1988 (4), NORDIC SR-NET: communication between different systems, 1995 (5).

In addition NORDINFO- Nytt has published a number of special issues of similar characteristic such as: A Study on Copyright and Legal Deposits, 2000 (6), Dublin Core, 1997 (7), Cookbook for Creating Web Publications, 1996 (8), Applying SGML to the Publishing Process, 1995 (9), Binding Materials and Binding Practises , ISO TC 46 SC 10 WG 4, 1991 (10).

NORDINFO co-operation with international organizations

The status of NORDINFO as a Nordic competence centre has lead to direct co-ordination with international organizations like the European Commission and UNESCO. For the European Commission NORDINFO has delivered the Nordic contribution to the Survey of information technologies in libraries with a report on the state of the art in the Nordic countries (11). For UNESCO

the Nordic competence centres produced a proposal for a set of guidelines on Internet applications in libraries (12).

In connection with EU's 4th and 5th framework programmes NORDINFO has supported seminars on accompanying measures like EXPLOIT and CULTIVATE, the first aiming at attracting users interested in implementing results produced by projects supported by the EU libraries programmes, and the latter a new initiative to stimulate co-operation between the major cultural heritage sectors (libraries, museums and archives). Particularly CULTIVATE might have a catalytic effect on the co-operation between the different sectors at Nordic as well as at national level.

At the bilateral level the main partner for co-operation was for many years the UK. Close contacts between the NORDINFO secretariat and central people at the British Library Research and Development Department and the British Library Association resulted during 1986 to 1997 in annual Anglo-Nordic seminars on actual topics like OPACs (Online Public Access Catalogues), Humanities Information, Quality Issues, Legal Deposit, Leadership Management and Training. These arrangements were considered very successful, but have been discontinued for a period by the UK for financial reasons.

A joint conference with the Deutsches Bibliotheksinstitut was also held in 1996 in Berlin on Document Delivery and Interlibrary Lending, but since then the primary "bilateral co-operation" has mainly been directed towards the Baltic Area. The Baltic co-operation has a high priority for funding from the Nordic Council of Ministers, and NORDINFO has received additional funding for this purpose. NORDINFO sought to include the Baltic countries in as many Nordic activities as possible. With the NORDINFO secretariat located in Helsinki NORDINFO has been in a good position to stimulate the co-operation at Nordic, national and European level.

In recent years the orientation of NORDINFO has followed the global trend and taken a stronger interest in the work of e.g. IFLA and the National Literacy Forum (USA) e.g. in the area of the digital divide as illustrated by the presence of the presidents/chairs of the two organizations as speakers at NORDINFO 25th Anniversary Conference.

The future – international SWOT

Based on NORDINFO´s experience in a very broad range of cutting edge activities in its first 25 years, NORDINFO is in a good position to be a central actor in the wider internationalization process in the new Millenium. The following international SWOT –Strenghts, Weaknesses, Opportunities and Threaths analysis, illustrates NORDINFO's strengths and weaknesses in the coming years:

Strengths and opportunities

- NORDINFO combines experience and expertise from the individual Nordic countries, which all are considered high quality actors in international LDI and IT
- It has a highly qualified and dedicated secretariat
- The NORDINFO competence centres are internationally visible and respected
- NORDINFO is in a good position to be a strong partner in the EU enlargement process and has already initiated a strong co-operation with the candidate countries in the Baltic region
- NORDINFO is in a good position for initiating and co-ordinating co-operation with the countries in the third world
- As a result of the co-operation with the Nordic schools/university faculties of library and information science, NORDINFO has an important role as sponsor of international expertise in the further education of Nordic LDI-staff.

- With its background in the scientific, cultural and IT-communities NORDINFO has potential to be a central partner in the further development of the global digital research and information community, e.g. in connection with the European attempts to open research and development to Asia, Latin America and the Mediterranean countries
- Also the co-operation in the Arctic area could be a potential area of increased NORDINFO activity in parallel to the focus on this area by the Nordic Council of Ministers
- NORDINFO has a potential role in Nordic scientific and cultural marketing in general

Weaknesses and threats

- A major weakness of NORDINFO and other LDI-organizations is the low status in their user communities. The LDI-organizations have in general been regarded as low status organizations in the academic world as well as at institutional level and in the research community. Furthermore, the rapid penetration of Internet to end users after the appearance of the Web has often created the impression that libraries and systems for formalized storage and retrieval of scientific information will become obsolete when everything can be accessed over the Internet.
- Inadequacy of the marketing of NORDINFO in the national LDI-environments by the national NORDINFO representatives.
- A direct threat is the political issue concerning the need for Nordic co-operation in an EU context as well as in a global world. Neither all Nordic politicians nor Nordic scientists are convinced about the relevance of a particular Nordic science area. The last years' discussions in the Nordic Council of Ministers of the future budget and the suggestions of either outsourcing or transfer of Nordic institutions to the national host institutions have created fear that the Nordic element might gradually disappear and that the concept of Nordic value is getting very vague.

The personal conclusion

As contributor writing about NORDINFO in this book on online development, it is of course, a particular pleasure when the organization concerned fully deserves all the praise. In the case of NORDINFO I have had very different relations to the organization in its first 10 years and the following 15. Until the 10 years anniversary in1987 I had "inside contacts" as a member of NORDINFO and member of several of NORDINFO working parties. Later I got contacts to NORDINFO in connection with the development of the IANI interface and as evaluator of some of NORDINFO`s activities; lately I have also seen NORDINFO through the political eyes of the Nordic Council of Ministers and the Nordic Council for Research Policy.

Regardless of the "hat" or "eyes" used, NORDINFO has in my opinion been a clear success which should be allowed a future in the Nordic co-operation. I hope that the intentions of converting the smaller Nordic institutions to "projects" to be outsourced to individual institutions in the Nordic countries as suggested by the secretary general of the Nordic Council of Ministers in Budget analysis 2001 will be forgotten, in general and certainly in the case of NORDINFO.

With its present key focus on development of the digital library NORDINFO is in an excellent position to follow and initiate new generations of library and information systems, methods and policies and to be a central actor in the further education of LDI-professionals and users. There does not seem any reason to doubt that NORDINFO also in the future has got the potential to serve as the central Nordic competence centre for digital libraries and scientific information in the Nordic setting as well as in the global science and information society.

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3 THE INFRASTRUCTURE

Introduction

Aud Lamvik

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I have been in "the online business" since its beginning in Norway, around 1973. I then started with the first online database, MEDLINE, at the Norwegian Institute of Technology Library (NTHB) (*Ed:s note: NTH became a part of NTNU in 1996*), a service for users at our university and industries in the whole country. Soon we used a lot of databases at several database hosts. Before the online time we took part in EDP-services SDI and batch searching at KTHB and BMDC in Sweden. During the years, more than three decades now, I participated in several national and Nordic projects in the field of online access to information, as well as EU-projects promoting the use of information.

It became very important to develop a good infrastructure in the online field, especially concerning the networks to connect to databases. In the beginning ordinary telephone lines had to be used to connect to database hosts, long distance calls with lots of frustrations! This chapter contains sections about the Nordic network SCANNET from its beginning, about the European network Euronet which was very important for us, as well as ESAnet, Tymnet and Telenet which we all used. There is also a section about networking in general.

3.1 SCANNET

Björn Grönlund

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Thirty years ago one could hardly imagine the situation of today when people use personal computers, email and the Internet as a matter of fact item. Neither PC's nor computer networks existed then. However, the need for information was there.

The experts of NORDFORSK´s committee for Scientific Information and Documentation, called the Info Committee, had noticed that the amount of information had increased rapidly. They had seen libraries use computers to handle the information. They had studied organizations in the USA that had started to use databases to collect information. To connect to the databases, networks were created. The best known of these was the ARPA network. The American networks also allowed you to communicate in a way that today is called email.

The Nordic countries, of course, needed to take corresponding actions. In Sweden fumbling efforts were made. Some databases were imported from the USA. Soon a few databases were built in the Nordic countries.

Research was also done to develop an information retrieval system for free text searching in big databases.

But more needed to be done. Nordic resources were small and they needed to be pooled together to achieve progress and success.

The Great Idea

A brain storming session in one of NORDFORSK's Info Committee meetings gave some interesting results:

- the databases being established in the Nordic countries need more potential users
- the access to the data bases also need to become more user friendly, e.g. need a common access procedure
- for this a computer network is needed
- we cannot wait for the Nordic PTTs to offer a data communications network for this purpose

The obvious conclusion from the meeting was: "Let's build a simple Scandinavian computer network for information retrieval purposes! Let´s make it the centre for Nordic Data Base Co-operation."

A group of people were appointed to investigate the possible realism in such a project. NORDFORSK's owner organizations were exposed to lobbying. To our surprise and delight we could soon take a project suggestion into consideration. We planned to build a network with one node in each one of the Nordic countries. We needed five so-called minicomputers with communications software to achieve that. Leased telephone lines should connect these nodes.

Such a thrilling, almost revolutionary project needed a good name. The name we invented was very clever indeed:

S C A N N E T

Scan for Scandinavia. Scan also for scanning information!

Theory meets practice

But could we afford such a project? Could we raise the money?

The obvious and only solution was to go to manufacturers of computers and offer them an "ever lasting good reputation and honour" if they made us a good offer! Only the Norwegian IT company Norsk Data Elektronikk A/S was seriously interested. They accepted SEK 1 million as payment. For the money we got five NORD 12 computers with all necessary support equipment. The software which was included was recently delivered to the Norwegian Railways. The network software was based on the packet switching standards to come, X.25 and X.75. Norsk Data became a sponsor of the SCANNET project!

The project of course was given a strong steering committee.

The PTTs showed very little interest in offering leased lines for the connections. They advised us to wait for them to establish a network. After some negotiations they accepted a temporary solution.

SCANNET got permission to lease lines for its purpose. We had to promise to switch over to the PTT network immediately when it existed. A set back was the fact that a leased line to Iceland was too expensive for the project. That is why the five nodes were placed in Oslo, Gothenburg, Copenhagen, Stockholm and Helsinki.

The computers were ordered and delivered, the lines between them were set up. The network was tested and taken into use in 1976. It worked from the very start with five databases connected!

Hello from SCANNET

The SCANNET project was eager to get the network as useful as possible. We connected existing databases in the four countries and we supported new database initiatives. For the administration of the project a mail function within the network was used!

The number of databases rose slowly and steadily. So did the number of users. Information about the progress of the project was spread through a newsletter called “SCANNET Today”. The information was, of course, also spread over the network itself.

The SCANNET steering committee tried to get acceptance from the PTTs to connect to other networks like the ESAnet and Euronet, the French Cyclades/Cigale and the American Tymnet. Without any success. We came really close, however! In Copenhagen the node of the Euronet and the SCANNET stayed in adjoining rooms! What was needed, was two meters of cable!

In 1980 the number of databases was close to 40 (depending on how you define an information database). The new Nordic organization NORDINFO, was there to accept the responsibility for the development of databases and the user service connected with this matter.

Now the time had come to switch over to the network offered by the PTTs. The much longed-for Nordic Public Data Network (NPDN) did still not exist. The PTTs offered a network consisting of one node in Stockholm and one in Oslo. In Helsinki and Copenhagen there were multiplexors. We found it practical to preserve the NORD computers as front-end processors. Thus the log on procedure could remain the same as before: “hello from SCANNET”.

Figure 3.1 A brochure marketing SCANNET.

Exit NORDFORSK

NORDFORSK’s mission was to initiate projects but not to accept long term responsibilities. That is why NORDFORSK transformed SCANNET to a foundation in 1980. NORDINFO appointed the steering committee for the foundation.

With the communications in the hands of the PTTs and the database development, co-ordination and financing in the hands of NORDINFO, NORDFORSK could abandon SCANNET in 1983.

In NORDFORSK we were convinced that we had contributed with a unique pioneering effort in raising Nordic know-how. The evolution in the Information and Documentation field had taken a great step forward.

In 1983 the PTT took the NPDN into use, and the NORD computers were not needed anymore.

In 1985 the number of connected databases had risen to around 200!

NORDUnet

At the time when NORDFORSK abandoned SCANNET we had already initiated another project in a related field. In the different Nordic countries universities had established communications networks. In Sweden there was the SUNET (Swedish University Network), in Finland the FUNET, in Norway the NORNET and in Denmark there was the Centernet.

There was never a more natural field for Nordic co-operation than computer networking! The synergy effects were automatically there!

To begin with, from 1980, NORDFORSK arranged annual conferences concerning the theory of computer networking in a research and development environment.

As a result of these conferences a project, or rather a programme, arose in 1984. It was called the NORDUnet, short for Nordic University Data Network.

The aims were:

- to raise the level of computer communications in Nordic research and development to an international one
- to add an effective, rational and economic alternative to travelling in Nordic co-operation

The tools to reach these goals were

- to establish a well working Nordic computer network based on the national networks
- to enable connection to international networks by using accepted communications standards
- to build a common infrastructure and competence
- to stimulate and catalyse Nordic R&D projects that may lead to new network services and competencies

At that time NORDFORSK's achievements were little by little taken over by the Nordic Council of Ministers. In 1985 this body took over the responsibility and the financing of the NORDUnet programme.

Let us mention proof of the foresight of NORDFORSK and of the specialists involved in NORDUnet:

- We immediately started to study the TCP/IP protocol. The Internet of today is based on this protocol!
- Like the SCANNET this programme was converted to a foundation
- It got a long life. It's still alive!
- A new contract is written in 2002 between NORDUnet and Telia International Carrier. The bandwidth today is a fantastic 2,5 Gbit/s
- The 20th NORDUnet Networking Conference is held in Copenhagen this year!
- Around 110 institutions are connected to NORDUnet

NORDUnet is today run as a company, the NORDUnet A/S.

Facts:

NORDFORSK - the Scandinavian Council for Applied Research - was a joint Nordic body for the promotion and co-ordination of inter-Nordic R&D activities in six major fields of technology.

The five technical research councils and the four academies of science and technology in the Nordic countries set up NORDFORSK in 1947. These councils and academies financed most of the projects initiated by NORDFORSK. The guiding principle was joint venture.

The idea of joint venture is that technical progress poses identical problems in two or more countries. Co-ordination of R&D will therefore yield higher efficiency and rational utilization of available resources.

The fields covered by NORDFORSK were

- Technical information and documentation
- Materials technology
- Environmental technology
- Social technology
- Computer, control and component technology
- Inter-disciplinary research and co-ordination

NORDFORSK's responsibilities were taken over by the Nordic Council of Ministers in 1986.

3.2 Euronet-DIANE – why and how the European Commission was involved

Lennart Scharff

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Introduction

The section will outline the political background for why the Commission of the European Communities was involved in the development of the information services market in the 1980s, and will give an overview of what was undertaken concerning:

- network development
- development of databases
- education and awareness actions

and will end up giving the author's personal conclusions concerning whether Commission activities were worthwhile.

Political reasons for the European Commission involvement

As part of the initiatives in order to strengthen the economy of the European Communities, naturally the idea to strengthen – or perhaps in reality to develop - an European Information Industry was relevant. Having, in the beginning of the 1970s, seen how the market developed in the United States, and perhaps more impressive, knowing the outlines of the coming Anderla report 1973 (1), in which Georges Anderla, at that time a Professor in Economics at the Sorbonne University, predicted the growth of information/knowledge and pointed out the necessity to develop tools and infrastructure in order to handle and "digest" the information, a programme took shape inside the Commission.

Naturally enough, the broad lines of this programme was drawn up by Anderla, who was subsequently appointed as director of Directorate-General XIII (B) in Luxembourg.

Looking at the "state of the art" of the information sector/market in Europe, it was evident that:

- Europe had a very strong and valuable cultural heritage and clearly possessed a great quantity of valuable Scientific and Technical Information. There were various important information sources that could be beneficial in the development of the competitiveness of European industry;
- Only a few of these information sources were available in electronic form as abstract services – and when they were available, they were mostly via USA services;
- Some countries had developed a national information policy - some had not – and there seemed to be no coherence between them and no clear position on what should be done nationally and what should be done in common at a European level;
- Pan-European availability of access to information sources did not exist – although in many countries there was access to USA services (via Tymnet, Telenet etc.);
- Europe was faced with having – additionally - to fight a language barrier, since we do not have a common language;
- There was no coherence in the European Library sector.

Based on these facts, a programme was shaped, with a First Action Plan, which was later followed by two more Action Plans - to be continued in subsequent programmes (IMPACT 1 & 2). The First Action Plan – and in fact all following plans and programmes - were based on four pillars:

- Development of the infrastructure;
- Development of the market through awareness actions;
- Bridging the language barriers;
- Catering for the access to original information, i.e., library actions.

Whereas the language and the library actions to a certain extent can be seen as complementary initiatives, the development of infrastructures and the awareness actions must be considered as paramount to the development of a European Information Market and in this book deserves to be treated in more detail, basically because some of the initiatives taken are of importance to the developments in Scandinavia.

Development of the infrastructure

The network – Euronet

The key action in the First Action Plan (1975-1979) was the development of the first data-network with – what was then termed - pan-European coverage – although it only covered the Member States. The packet switched network Euronet was inaugurated in February 1980. In 1975, the Commission signed a contract with a consortium of PTTs – headed by the French PTT – and actually paid about two-thirds of the development costs (some EUR 7 million) for this first packet switched network in Europe. In addition the European Communities contributed to the operational costs of the network during the first three years. With the network in place, with access possibilities in all Member States at that time (Belgium, Denmark, France, Germany, Ireland, Italy, Luxembourg, the Netherlands and the UK), the technical infrastructure was in place, and usage appeared and gradually increased.

By 1981 some 24 hosts were available via Euronet, with a total of some 200 databases.

The only Scandinavian presence as host was I/S Datacentralen af 1959, Denmark, quite natural, since Datacentralen had been involved in the development of some of the Commission's own databases, and for years had provided "batch-access" to some international databases. In 1981, the network was used by some 1,400 users, having some 25,000 accesses per month. Impressive figures for those days, but obviously far below the available capacity and the predictions in the Anderla report.

An interesting point to note is that although a European network was implemented, it did not solve the real technical access problems. In all Member States there was one – and only one - access point, a node or a multiplexer, and to get access, a telephone connection up to the access point was needed. Bearing in mind the state of the art of telephone networks in the early 1980s, one was frequently faced with access problems, simply due to problems with line capacity up to the Euronet access point. So even if the network itself was performing very well as such, it was still difficult to get access. One interesting facet of Euronet is thus that it also stimulated development of, and improvements in, national telephone services in some countries.

Another important issue is that with Euronet – for the first time in Europe and for European Telecom administrations - we saw communication tariffs emerge, which were completely independent of geographical distance: same price for all calls completely independent of from where to where.

This was not an easy thing to get right, but it was - naturally - a very important principle for the Commission. The direct result of this was immediately recognised by users, since they could see a dramatic reduction in telecommunications charges compared to using US-based services, which of course was one of the major achievements of Euronet. No wonder that the Commission insisted on this!

A consequence of this was, however, that although packet switching is designed for dynamic routing, where the network as such always would find the "best available stream-pattern", this was impossible for the PTTs to handle. Revenue sharing of the network-traffic fees was – like any other telecom facility – based on sharing according to usage of the different national facilities. So in order to cater for the complex mechanisms under which PTTs share income, Euronet used a sort of "fixed virtual routing", meaning that when a call was set up, the network would find the best available routing – but this then became fixed so that the "packet-stream" would also follow the same route. Otherwise revenue sharing was impossible.

With Euronet, the Member States now had a network with European coverage.

So far so good – for the Member States – but what about the rest of Europe, especially Scandinavia, where only Denmark was a Member State? This was politically a "hot potato"!

Naturally the network was only for Member States, and in the early phases, network access was severely restricted and should only be made available to citizens in the Member States. More than one "foreigner" tried – notably embassies from "outside" - but the rules were strictly applied, at least officially!

However, already at that early point in time, the technology made it obvious that, in practice there were no geographical limits. But it had to be solved case by case, and in fact other countries joined the Euronet later – all by paying their share of the costs. Switzerland was the first to join, later followed by Sweden, Finland and Norway. By the time these countries had joined, Euronet was towards its end as a separate project and, virtually, the rest of the world got access by the interlinked national packet switched networks. Euronet therefore in many ways served as a test-bed for interlinking networks.

Although important and necessary, the establishment of the network was, as such, only the first step. Other steps followed, most important perhaps stimulation of development of databases, education and awareness.

Development of databases

Another important element in the Actions Plans was the development of European databases.

The Commission itself initiated development of databases, mostly based on its own data sources, but also by giving financial support to the development of European databases. Some initiatives were part of the Second Action Plan (1978-1980), however the majority of this support was part of the Third Action Plan (1981-1983), where some EUR 5 million was made available for calls for proposals for development of European databases and databanks.

Some examples of Commission databases are AGREP about agricultural research projects, and ENREP about environmental research projects, but also some hitherto internal Commission files were made available, e.g., EURODICAUTOM, the European Commission terminology databank. These bases were made available via ECHO, European Commission Host Organization, the Commission's own (experimental) database host in Luxembourg – a service which basically was operated as part of the Commission's education and awareness actions.

Education actions

Realizing that Euronet was "merely" the vehicle for information access, the Commission decided to "invent" a new acronym for awareness actions. This was referred to as DIANE, Direct Information Access Network for Europe, and as a centralized outfit to cater for education and awareness actions, the Commission established a team centrally located in Luxembourg. This team, called the Euronet-DIANE Launch Team, was then given the operational responsibility for educating hosts and users as well as for creating awareness. The underlying line of thinking for this was simply, that even though a network and some databases existed, this was no guarantee, whatsoever that usage would take place, and politically it would be almost a disaster if the network was not used, or if for example the

Italians would only use Italian services. Education, training and lots of awareness improvement actions were needed!

The Euronet-DIANE Launch Team, a small group of seven people formed in 1979, had a very simple mandate: Increase usage! – and do this through the education of hosts and users and implement lots of awareness.

Education of hosts

One may ask oneself why it should be necessary to educate hosts? Was this really necessary? Did they not themselves know what to do in order to run an information service? The simple answer is: Not really! One has to bear in mind that even though information retrieval via data-networks at that time was some five to eight years old, very few people involved in it had much practical experience. To many of the players in the market, information service - where service is deliberately underlined - was untouched ground. This can clearly be seen through some of the items we handled in the Launch team, items such as:

- what should a welcome message to a service look like?
- how do I develop a user contract?
- what sort of documentation should I provide for my users?
- how do I market service? and to whom?
- do I need a help-desk and how do I staff it? · etc.

All relatively simple questions, and questions one would assume had been asked and answered even before you started to operate a service.

If one would consider any other kind of service to be established, one would normally have had a clear plan for operation made even before thinking of launching a service. The truth was, however, different! Many hosts were launched as parts of national information policy programmes in the Member States – or perhaps just because the technical facilities existed – and only in a few cases, a host was established due to market intelligence analysis.

As a general forum for discussing with hosts and in order to find out what should be done by the Launch Team, EHOG, the European Host Operators Group, was established and through regular, quarterly meetings points of common interest was raised and discussed. Based on recommendations for EHOG, the Launch Team then created activities and training courses.

Education of users

Educating users was a completely different, and in many ways, simpler task – at least concerning existing users. Basically, the only users one could get in touch with were existing users of online retrieval services. To be able to discuss developments with these, the Euronet User Forum was established, and like the hosts, these users were consulted in quarterly meetings in Luxembourg.

It would be unfair to say that meetings with the User Forum were not constructive – on the contrary. A great many important items were discussed, and in many ways the User Forum contributed very constructively to the development of the European Information Services Market, especially concerning improving the service levels of the operators. Numerous were the ideas created by the User Forum and taken to EHOG, and the fact that over time hosts improved greatly is, of course, thanks to input from the User Forum.

But looking at it retrospectively, one has to realize that we were speaking there to the elite of users in Europe – the people who were already convinced of the benefits of using information services. Further, in many ways these experienced users thought that this was still, and would be for many more years to come, too complex even to dream about that the end user, i.e the people needing the information, would ever be able to retrieve this information themselves. The general feeling was that real information access could only beneficially be done via intermediaries, i.e. persons performing searches on behalf of external users. Therefore, the main problem that we were faced with in the Launch Team, attracting potential users to the services, was not really a subject that received a great deal of attention at the User Forum. This had to be catered for in other ways, notably through awareness actions.

Awareness actions

Awareness – informing potential users that information services existed and there were benefits to be achieved in using them, in satisfying their information needs, was in fact the main task of the Euronet-DIANE Launch Team. To this end professional advertising agencies were used, and many different means were applied. The most significant ones actually laid the ground for many of the activities to come in the future, ideas which were created and initiated by the Launch Team and continued afterwards, in other programmes and in synergy with national activities. The most important ones were:

- development of directories of databases;
- exhibitions and seminars;
- establishment of national centres.

Directories

Already in the initial phase of Euronet, a first directory was created, the so-called enquiry service. This was a “host” containing very condensed information about the few hosts and services available, structured in a very simple database, operated by British Telecom. The “online version” was supplemented by “Fact Sheets” – in six languages – issued regularly. Later on this enquiry service database “transformed” into the DIANE-GUIDE, operated on ECHO, as well as more “fancy and glossy” books were produced in large quantities and several languages, and distributed across Europe. Interesting enough perhaps is to notice that even in the 1990s this “project” was continued, on ECHO, now named the I’M-GUIDE – Information Market Guide.

Exhibitions and seminars

Not as a big surprise to anybody I would guess, is of course that the “thing had to be shown”. The International Online Information Meeting, IOLIM, had been established, and of course the Launch Team had to be there – as had many of the hosts – and this as early as in the beginning of the 1980s.

Of course things were rather primitive! Looking back I see myself standing in a very, very cold exhibition area at the Cunard Hotel, Hammersmith, London at the start of December 1980, equipped with a Texas Silent 700 with acoustic coupler, using local access to Euronet. (Texas Silent 700 was a printing terminal, used for dial-up access via regular telephone lines to computers, e.g. online hosts). The local switch could hardly cope with the amount of traffic created by the 10-15 European hosts being present, a fact that lead to all of us rushing in very early, 7 a.m. just to get a line – bitterly freezing all day! But we were there and we showed it and we created a certain impact, and perhaps

more importantly, a "habit" that this was the place to go! – a "habit" which in many ways still exists, but where today's activities are much more professional.

One thing that those early "pioneer-days" did was to open our eyes to that fact that one could not just describe the concept – it had to be demonstrated to potential users in order to make them realize what it was: a lesson which lead to more direct actions towards end users.

Figure 3.2 Texas Silent 700 printing terminal with acoustic coupler.

In the years 1982-1983, the Launch Team initiated the first real drive towards these end users – the so-called "RoadShow". Together with primarily Chambers of Commerce, we arranged some 50 seminars in major European cities, where we, using the mailing lists of the Chambers, got in touch with "end users". The kernel element in the "Road-Show" was a 25 minute long, professionally produced film – "The invisible ingredient" in which a real-life case-story about an information need and how it was satisfied successfully using online information services - was documented. This was then supplemented by speeches, demonstrations and printed materials and, perhaps the most important thing, fact sheets about "what to do next in order to get started".

Also this idea – of attracting end users and basing "the message" on case-stories, was continued later on, now in combination with the creation of a network of national awareness centres.

The Euronet-DIANE Centres

Perhaps one of the most important initiatives of the Commission was the establishment of the DIANE centres. Realizing that there is no way that a central team in Luxembourg could reach throughout all countries, the Commission, in collaboration with national authorities, established the DIANE centres.

Working closely together with the central team in Luxembourg, the DIANE centres played an important role in market development in the Member States. They worked as general help and reference centres and as such, they represented points of contacts, where existing and potential users could obtain information about "what is this" – and perhaps more importantly, help to get started, in connection with lots of practical advice.

Interestingly enough these centres continued their lives throughout later programmes of the Commission, later called National Awareness Partners, and they even served as a model for other Commission programmes where national referral was needed.

Conclusion

Now – more than 20 years after the things were initiated, and looking upon what has happened concerning the Information Services Market in Europe, it is pertinent to ask the question about whether the Commission initiatives really had any value and whether the millions of Euros that have been spent – European Taxpayers' money – were worthwhile to spend?

Although I cannot prove it as one would normally do in a cost-benefit analysis, my clear feeling is - Yes!

But this simple answer needs more details, and in elaborating these, please allow me to answer some typical questions.

Did it help that the Commission invested in Euronet?

Clearly one can say that the Commission just paid the PTTs to do a thing they would have done anyhow! This is definitely true, but the fact is also, that Euronet brought speed into national developments of X.25-networks, which definitely lead to those appearing some five to seven years before they otherwise would have appeared. Also, through the Euronet consortium, the PTTs got acquainted to working together in a different manner – in a multilingual society – a fact which in many ways broke the "barriers" between them and which so to say, forced them to think more European-wide!

Did it help to have ECHO?

It surely did! ECHO was an important test-bed for Commission activities, not only by providing access to Commission databases, but also as a vehicle for demonstrating research-oriented projects related to information services, e.g., Natural Language Access, Voice Recognition, Automatic Indexing, Document Delivery Services and the famous CCL, all of which could be implemented on ECHO and as such demonstrate how things worked in practice. Especially through CCL and the many courses held about CCL in all Member States – combined with training packages and an "off-line" training system on a floppy disk (magnetic storage media for personal computers, word processors etc) - many, many first time users got cheap access to information and got the opportunity to get "hands-on" experience.

Further, some of ECHO's databases held important information. The above mentioned DIANE Guide/I'M-GUIDE proved to be an important source of information about what was available in Europe and has been used as reference database at many educational establishments.

Awareness campaigns and seminars – did they contribute to anything?

This is, of course, extremely difficult to measure. The main difficulties seemed to be to reach the potential users and to find the convincing message to communicate to them. Online information retrieval was considered as being a technically complex subject, and even though we desperately tried to get away from the technicalities, and to focus on the value of information, it was not received like that. Experience showed that even when we did direct mail shots to management, the mail in fact ended up at the desks of the computer managers, and they, for good reasons, did not

have a high degree of interest in these “external services” but were, it seems, pre-occupied with the internal Management Information Systems.

It is fair to say, that the real break-through in reaching management, the people needing the information, came when we did the “Road-Shows”. Working with Chambers of Commerce enabled us to attract the right people, and once we had them in the room and showed them the film “The Invisible Ingredient” – perhaps one of the best films ever produced on the subject? – they were convinced, and armed with the practical information about “How to get started”, they possessed the right tools to put pressure on the technical staff to get them to arrange the infrastructure, i.e. modem, dial-up connections and network subscriptions.

This is clearly demonstrated by the fact that, in the months following the “Road-show, the number of user IDs (identities, or accounts) to Euronet grew steeply from those cities visited by the “Road-show”!

This to us was proof that we were on the right track: We had a simple message, it was well explained in a true case-story, we could show it live during the seminars, and people left the seminars with clear descriptions about what to do to get started! Therefore, it must be recognised, that in many ways a lot of the “ground-work” for future marketing of information services was laid in the campaigns by the Launch Team and ECHO.

The DIANE Centres

The excellent collaboration between the Commission/The Launch Team and the DIANE Centres definitely created much awareness and interest, and is probably the main reason why many “newcomers” were attracted to the services.

This collaboration in a very pragmatic way contributed to make a “bridge” between European information policy and national information policies, since it was, in practice, the first attempt to do so! Further, it solved one of the inherited problems - bridging the language barrier! Here you had someone, who (almost) locally and in your own language could answer the basic questions, a thing which would never have been possible having a centrally based team – despite this team’s attempt to cover all languages. This is, in my opinion, why these centres were continued and “copied” over the years. They worked!

Final conclusion

Yes, the Commission activities have contributed greatly to the development of the European Information Services Market!

- They speeded-up national data-network developments substantially
- They were an excellent test-bed for development of new services
- They contributed greatly to the harmonization of services
- They laid the ground for the future marketing of information services.

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3.3 Networking

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A short history of Open Systems' Interconnection

In the end of the 1960s and beginning of the 1970s several computer manufacturers had their own network facility. The networks differed in policy concerning "who is the master" of the network. IBM had their Master-Slave concept in SNA networks (SNA = Systems Network Architecture), Siemens and Digital Equipment Corporation had their peer-to-peer concept etc. But each network consisted of computers (called hosts or nodes) from only one manufacturer. There could be different IBM computers in an IBM network, but they were all IBM computers. Likewise, different Siemens computers could be linked in a Siemens network, but only Siemens computers.

Computer systems communicate by exchange of messages. A message sent from one computer may pass through several computers before it reaches its destination.

A computer network consists of transmission lines, switching elements and hosts. The hosts are computers running user application systems such as library systems, and the messages originate in a host. The switching elements are specialised computers used to connect two or more transmission lines. The switching elements were called IMPs (Interface Message Processors) in ARPANET. The task for the IMPs is to receive a message on an incoming line and to decide which outgoing line to forward it on to. In some networks the task of the IMPs is taken care of by the regular hosts.

The transmission lines may be special cables, ordinary telephone lines, optical fibers, radio waves etc. The transmission lines connect the computers in the network, but the computers are not directly linked to all other computers in the network. The path from computer A to computer B may go via several other computers.

The network project in ARPA (Advanced Research Projects Agency) changed the computer networks from being limited to computers of one and the same manufacturer to become networks between different types and models of computers. The ARPA network project started in the late 1960s and the result of the project was the network called the ARPANET. This is the most important ancestor of Internet.

In the beginning all nodes in the ARPANET were located in USA, but in the early 1970s a computer at Kjeller outside Oslo was included as a node.

The ARPANET was a network model with different types and makes of computers as hosts and IMPs. The Open Systems' Network was the new model.

During the 1970s a lot of work was carried out in the field of network protocols for this new model of networks.

In the last half of the 1970s the Model for Open Systems Interconnection (OSI) emerged. ISO defined a 7-layer model for computer communication in an Open Environment. An Open Environment meant that computers from different manufacturers and of different types could be hosts in the same computer network. The model, referred to as the ISO OSI model, was a structured model for

communication between systems running on heterogenous computers. The seven layers were called:

- *physical, link, network, transport, session, presentation and application.*

This model should enable end users to use different remote systems via their own local system. It should also enable end users to connect to a remote system directly, to transfer files between computers, to communicate via email and use other communication facilities.

The communication between systems in the OSI model had to follow the rules defined for each of the seven layers:

- *the seven different protocols.*

The ISO standard for the OSI model was published in 1984 (1).

The protocols for the layers 1 to 6 (physical to presentation) were defined by computer scientists, but the application protocols had to be defined by specialists in each application field such as the library field. Two application protocols were defined for the library field. They were protocols for:

- Search and Retrieve of bibliographic records (SR) (2), (3)
- Interlibrary Loan (ILL) (4), (5)

The basis for the SR-protocol was the protocol defined in the Norwegian BIBNETT projects.

The standardization of the SR-protocol started in 1983. The standardization work on the ILL-protocol was carried out in parallel with the SR-protocol and the two standards were agreed upon by standardization organizations in September 1991. The standards were published in 1993.

OSI network projects in the Nordic countries

The Nordic countries were pioneers in the area of network communication between information systems. The library community wanted to test the possibilities of the OSI model for communication between library systems. The first OSI-project in the Nordic countries, the BIBNETT project, started in 1980. Both BIBNETT (1980 - 1982) and BIBNETT 2 (1983 - 1984) were pure Norwegian projects, but in 1985 the project "*Prøvedrift av informasjonsnettverk*" ("*User Trial of an Information network"*) started, with financial support from NORDINFO. This project had partners from Norway and Sweden and a reference group from Denmark, Finland, Iceland and Sweden.

In October 1991 the project Nordic SR-Net started with participants from all five Nordic countries and financed mainly by NORDINFO. The project ended in February 1994.

In January 1995 the EU project ONE, OPAC Network in Europe started, using the results from Nordic SR-Net as a basis. Four of the five Nordic countries and four other European countries participated in ONE. ONE was finished in December 1997 and the work continued in the EU-project ONE-2 (1998 - 2001).

When the network application protocols for the library community were finalized in September 1991, it took only one month before the project NORDIC SR-Net was launched.

A successful network project depends on several factors. Some important factors are:

- availability of financial resources
- availability of the correct tools

- availability of operational databases

Both national library bodies in the Nordic countries and NORDINFO were willing, and able, to finance network projects. In addition the participating institutions were willing to offer human resources (work force) and computer time.

Good tools were not easily available. Both the two BIBNETT projects, the User trial project and Nordic SR-Net took place too early for this.

The participating institutions made their databases available for all these projects.

Tools to be used

The main aim of the computer network projects in the library sector in the 1980s and 1990s were to test the feasibility of, and the need for, network communication between library systems.

The tools we needed in order to implement network communication between heterogenous systems were:

- stable network protocols
- implementation of basic communication services (protocols)
- source code for library systems

Network Protocols

All communication between systems in a computer network is carried out by exchange of messages. The syntax of such messages and the functionality they support, vary from one type of network to another.

In all computer networks the communication must follow a common set of rules, the so called protocols.

In proprietary networks the computer manufacturer has full control of the definition of the protocols, in Open Systems' Network many different parties must agree to the content and syntax of the protocol. These protocols are therefore standardized by, or at least accepted by, ISO.

Computer network communication has been designed in a hierarchical way. One speaks of up to 7 levels, or layers, of communication (physical (lowest level), link, network, transport, session, presentation and application level).

For each level one, or a set of, protocol(s) have been defined. Each "level" uses services offered by the level below. In this model it should only be necessary for the library community to define and implement application protocols.

The work of standardizing network protocols for library applications (top level) started in 1983 using results from the Norwegian BIBNETT projects and the American LSP project (Linked Systems Project with WLN, RLG and LC as partners. WLN = Washington Library Network, RLG = Research Libraries Group, LC = Library of Congress) (6).

The result from this standardization were two protocols:

- ISO 10160/61 for Interlibrary Loan (ILL protocol) (4), (5)
- ISO 10162/63 for Search and Retrieval (SR protocol) (2), (3)

The SR protocol has developed further and has been completely aligned with the American z39.50 v3 (7) into ISO 23950 Search and Retrieve (8).

Use of Z39.50/ISO 23950 (SR) and ILL/ISO 10160 (ILL) protocols

The SR- and ILL- protocols are described both in the standards themselves and in several articles. Both protocols focus on support of functions, and not on explicit knowledge of the remote systems.

According to the SR-protocol, communication between two systems is carried out as follows:

- The communication parties are the Origin (starting the communication) and the Target (the called upon system). The Origin requests certain, specified services from the Target. The Target carries out the request according to the specifications. But the target does not have to have the same data model or indexing practice as the Origin.
- For instance: If the origin is indexing personal names as <last name>, <first name> and requests a search for “Hansen, Ole”, the Target can fulfil this request even if the Target has two indexes, one for <last name> and one for <first name>, or if the Target indexes personal names in direct order (<first name> <last name>). In both cases the Target must convert the search criteria to the form used by the Target. How the search is carried out is irrelevant to the Origin.

Implementation of basic communication services

The library community should concentrate on defining, and implementing, application level protocols. We were to suppose that the programmes responsible for carrying the application messages between the systems were available. That is, protocols for all levels below the application level should exist and implementations of these protocols should be available.

The existence of such modules was necessary in order to test the feasibility of Open Systems’ Network for libraries.

When the BIBNETT projects and the NORDINFO project “*User Trial of an Information network*” were carried out, there existed drafts for ISO protocols for the lower levels and implementations of the three lowest levels (physical, link and network levels). The CCITT X.25 protocol (packet switched network) (9) covered these layers and was accepted by ISO as a standard for the lowest three levels (CCITT = Comité Consultatif International Télégraphique et Téléphonique) (10), (11). The X.25 protocol was implemented, but such implementations were not available for all partners and the implementations were not stable.

There were no implementation of the levels between network and application (transport, session and presentation). Actually, the protocols were not stable either. The functionality planned for these levels had to be taken care of by the applications.

Source code for library systems

The third type of tool necessary in order to carry out the projects was the access to the library systems' source code. Both in the BIBNETT projects and in "*User Trial of an Information network*" one had full access to the source code in all the participating systems. This was a major benefit and made it possible to carry out the projects.

In Nordic SR-Net one did not have access to the source code for two of the participating systems and this caused delays and some problems.

Two Norwegian projects

The two Norwegian projects were:

- BIBNETT (1980 - 1982) (12)
- BIBNETT 2 (1983 - 1984) (13)

BIBNETT

BIBNETT started on February 8th 1980 and was finished on March 31st 1982. The project was managed by Norsk dokumentdata.

In 1980 there existed many automated library catalogues and many online reference databases. But to use two different systems one had to use two different user dialogues and often one had to use specific terminals for each system.

The important question was:

> Is it possible to use ISO OSI network model in such a way that the end user can use one and the same terminal to all other, remote systems, and also use the same user dialogue to all remote systems. That is, each user should be able to use the local dialogue to all systems regardless of what this local dialogue looked like.

BIBNETT was a co-operation project between

- Norsk dokumentdata
- BIBSYS (Library system offering union catalogues as well as housekeeping functions)
- UBO (University library in Oslo)
- UBB (University library in Bergen)
- Directorate for research libraries in Norway
- UNINETT (University network in Norway)

The main aim of the project was:

- to test and influence UNINETT's properties for performing library tasks
- to clarify whether program-to-program communication between independently developed library systems implemented on different computers is technically and economically feasible in Norway
- to increase the participating institutions' competence to the degree they themselves wanted in those fields the project would involve

In order to fulfil this main aim a more practical, intermediate target was defined:

- to make it possible to retrieve "automatically" records from BIBSYS, NORMARC (Norwegian MARC format, later called UBO:BOK) and UBB/TEST for editing and storing in one's own local database
- to transfer bibliographic data of variable length from one computer to another using UNINETT

BIBSYS was at this time running on a UNIVAC 1100/62 (a mainframe computer) and supporting acquisition, cataloguing and searching. NORMARC was running on a DEC-10 (a mainframe computer) and supporting cataloguing and searching.

UBB/TEST was running on a UNIVAC 1100/82 and was a NOVA*STATUS system (Norwegian version of the STATUS information retrieval system) supporting information retrieval.

When the BIBNETT project started, the ISO OSI model was defined, but the protocols for the different levels were not stable and few were implemented.

Furthermore, there existed a framework for an application protocol for library and information work written by NCLIS/NBS Task Force on Computer Network Protocol (14). (NCLIS/NBS = National Commission on Libraries and Information Science/National Bureau of Standards, USA). This protocol was just a framework and had therefore not been implemented anywhere.

An application protocol is dependent on functioning protocols below. That is, the communication between the computers, the handling of synchronisation of messages, errors in the transfer of messages etc. should be taken care of by the levels below the application.

At the time when the BIBNETT project was carried out, very few of these requirements were fulfilled. One had to disregard some of these requirements and for others one had to improvise.

The project group intended to use Datapak (Public packet switched computer network in Norway and Sweden) for the actual communication between the hosts in the network. The implementation of this had begun, but was not finished. UNINETT had defined two services:

- the Interactive Service (UIS, UNINETT Interactive Service)
- the File Transfer service (UFTS, UNINETT File Transfer Service)

When BIBNETT started, UIS was partly implemented and the implementation of UFTS had not yet started.

The evaluation of the protocols defined for these services concluded that the UFTS was not suitable. The UIS was not ideal, but could be used with some modifications. The best service for BIBNETT would be a Program-to-Program Service (PPS) which included a Communication Process (CP) for each host. These CPs should cover the functionality of the session and presentation levels in the OSI model.

The Project group defined a Communication Process Protocol for this purpose.

The application protocol had to be defined using the framework from NCLIS.

The BIBNETT model consisted of the following modules:

- library system
- application protocol implementation (SRPM)

- Communication Process implementation (CP-module)
- UNINETT Interactive Service

and the architecture was as shown in figure 3.3.

All messages passed through the CP-modules and were logged there with a time stamp. This way we could log any delays in the network itself. The messages consisted of only ASCII characters (ASCII = American Standard Code for Information Exchange)

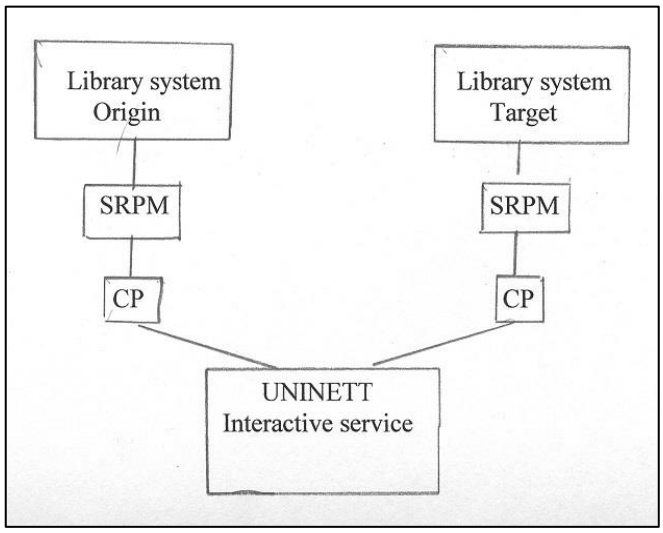


Figure 3.3 Architecture in BIBNETT.

The results from BIBNETT were:

- the Application Protocol (15)
- the communication process protocol (CP)
- implementation of both the application protocol and the CP protocol in all three systems
- increased know-how concerning computer networks and protocol specifications

The conclusion from the project was that it was quite possible to use an open systems network for communication between heterogeneous library systems. The time needed for connecting two systems were the only noticeable delay in a searching session compared to using a system locally.

The MARC records could be transferred without problems.

Program-to-Program communication between library systems is dependent on stable networks and clear and informative error messages if an error occurs.

Economically it is quite feasible to use an OSI network in searching in, and retrieving data from, remote systems.

The Application Protocol was handed over to ISO TC 46/SC4 as a basis for defining an ISO standard for network communication between information systems.

BIBNETT 2

The results from BIBNETT were positive and a new project was defined: BIBNETT 2.

The new project lasted from January 1st 1983 to December 31st 1984.

The participants in BIBNETT 2 were:

- BIBSYS
- BRODD - R&D Department of Norwegian School of Library and Information Science
- NSI - Norwegian Centre for Informatics
- UBB - University library in Bergen
- UBO - University library in Oslo

NTNF (Norges Teknisk-Naturvitenskapelig Forskningsråd) and RBT, National Office for Research Documentation, Academic and Special Libraries (Riksbibliotekstjenesten), gave economic support to the project.

BRODD was the project manager.

The main aim of BIBNETT 2 was:

> On the basis of the results from BIBNETT 1 and UNINETT to contribute to, and encourage, the research in computer networks by:
>
> - carrying out more complex dialogues between independently developed information systems running on different mainframe computers, than those carried out in BIBNETT 1
> - to implement the same possibilities for complex dialogues between micro computers and mainframe computers
> - to allow IR (Information Retrieval) systems and cataloguing systems to update each others databases
> - to analyse the multicasting, i.e. sending IP data packets from one source to multiple receivers, problems seen from the side of the network user

In order to fulfil this aim the following practical goal was defined:

> The complete application protocol from BIBNETT 1 should be implemented in the following systems:
>
> - BIBSYS running on UNIVAC 1100 and supporting library housekeeping functions
> - Mikro-Polydoc (Norwegian information retrieval system) running on CP/M and MP/M computers supporting IR (CP/M, MP/M = operating systems for micro computers)
> - SAMKAT running on DEC-10, a union catalogue
> - UBO:BOK running on DEC-10, but with different software from SAMKAT, supporting IR

The multicasting problems should be analysed, but no solutions should be tested.

In BIBNETT 1 a need for a PPS was identified. At the start of BIBNETT 2 this service was not yet available. Furthermore, the CP developed in BIBNETT 1 had been removed from one of the hosts and the direct use of the protocol X.25 was one option. The new host (with Mikro-Polydoc) was not connected to UNINETT at all and used its own communication module.

The application protocol from BIBNETT 1 was implemented, but it became obvious that it needed to be enhanced in several aspects. The need for optimisation of the size of protocol messages as well as the need for more attributes to describe the search criteria. Also the need for new functionality resulted in a new and enhanced application protocol. This new version of the protocol was then implemented.

The functions covered by the protocol at this point were as follows. The general commands in many IR systems (IR=Information Retrieval, nowadays called “enterprise search engines”) are given within parentheses.

> Begin Session (Start)
> End Session (Stop)
> Purge message
> Purge Session (Abort)
> Wait (Detach)
> Continue (Attach)
> Help (Help)

Choice of database(s) (Base)
Send own (use of special query form such as CCL)
Result set handling (e.g. Delete)
Thesaurus search
Neighbour search (List terms or Scan)
Search (Find)
Continue search
Modify (Modify search result)
Record request (Show, Print)
Loan Search (Circulation status)
Loan Update (Update circulation status)

The thesaurus Search facility should enable searching/navigating in a thesaurus.

Due to difficulties in the implementations of communication protocols on the lower levels in the OSI model the implementations in BIBNETT 2 could not be fully tested. One of the systems could only be an originator, i.e. not receive search requests from the other systems. One of the systems could only be a target, i.e. only receive requests from the other systems, not sending requests itself.

Both UNINETT and Datapak were unstable throughout the project. This caused the testing of the implementations to be delayed. All technical testing was carried out, but end user testing became greatly limited.

Apart from that each facility was tested for at least two systems and the results were:

- Technically, the systems can communicate and perform searches, send records and update each others' databases. The possibility to update remote databases over the network will be limited by administrative rules, not technical solutions.
- The protocol works well for Norwegian systems both on mainframes and on micro computers.

Two NORDINFO OSI projects

The two OSI projects financed by NORDINFO were:

- User Trial of an Information network (Prøvedrift av informasjonssystemnettverk) (16)
- Nordisk SR-nett (Nordic SR-Net) (17)

User Trial of an Information network

The end user testing of BIBNETT 2 implementations were limited due to technical problems with the network. This testing should be carried out. In addition it was important to test how the model would work across national boundaries using different network carriers.

The BIBNETT-model was communication between library systems using the OSI model in such a way that end users could search in different, remote library catalogues using the user interface of their local library system.

This project was carried out in the period January 1985 to September 1985 and the participants were:

- BHS – Swedish School of Library and Information Science
- BIBSYS – RUNIT (Computing centre at Norwegian University of Technology)
- BRODD - R&D Department of Norwegian School of Library and Information Science
- NSI - Norwegian Centre for Informatics
- UBO - University Library in Oslo

BRODD was project manager.

This project had a reference group consisting of specialists from:

- The library at the Karolinska Institute (KIBIC), Sweden
- Upplýsingabjónusta, Iceland
- Forskningsbibliotekernes EDB-kontor (FEK), Denmark
- TKAY (Automation Unit of Finnish Research Libraries in Helsinki University Library), Finland

The main aim of the project was to:

- Test the BIBNETT 2-model for library systems in two or three Nordic countries.

The plan was to test the model with systems in Denmark, Norway and Sweden. Regretfully, Denmark was not able to implement the software in time. The test was therefore carried out between the following systems:

- BIBSYS in Norway (at this time a union catalogue and housekeeping system for many academic libraries)
- Mikro-Polydoc in Sweden (School of Library and Information Science in Borås, Sweden)
- UBO:BOK in Norway (the National bibliography)

In addition two installations of Mikro-Polydoc in Norway (NSI and BRODD) were used to some extent.

The two Mikro-Polydoc systems had been enhanced with a network communication module in order to be able to initiate a communication. But the Mikro-Polydoc system could not act as a Target due to the limited communication module.

In 1985 both SUNET and UNINETT were operational and could offer network services up to, and including, the transport level (level 4 in the OSI 7-level model). This was a major improvement from the BIBNETT projects. But it was uncertain how, or if, the communication between SUNET and UNINETT would work satisfactory. Or if we could use these networks at all.

Users of all three systems were selected and were to search as follows:

- Users of BIBSYS should search in UBO:BOK
- Users of UBO:BOK should search in BIBSYS
- Users of Mikro-Polydoc in Sweden should search in BIBSYS and UBO:BOK
- Users of Mikro-Polydoc in Oslo (NSI and BRODD) should do some searches in BIBSYS and UBO:BOK

The definition of a session in an OSI environment is the period from the originating system says “Begin” until either the originating or the target system says “End”. A session-log consists of all messages sent from the origin and target systems during a session. The sessions in this User Trial project contained searching, record retrieval, use of help-functions, scanning of result sets, use of previous search results etc.

The session logs showed that during the project:

- 160 sessions were carried out from Mikro-Polydoc in Borås
- 29 sessions were carried out from BIBSYS
- 160 sessions were carried out from BRODD

In these sessions a total of 831 searches were carried out. Online update of the union catalogue was tested technically, but due to administrative decisions it could not be tested fully.

UBO:BOK could only act as a Target due to communication problems.

Communication problems such as unstable networks, missing Transport level (due to difficulties in using SUNET), unstable network software etc. caused the number of sessions to be severely reduced compared to the project plan.

The concrete result from the project was an improved application protocol (the BIBNETT Search and Retrieve protocol). It was the error-handling part of the protocol in particular that was improved.

The project taught us that:

- It is important that all implementers interpret the application protocol the same way. This led to the definition of profiles of the protocol
- The communication between two heterogeneous library systems works well if the network communication is stable. There is no extra response time in communication across national borders crossing over from one network to another, compared to searching in a local system.

The results and experiences from this project were used both to improve and enhance the SR-protocol and as a basis for the next NORDINFO OSI project.

Nordic SR-Net

In September 1991 the application protocols for the library community had been agreed upon as a standard by ISO TC 46/SC 4/WG 4 and handed over to the ISO office for publication. The time had come for a project to test the protocol as it now was defined. The ISO protocol, ISO 10162/63 (2) and (3), covered fewer functions than the BIBNETT-protocol, but it was more general because it covered information systems outside libraries.

Project description

Nordic SR-Net was an OSI project were all five Nordic countries participated. The partners were:

- FEK (Forskningsbibliotekernes EDB-kontor) in Denmark with ALBA (today DANBIB)
- TKAY (Automation Unit of Finnish Research Libraries in Helsinki University Library) in Finland with LINNEA, a VTLS library system
- University of Iceland with a LIBERTAS library system (using STAIRS IR system) with GEGNIR library system
- BIBSYS in Norway with BIBSYS
- University of Oslo in Norway with UBO:BOK (local software and using TRIP IR system)
- LIBRIS at the National Library in Sweden with LIBRIS library system
- BRODD (R&D Department of the Norwegian School of Library and Information Science) in Norway
- RBT, National Office for Research Documentation, Academic and Special Libraries, Norway

BRODD was project manager.

The project Nordic SR-Net was carried out from October 1991 to February 1994.

The main aim of the project was:

to implement the ISO 10162/63 protocol for Search and Retrieval (SR), communication between all the participating systems in a way that makes differences in user-dialogues and database structures completely invisible to the end user.

More specifically the aims of the project were:

- To connect main library catalogues, in the Nordic countries, in a computer network for the purpose of simplifying the reference work and at the same time to be able to benefit from the other institutions' classification and indexing work.
- To improve the knowledge of the use of library OSI protocols in the Nordic countries.
- To influence further development of the library OSI protocols based on our own experience with the use of such protocols.
- To simplify the search and retrieval of MARC records from bibliographic databases with different command syntaxes, in Europe and North America.
- To prepare a basis for the general use of SR in the academic networks and in the library community, by making available a general implementation of SR together with the experiences gained in the project.
- To make it possible to search different types of databases using IANI in general.

As with the previous projects, the main tools would be:

- implementations of computer network protocols
- implementation of basic communication services
- source code for library systems

But in addition we now needed format converters and it became evident that also a stand-alone client would be needed, at least for testing.

Computer network protocols

In 1991 we had two possible sets of network communication protocols:

- OSI
- TCP/IP

The OSI set of protocols includes a wider range of functions/services, but this lead to problems of availability of implementations. Implementations of the full OSI model was expensive and very few existed in 1991.

Implementations of the TCP/IP set of protocols on the other hand, were much cheaper and thus easier to find. In the project we implemented the use of both sets of protocols.

Implementation of basic communication services

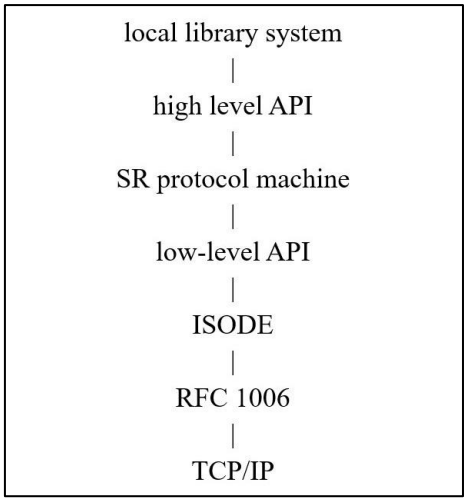
In 1991 a package was made available, for free, for implementing the different levels of the OSI model. The package was named ISODE. This package made it possible to use the services defined in the OSI protocols for levels up to (and including) Session layer. The implementation of these protocols required a relatively small part of the man days available in the project.

This made it possible for the Nordic SR-Net project to concentrate on the application layer and to really rely on services below the application layer to be offered and to be stable. This was a big step forward from the situation for the “User Trial of an Information network” project.

One decided to make one implementation of the application protocol (SR), which is a program that could handle the building of, sending of, receiving of and interpretation of application level messages. This program was called the SRPM (SR Protocol Machine). This program module had to communicate both with the underlying communication system (ISODE) and with the local library system. This program was ported to each participating system.

The task for each partner was to implement an interface between the local system (client and/or server) and the SRPM.

The structure for a local installation was:



The two types of API (Application Programming Interface) were made in order to have a standard way of interfacing the ISODE (low-level API) and the library systems (high-level API).

Source code for library systems

A program module like SRPM ought to be integrated in the local system, but it is also possible to run it as a module between the local system and the communication system. To make a so called proxy to handle the SRPM tasks had not been tested in 1991.

When one has access to the source code of the library system, the first solution is possible. Two of the systems in the project were commercial systems (LIBERTAS and VTLS) and we had no access to the source code for these. Although both systems had plans for implementing an SR protocol, they both wanted to implement Z39.50 version 2.

At this time there were some discrepancies between ISO 10163 and Z39.50 v2. The ISO protocol included a SCAN service while the Z39.50 included Access Control Services. There were also different interpretations of some of the message attributes. All these discrepancies between the two protocols have later been resolved. These discrepancies could be overcome, but also the implementation of Z39.50 v2 was delayed for both systems.

Converters

The systems participating in Nordic SR-Net used several MARC formats, a total of seven MARC formats were involved. A conversion between these formats was necessary.

The command language CCL (ISO 8777 Common Command Language) (18) was in use to such a degree that it was decided to make a conversion between RPN (Reverse Polish Notation), which is mandatory to support within the protocol, and CCL. Such converters did not exist and had to be developed within the project. The decision to make a Toolbox with different common tools was made.

Carrying out the project

The project was divided into seven phases:

1. Study and requirement
2. Test of tools
3. Implementation of common software (SRPM and Toolbox)
4. Porting of common software; possible integration of IANI
5. Implementing the interfaces between the local systems and the common software modules, including necessary changes to the local systems
6. User testing of the system communication in ordinary library environment
7. Evaluation and final report

Each phase was completed and evaluated before it was decided to continue the project.

Among the experiences gained from BIBNETT 2 was the need for a protocol profile. A draft profile was made in phase 1 and it was updated throughout the project.

Another experience from BIBNETT 2 was the need for structured testing of all implementations. At this time it was highly recommended to carry out conformance testing according to ISO 9646 (19). Therefore a Conformance Test Suite for the SR protocol was made and used in the testing of the implementations.

In addition to the Conformance Test Suite an End user Test Suite was defined. This test suite should clarify whether searching in remote databases resulted in a relevant set of records. That is, will search for a given topic give the expected result?

We would also investigate how the different systems reacted to result sets of different sizes (from 1 record up to 1000 records).

The MARC conversion program was made flexible by using conversion tables and codes in the table for how to convert one field/subfield to another, how to merge or split subfields etc.

The plan was to make a MARC-convertor that read one large table for all formats. This turned out to be too complex. The MARC-convertor had to be made for conversion between two and two formats.

Phase 6 was planned as a pure testing phase. However, implementations were not ready and the end user testing had to be limited to 3 intensive weeks.

30 end users participated in the end user testing. They carried out approximately 800 search sessions. It became clear that error-handling was still not sufficient, but the end users found the possibilities for searching unfamiliar systems very good.

Results from the project

The results of the project were:

- An Implementation of the application protocol ISO 10163 (SRPM) on a UNIX platform. The implementations were tested on VAX computer running ULTRIX (version 4.3.a) (version of UNIX), HP (Hewlett Packard) computer running HP-UX (version of UNIX) and SUN computer running SunOS (version 4.1.3) (version of UNIX).
- Implementation of the Origin (client) became operational in one system, and during the testing phase in two other systems.
- Implementation of the Target (server) was operational in three systems and became operational during the testing phase in another system.
- An (API between a local library or information system and the SR protocol was developed (low level API).
- A high-level API was defined and implemented
- A toolbox for implementors which includes an RPN parser and a MARC conversion program was developed.
- A MARC conversion table for conversion between seven different formats was created, but had to be split up in sets of tables for two and two MARC formats.
- The implementation of using either ISODE over TCP/IP or TCP/IP directly for transmitting the application messages (APDUs, Application Protocol Data Unit; a computer network message on the application level, level 7) were finished, tested and used
- A Conformance Test Suite for the SR protocol was defined.
- A test machine for conformance testing of implementations of SR was developed

The addenda SCAN and EXPLAIN to the SR protocol were not passed as international standards before the project ended and were therefore not included in the implementation.

The project was based on the services offered by the Nordic academic networks (DENet, FUNET, ISNET, UNINETT and SUNET). These networks offered both the use of OSI protocols (X.25 for the lower layers), and TCP/IP protocols.

Within the project we could therefore choose which network stack to use. For practical reasons we chose to use TCP/IP for the lower layers, but the software that was used (ISODE) made it possible to change this decision or to offer several stacks.

Conclusions from the projects

The projects BIBNETT 1, BIBNETT 2 and "*User Trial of an Information network*" were very early OSI projects. The basic communication protocols were not in place and the library specific protocols were still under development. But these projects made the Nordic library community aware of the possibilities, and the problems, of using OSI between library systems. It put us in a position to influence the development of the application protocols and to get early implementations of system-to-system communication between library systems.

The project Nordic SR-Net gave several important results which were used both in further development of the protocol and in enhancements of products such as SRPM, MARC-converter, command-language converters etc.

The results from NORDINFOs engagement in OSI projects are very important and they are a basis for several of the protocols, profiles, tools, implementations and solutions we use today.

Some of the conclusions from Nordic SR-Net can stand as a conclusion for NORDINFO's OSI projects:

1. The SR protocol is possible to implement as is, and such implementations offer better services to end users (librarians and library users) than other methods of connecting to the same remote databases. The Nordic projects have made important contributions to defining, implementing and testing the SR protocol (Z39.50 v3).
2. Several tasks outside the scope of the protocol needed to be addressed before different implementations would give interoperability between systems. Two of these tasks were:
   - format conversion
   - character conversion
3. Two MARC converters have been developed. MARCconv from Nordic SR-Net and the ONE projects, and USEMARCON from the EU project USEMARCON. The character converter CHASE (Character Set Standardisation; a tool for conversion between character sets resulting from the project CHASE) has been developed by the British Library. Both CHASE and MARCconv are available in the Toolbox from the projects ONE and ONE-2.
4. Versions 7 and 8 of ISODE were used in the Nordic SR-Net project. The use of ISODE made it easier, and quicker, to implement the network access module for the OSI stack. It was an important tool during the Nordic SR-Net project and much experience was gained by using it. The use of ISODE was dropped when the package was no longer free of charge. The protocol stack TCP/IP is by far the most used protocol stack between library systems today. From the Nordic SR-Net we got experience in using both the OSI stack and the TCP/IP stack.
5. Good documentation of a software package is necessary for it to be used.
6. In order to be able to use the software developed within Nordic SR-Net, it was necessary to be able to have communication between the SRPM (SR Protocol Machine) and the local system. The SRPM and the local system may reside on different machines or on the same machine.
   To run the SR-Net software one needed:
   - ANSI C-compiler (ANSI = American National Standards Institute)
   - TCP/IP SOCKET library
   - the local system software must be able to call, and be called by, C-procedures

   The communication between the SRPM and the local system will be handled by the SR-Net software package. Thus making available the high-level API on the local system machine. These software packages were not documented well enough. And although they worked well they were exchanged for a better documented package developed in the projects DBV-OSI, ONE and ONE-2. But the development of the Nordic SR-Net common software increased our know-how in this area.
7. The problems connected with use of different character sets were not studied within Nordic SR-Net or the projects prior to that. This was recognised as an area that had to be addressed. One concluded that the identification of, and choice of, character sets could be included in the SR protocol.
   The character set handling (negotiation) is today included in the SR-protocol and conversion between character sets can be handled by a module in the Toolbox.
8. It was not possible to test the use of IANI in Nordic SR-Net due to the lack of working IANI-clients at the participating institutions. Therefore the OSI projects within NORDINFO have not given any increased knowledge in how an IANI installation could work in a Z39.50 environment.

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4 INFORMATION SYSTEMS AND DATABASES

Introduction

Marie Wallin

Manuscript received 2007

Active participation in international research and research policy, especially in the fields of medicine and nuclear energy gave an early start to the development of online information production and retrieval in the Nordic countries.

In this chapter two lines of development are described, namely leasing and adapting retrieval software programs to local conditions as was the case for the development of the MEDLARS/MEDLINE services in the life sciences, and developing genuine software at home as was the case with ABACUS, EPOS/VIRA and 3RIP for science and technology. In the latter fields information on tape was produced by diverse learned societies and professional organizations all in their own structure and with specific indexing and required conversion to a common format before retrieval. This is a problem still facing the online vendors of today but at that time overcome within batch SDI services like NERAC in the US or CAN/SDI in Canada and EPOS/VIRA in the Nordic countries, as well as by early information spinners providing information online. To remind us of the technological context of the time, Roland Hjerppe, after naming many of the pioneers in Sweden, give us also a list of the global developments in the field

The same double line of development can be seen in databases provided online on SCANNET: international databases that one or the other country participated in with national input and databases produced at home, often as part of a Nordic co-operation project, later also national library catalogues online.

Proactively providing relevant information to researchers was the job of information officers in larger corporations; university researchers more often were expected to come to the library and “do it themselves”. With the advent of computerized handling of information that started in larger research centres a new breed of specialists was born, graduated scientists who learned to use all kinds of computerized tools for better serving their individual patrons. The title *informatiker* already used in Finland to describe what we in Sweden called *information engineers* became a formal job description in Sweden. The term *information specialist* was used in the other countries but has recently become the norm also in Sweden.

The keen and, at some time, generous interest shown by the Nordic government agencies, understanding that fast and relevant information was the key to not only scientific but also industrial development, favoured a climate for trial and error experiments and this created a fruitful and friendly competition between efforts in the different countries as well as co-operation in more advanced projects like IANI. With this very early multi-systems interface one hoped to solve the problems of the information seekers who had to access many different online systems to find all relevant information. Ambitious informatiker were trying to master these, but no real increase of usage of Nordic online information would arise if the end users were not able to perform their own

searches. It is claimed now that the Web and the Internet have solved all these problems, but professional information specialists know better. They themselves continue to learn and to teach others the use of specially designed information systems, at the same time keeping a critical eye on what is offered for free on the Internet.

4.1 Early access: EPOS/VIRA, 3RIP and Paralog – Prehistory and early stages

Roland Hjerppe

Manuscript received 2006

This story, which was prepared for the anniversary commemoration of Paralog (first made available in The TRIP Family History 1970-2001) (1), a CD-ROM made for Paralog's 25th Anniversary, summer 2001, a total of 50 copies distributed only to the project´s participants), is told as I remember it, assisted by various documents at hand and by answers from some of the participants.

Prelude

In 1967 I was a student at the Royal Institute of Technology – KTH and should by then have finished my studies in Technical Physics. I had taken an interest in computers and had swapped a number of courses so that I could take all the computing courses available at that time. I had also taken an interest in information storage and retrieval; I had realized that it probably was more fun reading (a lot about) research than doing it - the physics and similar stuff at least. Little did I know then, that 15 years later I would be heading a research laboratory.

In the summer of 1967 I had for the second year a temporary employment supervising the process of selecting new students for all the Swedish institutes of technology, using a computer-based system to match and rank student applications and grades to available places at the institutes. The work which consisted mainly of transforming grades and applications to machine readable form and of sending out printouts, receiving answers, and preparing for new batches was taking place in the meeting rooms on the ground floor of the Administration building of KTH, opposite to the library.

SDI - IDC

Sometime during the summer or early fall I found out that the library was looking for two persons with a science or technology background to work as documentalists/information officers in a project on computerized information services - Selective Dissemination of Information (SDI). I applied and on October 1st Malin Edström and I (both on a half time basis) and Kerstin Bengtsson (later Wessgren) started working at KTHB. The project eventually evolved into IDC-KTHB.

I have no recollection of when I first met Rolf Larsson. It must have been sometime before the first week of April 1968 because then we both participated in a course on I&D held at KTHB. Among the participants was also Erik Sundström, later to become the first expert in the field of IR at SAFAD, the Swedish Agency for Administrative Development (Statskontoret).

Interlude

Rolf was the first holder of an Information Retrieval scholarship at KTHB (I will use the term SF - short for SINFDOK fellow - to designate the holders of such a scholarship, since it was SINFDOK, the Swedish Council for Scientific Information and Documentation, that funded all the other SFs). Erik Sundström who got the other IR fellowship at the same time as Rolf was, however, not affiliated with KTHB but with IVA, the Academy of Engineering Sciences (Ingenjörsvetenskapsakademien). Both Erik and Rolf were funded by TFR, the Swedish Council for Technology Research (Teknikvetenskapliga forskningsrådet). After Erik and Rolf there were no scholarships for a few years. SINFDOK was established in the budget year of 1969-1970 with Fredrik Backlund as head, and took up the fellowship practice in 1970 resulting in the appearance of Mats G. Lindquist.

Figure 4.1 Roland Hjerppe (2nd to right) with his IDC-KTHB staff in 1975 outside the premises of KTHB. Photo: Roland Hjerppe.

Björn Tell, who was the Library Director at KTHB, somehow managed during the following years to affiliate a number of people on SFs to KTHB. Some of the reasons must have been that at that time there were in Sweden only a few places working in the field. Information retrieval was not a recognized academic subject, and the experimental SDI service started at KTHB in 1967 (and before that at the AB Atomenergy library in Studsvik) provided a continuing base both for systems development and for experimenting under real life conditions. This service existed as a hybrid of fee-based services and grant-supported developments for a very long time, from 1967 to 1978-1979, and after that as a purely fee-based service until 1997. In 1976 the centre had to justify its existence, and the evaluation report, assembled under great pressure by all who worked at the centre at this time, received by chance the number 1066 in the library reports series (2) i.e. the ominous date of the Norman invasion of Britain, a deed never to be forgotten by its authors.

Once a small, critical mass of youngish, eager and bright (qualities guaranteed by the SF screening process!) people were assembled it was probably only natural for the later ones to join.

- Björn Tell was in 1973 appointed Library Director at Lund University Library and Stephan Schwarz became the new Library Director at KTHB.
- In 1972 Mats Löfström and Jan Carlsson were appointed SFs and spent their first year in England at Sheffield University (where computerized indexing of chemical compounds was being developed at the time).
- Bo Göranzon, now professor at KTH at the faculty of Industrial Organization, was appointed as SF probably in 1973, but although we did interact frequently he did not participate in the developments at IDC. Joining the team in 1974 Göran Thorén developed KOMPOST - A Compression Method for Structured Files (implemented by Jan Sunnebäck), and later worked on security issues producing PROTECT - A Security Device for System EPOS.
- Lars Höglund, appointed in 1972 (I believe) and Olle Persson in 1975, both affiliated with the Department of Sociology at Umeå university, were closely related to KTH at the time. They made for example a very extensive study on the use of SSCI (Social Sciences Citation Index). Lars now holds the first chair in information science research at the University of Gothenburg.

In 1970 it was also time for me to finally finish my studies at KTH i.e. by producing a Master's thesis with the title "*A computer program for the identification of significant changes in citation frequency*". Christer Bryntesson, who was at the time an assistant at the Department of Information Processing, ADP (Automated Data Processing), was somehow found and employed to do the programming, resulting for his part in a technical report (3), in contact with the others in the gang at KTHB.

- Bo Johansson, who joined the project group in 1972, resisted until 1989 before leaving IDC-KTHB and re-joining the team that by now had created its own computer firm under the name of Paralog.
- Jan Sunnebäck joined the project group in June 1973.
- Jan Hultgren who had an employment at the Department of English at the Stockholm University was recruited by Rolf Larsson. They had both been studying at the University of Lund.
- To complete the list there was also Jon-Erik Nordstrand, who was appointed in 1974. He did not participate in the work on the IR system 3RIP (a predecessor of TRIP), but focused on library automation and is now Library Director at the University College of Borås, after having occupied similar posts at the universities of Umeå and Gothenburg.

EPOS/VIRA

One of the first contributions Rolf made was to implement, on an IBM 360/75, the ABACUS system that had been developed and used at AB Atomenergi.

The earliest document I can find where Rolf is an author, is co-authored by Björn Tell and Rolf Lindh (a programmer employed by AB Atomenergi, where Björn had been the Library Director). The paper is on searching literature with a general ADP (Automatic Data Processing) system, "*Overview of ABACUS. Second phase: the search part*" (4). ABACUS was an acronym for AB Atomenergi Computerized User-oriented Services. The library was participating in the international nuclear

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NAME      : KTHID11                                    PAGE 01
DATA BASE : COMPX              VERSION : 002

RANK      : 90                 MODIFICATION DATE : 76-04-26
MAX. REFS : 0100               CREATION DATE     : 76-04-09

LOGIC     : 20*(A+B*C+D+E*(I+1)*F/10)*(G+1)
              +E*(H+1)*(B+C/4+G+I/2)
*             +J*(2*K+L)/10

GRP NO TYP TYPNO WGT CUM   TERM

 A  01 KEY 29    +10     * INDUSTRIAL TRUCKS*

 B  01 KEY 29    +02     * MATERIALS HANDLING*

 C  01 KEY 29    +02     * HOISTS*
 C  02 TIK  0.5  +02     * HOIST*

 D  01 KEY 29    +02     * MATERIALS HANDLING.MECHANIZAT*

 E  01 TIK  0.5  +02     * ASSEMBL*

 F  01 CLA 28.1  +10     * A913*
 F  02 CLA 28.1  +02     * A911*
 F  03 CLA 28.1  +02     * A912*
 F  04 CLA 28.1  +02     * A914*

 G  01 CLA 28.1  +02     * A69*

 H  01 TIK  0.5  +02     *WORKER*
 H  02 TIK  0.5  +01     * PERSON*
 H  03 TIK  0.5  +02     *FITTER*

 I  01 TIK  0.5  +02     *DEPARTMENT*
 I  02 TIK  0.5  +01     *LINE*

*J  01 TI   0.1  +02     * PACK*

*K  01 TI   0.1  +03     * GOODS*
*K  02 TI   0.1  +01     * FREIGHT*
*K  03 TI   0.1  +02     * MATERIAL*

*L  01 TI   0.1  +02     * WAREHOUSE*

 TOTAL NO. OF TERMS : 0021
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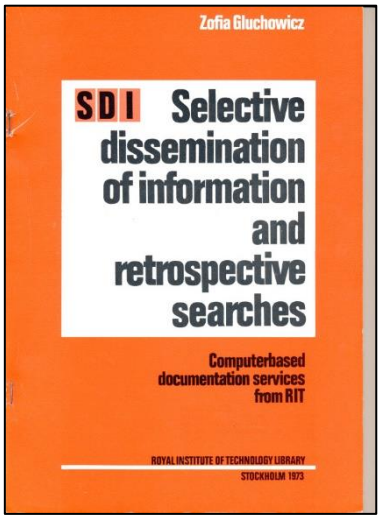
Figure 4.2 Example of EPOS/VIRA search profile.

information collecting network – first Nuclear Science Abstracts, NSA, then to become International Nuclear Information System, INIS, - and processed the tapes received in exchange for that contribution.

After ABACUS a better and faster batch retrieval program called VIRA was developed by Rolf and Jan H. VIRA was named, I think, to allude to the card game Vira (which according to legend is named after the 17th century iron forge Vira, north of Stockholm), to Rolf's dog named Vira, and as an acronym for Voracious Information Retriever and Advertiser.

The first search-profile handling program after ABACUS was called PROSA (Swedish for “prose”) and at that time input was by punched cards. When a system was developed for interactive input of search profiles it seemed natural to call it EPOS.

The EPOS/VIRA system was very successful and was provided for use to Le Centre National de la Recherche Scientifique, CNRS, in France in exchange for the PASCAL tapes. PASCAL is a scientific bibliographic database produced by CNRS. It was also used in Portugal at the National Research Council as a result of a SIDA (Swedish International Development Authority) supported information co-operation project.



As said above the software served for many years and was used in the Nordic countries by a network of information centres, both public and in enterprises, regularly providing individual users with the result of batch searches in many scientific bibliographic databases. Within the decentralized SDI service, a real-time search profile formulation feature was developed. By 1985 the results could even be distributed in electronic form, in a common DOREF downloading service format. For many database producers this service was the first for which “e-format” royalties had to be discussed and entered in the license contracts. The SDI service had its peak in 1979/1980 when it was running 23 databases and was used at some 40 different documentation services in Sweden and the other Nordic countries, serving a total of more than 2000 research scientists.

A comprehensive study of the economics of the service (5) was commissioned by DFI - the Delegation for Scientific and Technical Information (Delegationen för vetenskaplig och teknisk informationsförsörjning) when “SDI-online” on the larger commercial

information services became a pressing competition. The evaluation resulted in a demand for total cost recovery, a requirement that slowly brought down the offline service.

EPOS/VIRA was in use at IDC-KTHB to provide a part of the SDI services until February 1997 when the last INSPEC tapes were processed for still some 100 subscribers. INSPEC is a database that was then produced by Institution of Electrical Engineers, IEE.

Already in 1973 it was felt that an interactive retrieval system was the natural next step now that EPOS/VIRA had reached a state of development that more than sufficed for the needs at that time.

Interlude

Today it is hard for those who were there to remember and much harder for someone who was not there to comprehend what was happening in a wider context and what the general circumstances were when 3RIP and Paralog were established. Therefore a list of events and developments happening elsewhere during this period is provided at the end of this section.

3RIP

The name 3RIP (which properly should be pronounced thrip) has to my knowledge never been explained before. One reason might be that when we settled upon it, we all agreed never to reveal why it was chosen. It is therefore with some apprehension that I now provide explanations. The name was invented in the room facing Valhallavägen in the basement of the library, which originally had been the living room of an apartment for the janitor. In that room there was a large table piled with papers and a large green chalkboard filled with writings.

The first explanation for 3RIP is based on 3R + IP - the Three Rs: readin', 'ritin', and 'rithmetics' + Information Processing. 3RIP was envisaged as a tool for both input and output and with some simple mathematical abilities. In the first applications for funding there are indeed references to these three capabilities.

The second, more ironical, explanation is, to be sure, based on 3 + RIP. The application for funding would provide a sinecure for the main three participants. Although everyone knew, even then, that the project would be far from a resting place no one could anticipate how much time and effort that would be invested in the years to come.

Part of the appeal of the name 3RIP was probably that it was different - one of the prerequisites, the pronunciation vague, and the number in the beginning would ensure that the name came first in sorted listings.

The first 3RIP funding proposal to SINFDOK was in 1972/1973.

Paralog

When Paralog was constituted as a company in 1976 I participated and acquired 72 shares. I was at that time the acting head of IDC-KTHB and in the beginning there was no conflict of interest, especially as Paralog did not generate any income for me, according to my income tax statement for that year. Sometime in 1977 such a conflict did arise. I needed as the acting head to buy services from the other shareholders of Paralog and I thus had to relinquish my shares that year. I have never

since been an active Paralogist but I have of course mentioned 3RIP and Paralog whenever it was appropriate.

My main interest in 3RIP, as the acting head of IDC-KTHB, was the potential for establishing services, in competition with DIALOG, SDC and other international online services. At the first International Online Information Meeting (IOLIM) in London in December 1977 we presented a list of required functions for an "ideal" interactive retrieval system (6). It contained many of the features existing in the online systems in use at IDC-KTHB but also some specific new possibilities like left truncation, a "save" function, SDI- online and a common index for several databases.

A full-fledged interactive service for searching databases in the field of energy was developed at IDC-KTHB and marketed in the Nordic countries. Especially Finland responded enthusiastically to this trial. But to develop this into a regular service proved too hard, for many reasons, one of them being the limited market in Sweden or even counting the Nordic countries, another the difficulty of establishing a proper pricing structure for services. Full cost recovery was not feasible but even with some subsidies we were at a disadvantage since we did not know the price elasticity of the services. The results of this feasibility study were reported to DFI by the leader of the project group at IDC-KTHB, Malin Edström (7).

Figure 4.3 The very room where 3RIP was born served also for modest celebrations. Here, IDC-KTHB celebrates its 15th anniv., Sept. 1982. From left, standing: Roland Hjerppe, Mats Sundin. Seated: Eva Agerberg, Lilianna Kanafarski, Bo Johansson. In the background: Inger Enander.

Interlude

In the summer of 1978 I went for two years to Tanzania to assist in developing information services for Tanzania National Scientific Research Council.

DFI

When I returned to Sweden after two years I took up a new job as Section Head, Section for Research and Development, at DFI, the then newly formed government agency in charge of national policy, research and development for information supply, i.e. libraries, information services etc. As Section Head I was in charge of planning and co-ordination of research and development in library and

information science. My tasks included drafting R&D programmes, initiating projects, programme control, assessment and evaluation. DFI's programme for research and development included user studies, development of systems for information retrieval and for library routines, education and training for R&D. We did manage to support to some extent further development of 3RIP and studies of the feasibility of establishing services based on 3RIP (some inherited from SINFDOK).

Postlude

In 1983 I left DFI to become the (founding) leader of Liblab - the Library and Information Science Laboratory at the Department of Computer and Information Science (IDA) at Linköping University (LiU), in Sweden, and remained there until the end of 1997.

After I left DFI my interests changed, at Liblab we focused first on applications of AI (Artificial Intelligence) to cataloguing and then on our long term vision, the HYPERCATalogue. I have always, of course, followed the developments of Paralog but had not much interaction except for the time we took an interest in case processing and archival retrieval. At that time our idea was that the retrieval problems at the archives could be alleviated by ensuring that the structure of documents that would become archival was designed with the later retrieval issues in mind (*a thought very present in the later work on scientific e-archives, see for example the proposed e-archiving model OAIS as discussed in (8)).*

So, here are some of the scenes I remember:

- meeting Mats G. Lindquist for the first time and finding someone to share a lot with.
- the shock when Rolf questioned something I had taken for granted, a training for lateral thinking.
- the room facing Valhallavägen with the big (green) blackboard, and later, the group's working place in an apartment on the KTH-site.
- all the discussions ranging from on-demand publishing (in the early 1970s) to the ideas of having nations based on month of birth.
- the poker evenings at Rolf Larsson's apartment.
- all the deep friendships. Being able to call someone after twenty (or more) years and immediately feeling the same contact we had during these exciting creative years.

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From batch processing to online (interactive). Various events (picked from a number of sources) to indicate the context of the prehistory and early stages.

1962

J.C.R. Licklider & W. Clark, MIT: On-Line Man Computer Communication (August).

1963

With funding from the U.S. National Institutes of Health, Institute for Scientific Information publishes the first issue of Genetics Citation Index (GCI) and the prototype of Science Citation Index (SCI), relying on computer indexing. While GCI is not continued, SCI is first offered commercially in 1964.

MEDLARS (MEDical Literature Analysis and Retrieval System), an off-line batch service, begins operation from the National Library of Medicine (NLM).

University of Sheffield Postgraduate School of Librarianship and Information Science is founded and two years later begins extensive research programme in computerized retrieval methods for chemical and textual databases.

1964

Meyer Mike Kessler, of Massachusetts Institute of Technology, develops Technical Information Project (TIP), an experimental online searching system.

Douglas Engelbart develops the mouse as an input device. Used shortly thereafter for manipulation of chemical structures in input and searching at the Lister Hill Center of the National Institutes of Health.

1965

CAS offers batch (off-line) access to users of the Chemical Titles file.

Partially funded by National Institutes of Health, Chemical Biological Activities is introduced by CAS. It was published simultaneously in printed form and on computer tape and was the first computer-produced service to include full text, searchable abstracts.

The first communication satellite (Intelstat I).

ARPA sponsors study on "*cooperative network of time-sharing computers*" TX-2 at MIT Lincoln Lab and AN/FSQ-32 at System Development Corporation (Santa Monica, CA) are directly linked (without packet switches) via a dedicated 1,200 bps phone line; Digital Equipment Corporation (DEC) computer at ARPA later added to form "*The Experimental Network.*"

1966

Chemical Society Research Unit in Information Dissemination and Retrieval is established at the University of Nottingham under the directorship of Anthony K. Kent. In 1969, it becomes the U.K. Chemical Information Service.

Annual Review of Information Science and Technology (ARIST) initiated with Carlos A. Cuadra as editor.

1967

Andreas van Dam completes the Hypertext Editing System, a program that allows nonsequential access to the various parts of a document.

IBM releases the 360/91 machine and introducing the concept of pipeline, which improves the performance of a computer by 33 %.

1966-1968

MARC I and MARC II developed at Library of Congress.

1968

Association of Information and Dissemination Centers - ASIDIC is established by various private and public national and international organizations to deal with production, distribution, and use of electronic products and services.

Information Industry Association is founded by Eugene Garfield, Saul Herner and others.

CA Condensates, an alerting service covering the full range of documents abstracted and indexed by CAS, commences. This is the first publicly available computer file to forthcoming issues of CA.

Computer Science Corp. becomes the first software company to be listed on the New York Stock Exchange.

ALGOL 68 appears but proves difficult to implement.

COBOL is officially defined by ANSI.

1969

On an experimental basis, U.S. National Library of Medicine begins offering online access service, known as AIM-TWX (Abridged Index Medicus Accessed by Teletypewriter Exchange Service), to the MEDLARS database. Uses Orbit software developed by System Development Corporation.

U.S. National Aeronautics and Space Administration (NASA) begins offering online search service RECON (remote console) to NASA facilities. Uses DIALOG software developed by Lockheed Missiles and Space Company.

U.S. Department of Defense implements ARPANET (advanced research projects agency network) to demonstrate how communications between computers could promote co-operative research among scientists.

The first floppy disk was built and was incorporated in IBM's System/370 machines.

1970

European Association of Information Services - EUSIDIC is established to co-ordinate and advance the interests of operators of computerized data services.

1971

NLM’s MEDLINE (MEDLARS Online) becomes operational.

OCLC goes online.

The first microcomputer (Intel 4004).

Ray Tomlinson of BBN invents email program to send messages across a distributed network. The original program was derived from two others: an intra-machine email program (SENDMSG) and an experimental file transfer program (CPYNET).

Computer Space the first modern video game developed by Nolan Bushnell.

1972

Commercial online systems, Orbit (System Development Corporation) and DIALOG (Lockheed Missiles and Space Company), become available in the United States.

Pong video game is a success.

Dennis Ritchie from Bell Labs. develops C, a programming language derived from BCLP. Unix is rewritten in C by Kernel.

1973

Bob Metcalfe's Harvard PhD Thesis outlines idea for Ethernet. The concept was tested on Xerox PARC's Alto computers, and the first Ethernet network called the Alto Aloha System (May)

ARPANET becomes operational.

1975

First ARPANET mailing list, MsgGroup, is created by Steve Walker. Einar Stefferud soon took over as moderator as the list was not automated at first. A science fiction list, SF-lovers, was to become the most popular unofficial list in the early days.

John Vittal develops MSG, the first all-inclusive email program providing replying, forwarding, and filing capabilities.

The first video terminal VT52l from Digital Equipment.

Altair 8800 becomes the first personal computer (microcomputer) on the market. Over 2000 sold by end of the year. It costs USD 395 but up to USD 2000 worth of peripherals were needed to make it go. Used Intel 8080 microprocessor and 256 bytes memory.

1976

CAS ONLINE becomes operational on a pilot basis.

Shugart announces its 51/4" mini floppy disk drive priced at USD 390.

1977

Digital introduces VAX-11/780 the first member of the VAX series of computers.

Gary Kildall of Digital Research develops the CP/M operating system.

This year Radio Shack introduced the TSR-80 model 1, the first complete pre-assembled small computer system. It included 4 Kbyte RAM, 4 Kbyte ROM (including Microsoft's BASIC), a Keyboard, Display and Cassette interface.

1978

Dan Bricklin and Bob Frankston develop Visi Calc, the first spreadsheet program for microcomputers, which will be distributed on the market in 1979 by Software Ants. Initially available only on Apple II, the program was an instant success.

First version of Oracle that will become the standard database for mainframe and Client/Server networking.

1979

First MUD, MUD1, by Richard Bartle and Roy Trubshaw at U of Essex.

On April 12, Kevin MacKenzie emails the MsgGroup a suggestion of adding some emotion back into the dry text medium of email, such as -) for indicating a sentence was tongue-in-cheek. Though flamed by many at the time, emoticons became widely used.

Wayne Ratliff develops the Vulcan database program that will later become dBASE II. It allows up to 65,000 records, and up to 32 fields of 1 Kbyte each.

Ada language developed by U.S. Department of Defence.

Hayes Microcomputers Products announces the Micromodem 100 the first commercial modem. It could transmit at 110 to 300 bps.

Xerox, DEC and Intel announced the Ethernet.

Usenet, a multidisciplinary computer network of news and discussion groups, is formed. CompuServe and The Source on-line services open.

1980

The ACS publication, Journal of Medicinal Chemistry, is made available in full text on an experimental basis on the BRS (Bibliographic Retrieval Service) online system.

IBM introduced its personal computer (PC) for use in the home, office and schools.

Shugart released 51/4" Winchester driver that holds 80 times as much data as a standard floppy disk and transfer data 20 times faster.

Commodore VIC-20 becomes the first million-seller model in the history of computer industry. It has 5 Kbyte RAM, BASIC in ROM, Colour Display, Modem interface, etc. for USD 300.

1982

EUnet (European UNIX Network) is created by EUUG (European UNIX Users Group) to provide email and Usenet services, original connections between the Netherlands, Denmark, Sweden, and the UK.

1984

Apple's Macintosh line is being introduced.

…and 1990

Quoted from the CERN home page:

> *By the end of 1990, Berners-Lee had defined the concepts of http, HTML and the URL - the fundamental concepts of the Web - and a prototype graphic Web browser, server and Web page editor were up and running. European physics institutes put up the first Web servers in 1991, and on 12 December of that year, the Web crossed the Atlantic when the Stanford Linear Accelerator Center, which has close links with CERN, put the USA's first Web server into service*.

4.2 Early access: MEDLARS/MEDLINE - Reflection on development and status in Scandinavia

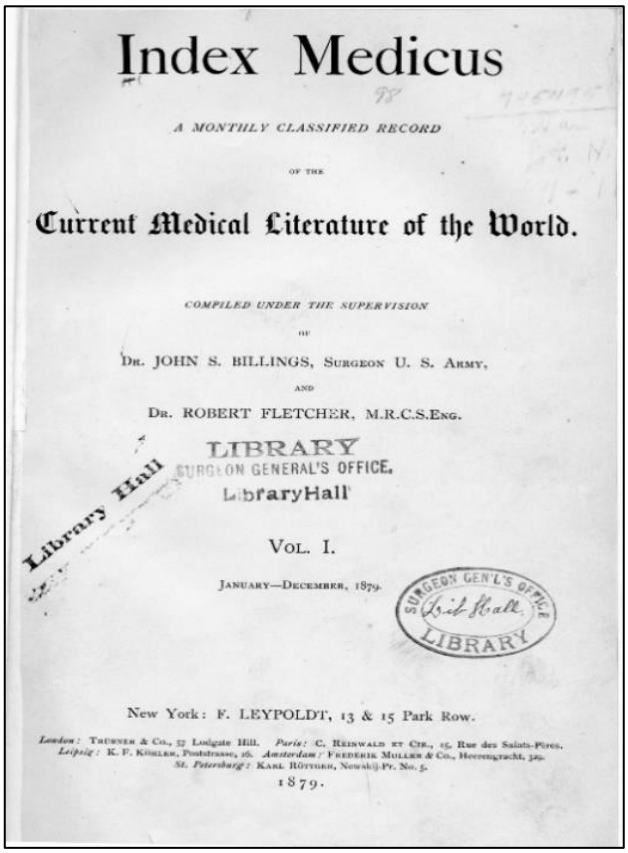
Carl-Eric Elwin

Manuscript received 2007

It was December 2003! After having visited the Library Director at KIB (Karolinska Institute Library into which MIC, the Medical Information Center, had merged) Per Olsson, I went over to the main library and sat down in the reading area of the four-storey building. What a difference compared to 30-40 years ago! Thoughts went back – the library was much smaller and localities where different in those days. Only professors, teachers and students with an interest in research from the different Departments of the institute came there to read or to pick up ordered articles and books. Today, all seats at reading tables are occupied, students coming and going all the time, standing and discussing in groups or entering and going to work at a number of PC-terminals available. That is technology in informatics – that´s the difference! This section will deal with aspects of this change.

Background

In 1864 the 27 year old assistant military surgeon John Shaw Billings in USA was called to the Surgeon General´s offices in Washington, D.C. In October 1864 the first catalogue of medical literature was published by them. However, the collections of books and journals grew rapidly and it was decided that the young officer should be in charge. The book lover Billings got the task of collecting journals and books, to acquire as complete collections in the library as possible. Another result of his work was the first printed catalogue issued in 1873-1874, rather limited in size but supplemented with another catalogue on index cards. At about the same time Billings started work on a subject index, and as a test of its utility the first major bibliography was published – the subject being Cholera.


Index Medicus

A MONTHLY CLASSIFIED RECORD

OF THE

Current Medical Literature of the World.

COMPILED UNDER THE SUPERVISION

OF

DR. JOHN S. BILLINGS, SURGEON U. S. ARMY,

AND

DR. ROBERT FLETCHER, M.R.C.S.ENG.

VOL. I.

JANUARY—DECEMBER, 1879.

New York: F. LEYPOLDT, 13 & 15 Park Row.

1879.

Figure 4.4 First issue of Index Medicus. Source: National Library of Medicine, NLM.

It is important to point out that already at that time the library should be a reference and not a lending library. Billings was collecting material for his thesis on the Surgical Treatment of Epilepsy back to 1859 but found it quite difficult to find all original articles and therefore turned to his brother

officers at different Army Hospitals for help. Out of this he prepared index cards which made up the start of the Index-Catalogue which was ready for printing in 1880. Billings proposed a model for a bibliography of Medicine and at this time started to refer to the collection as the "*National Medical Library*" which, however, was not accepted as an official name.

The Index-Catalogue was continually published until 1961. From this time on the Index was followed by a periodical list of current medical articles, books, reports and other literature – this became Index Medicus, a name suggested by the publisher. Billings obtained permission to have the library's index-catalogue, cards, and articles to provide the text for Index Medicus. Its first issue appeared in January 1879.

In those days most of the medical scientific publications were issued in Europe and sent to the USA for inclusion into Index Medicus. Dr Billings extraordinary labour quickly established his international reputation and in 1880-1881 he was invited to give the general address before the International Medical Congress, the first American ever to do this. Billings was the head librarian between 1865 and 1895, having the major responsibility for the further development of Index Medicus but also for the collections and their location. The collections of the library grew quickly during this time. However, it was difficult to find funds for a building to be built on Capitol Hill, close to the Library of Congress. Later, the decision was taken to have a new building, the Library-Museum and this was opened in the year 1888.

One must remember the tremendous work performed to publish Index Medicus monthly because there was no electricity at hand until the early 1900. There was also a continued demand for more space during the following decades. Finally, in 1941 a new building was planned on Capitol Hill, but as the US had entered the Second World War the same year this plan was overruled by concern for the safety of the collections. Of great help now was the microfilm technique (developed by Atherton Seidell, a biochemist) and in the next few years most of the library collections were on microfilm. The US contribution to medical science was continuously increasing and when the war was over the library also had to set out collecting relevant literature published in the enemy countries during the conflict.

The library buildings on the Mall were in great need of modernization and enlargement and after many debates the Surgeon General in 1949 decided that the library should be moved to Bethesda. Ten years later, in June 1959, the ground breaking ceremony could be held on the site to mark the start of the construction (Senator Lester Hill). By December 1961 the building was completed to about 90 % and the collections could be moved to Bethesda. During these years there were also discussions concerning the name of the library and some alternatives were considered, but in 1956 it was decided under a new bill that the library would become an independent agency named the National Library of Medicine (NLM), a name which the library has carried since then and probably will continue to carry because it has got a worldwide reputation for its services. Thus, the biomedical world owes a lot to the man John Shaw Billings as scientist, librarian and clinician.

Swedish research and biomedical documentation

In this connection especially two men should be mentioned and honored, Martin M. Cummings and Sune Bergström. In 1964 Dr Cummings was named Director of NLM, a part of National Institutes of Health, NIH, and his successor at his retirement became Dr Donald A. Lindberg, still the Director of NLM. During Dr Cummings era great steps were taken in the advancement of the library in becoming an international biomedical communication center, such as the establishment of the International MEDLARS Centers, the regional medical library network for the US, the programme for awarding grants and contracts, a proportion of these being history grants, the establishment of a History of

Medicine Division at the library, and the establishment of Specialized Information Services including the Toxicology Information Program. The library was converted from a traditional medical library into an active information center that was inaugurated in 1970 as the Lester Hill National Center for Biomedical Communication, and plans were drawn for the Biomedical Communications Network through the development of AM-TWX, MEDLARS-MEDLINE, the National Medical Audiovisual Center, etc.

During his time at NIH, as associate director of research grants Dr Cummings also visited Sweden to review research projects and became interested also in other aspects of research at Karolinska Institute (KI).

Swedish medical research at this time held a leading position internationally and Professor Sune Bergström, head of the Department of Chemistry, realized that in order for Sweden to maintain that position it would be fundamental that Swedish researchers had quick access to the international medical literature. As Dean of the Faculty of Medicine, professor Bergström worked actively to bring the MEDLARS system to Sweden. Index Medicus was already used by researchers at the different medical libraries. Actually, in the 1950s and 1960s most of the Swedish medical research was supported by the Rockefeller Foundation, the Swedish Medical Research Council and/or NIH grants to Sweden.

During the later part of the 1960s the contribution of the Swedish Medical Research Council increased markedly which was followed almost in parallel by a decrease in NIH grants. As late as 1971 the percentage of total NIH research grants to Sweden amounted to about 15 % of Swedish medical research efforts. However, there was also a tendency within NIH to switch from grants to contracts in medical research. It could also be worthwhile mentioning that the creation of the Nobel Foundation in Sweden in 1900 constituted the first systematic, international effort to support scientific work worldwide. Thus, it could be said that the Swedish Nobel Prize awarding bodies functioned as the first International Research Council, the idea being to give the laureates a significant amount of money to release them from personal economic problems but it also gave the Research Council Members a possibility to communicate with outstanding experts around the world. However, today the Nobel Prize does no longer play the same direct economic role for the laureates as it once did.

MEDLARS

In the early 1960s, with the arrival of the electronic data technology the NLM developed the computerized bibliographic information storage and retrieval system MEDLARS – which is an acronym for Medical Literature Analysis and Retrieval System. This was necessary for coping with the ever-increasing volume of the biomedical literature and to be able to respond to the needs of the health profession. The purpose of the MEDLARS system was mainly to get a tool for the monthly publication of Index Medicus and the publication of the hierarchical controlled vocabulary MeSH (Medical Subject Headings) but it was also the key tool for publishing recurring bibliographies and later on even for retrieving subject citations from journals by “searches on demand”. From now on NLM acquired a number of functions that were atypical for a library and created the fundaments of the world’s largest biomedical service system. To avoid an overflow of demands for computer searches, that were coming nationwide, and to develop partnerships with other US medical libraries MEDLARS was formally centralized according to the Medical Library Assistant Act 1965, and eleven regional medical libraries were established over the United States.

Today, NLM has developed from a national resource into an organization with a major international impact. Initially, subject searches were provided through MEDLARS by so called batch searching.

Since 1991, the original medical library has continuously developed and is today made up of eight regional medical libraries and a number of resource libraries, access libraries at the health science schools, hospital libraries etc., in a hierarchical structure. This has now resulted in the partnering of almost 6,000 health science libraries across the US as a National Network.

In the next few years computer technology developed further and made it possible for NLM to promote its information services to the end users. By 1997 MEDLINE (MEDLARS on line) was accessible on the Internet at no cost, and via the Web interface, the PubMed and the Entrez systems replaced Elhill as the basic MEDLINE retrieval system.

After the Second World War it became obvious that the various services provided by NLM were a national resource that might have international impact. It might be a scientific tool for the benefit of the world but could also be an instrument in foreign policy and, in fact, it was used as such in some periods during the following decades. These aspects precipitated conflicts between different government agencies and the lack of co-ordination caused delays in many international programmes.

The US Government was after the Second World War active in a number of international organizations such as the UN, WHO (created 1948), PASO (Pan American Sanitary Organization, 1947) and within the next decades such programmes became bigger and more differentiated and demanding more economical resources. As an example let us mention that the number of member states of the WHO increased from 56 in 1948 to 153 in 1979. The progress of different programmes became dependent on where the various US Presidents wanted to put the major emphasis. However, the focus was always kept on the health care programmes of the nations of the world and the eradication of tropical diseases, such as malaria, cholera and smallpox. As a result of this co-ordinated efforts WHO could declare smallpox eradicated globally in October 1979. Another such programme is the programme on human reproduction started in 1972, which in the following five to ten years meant an enormous increase of grants for research in different countries where this was a serious problem.

For Europe the establishment of the Marshall plan in 1948 was of fundamental importance. In days of the so-called “Cold War”, programmes and services provided by NLM were important parts of the bilateral agreements with Russia and Japan (a former enemy). However, some years later it was decided that international co-operation should work not primarily through the State Department but with HEW (Health, Education and Welfare) and through NIH (National Institutes of Health).

The Swedish MEDLARS era

The MEDLARS database and Index Medicus are international in character and many countries were interested in obtaining MEDLARS computer tapes when the system became operational in 1964. The NLM began international co-operation with the UK and Sweden for their experimental testing of the new computerized system. As these two countries moved closer to an operational status and to providing services it became clear to NLM that definitive bilateral arrangements were feasible. In 1961 the OECD was formally established as a successor of the Marshall Plan organization OEEC. Therefore, it was natural that the American Government invited the OECD to start a MEDLARS branch somewhere in Europe, even more so as some OECD members over the years had discussed establishing science-related programmes and had created a scientific directorate. Initially, the idea was to set up such a new Center in Paris. However, after a number of unfruitful meetings over a few years, the decision was taken to have bilateral agreements with individual countries instead.

Professor Sune Bergström participated in three such meetings as the Swedish representative and he of course had a rather strong case since already back in 1964 Sweden had ordered as many as 3,000 MEDLARS searches. For this reason in particular, it was decided that KI would become the branch

MEDLARS Center. At about the same time a similar agreement was made with the British Lending Library at Boston SPA. Even though many countries applied for becoming a MEDLARS Center, NLM did not make the choice but the countries themselves as they had to comply with certain technical criteria established by NLM. The country had a choice of alternative MEDLARS arrangements. Sweden and the UK were to receive tapes and to help develop the software, Germany initially just to receive tapes and France to go online to NLM as soon as that could be possible. Two functions had to be maintained by all centers, namely searching and training, and both Sweden and the UK were especially active in this respect. NLM also arranged for MEDLARS services through such large organizations as UNESCO and WHO between 1965 and 1972. However, it turned out that the majority of MEDLARS searches at WHO were performed for staff members rather than for projects within member states.

Development of the Swedish MEDLARS Center

The MEDLARS Center was established in the spring of 1965. This was preceded by negotiations in 1964 between Professor Sune Bergström and Dr. Cummings. It is fair to say that the successful outcome of the negotiations was due partly to the fact that these two gentlemen had known each other for years.

Naturally, the start of the Documentation Center at KI had to be formalized with regard to the conditions between the two organizations and with regard to which services the MEDLARS Center in Stockholm could and would provide to other European countries and organizations. NLM started so-called "*Quid-pro-quo*"-programme arrangements with countries and organizations that wanted access to the MEDLARS programs and files. Such a contract was signed in the spring of 1965 between NLM, MFR (the Swedish Medical Research Council) and KI. This meant that NLM agreed to make all MEDLARS material continuously available to KI. In return KI would provide training in indexing and provide the actual indexing of the Nordic literature for the system.

By a decision of the Swedish Government the project was initially to be financially supported by MFR since it was of national importance. Therefore, MFR in the same year formed its own documentation committee made up of representatives of MFR, KI and the Universities of Uppsala, Lund and Gothenburg. And this represented a good coverage of the Swedish scientific community. KI was given responsibility for the operation of the center, but otherwise the center, under the name of Biomedical Documentation Center (BMDC), stood under the supervision of the MFR Documentation Committee. During the development phase, the Center could rely on grants and donations, but in the long run it would have to be profit-driven. In the beginning it would have to exist on a MFR budget, which meant an uncertain future.

Of great importance for the success of this project was that the secretary of MFR at that time, Professor Bengt Gustafsson, got very interested. He made sure that funds were allocated not only for leasing a suitable computer or computer-time but also that means were available to get access to the Scandinavian journals to be indexed.

The operation of BMDC was further formalized by a decision of the Swedish Parliament (Sveriges Riksdag) whereby one position as principal administrative officer and three positions as senior administrative officers were to be financed through MFR. Further staff-members were hired by KI and paid by MFR. The administration of BMDC became the same as for any other Department at KI with both a Department head and an executive committee and the Senate of the Institute created a statement of purpose for the Center in the beginning of 1969.

During this time KI sent people to NLM in Bethesda for getting acquainted both with the actual running and developing of the computer programs and for training in literature indexing. This was

actually the basis for BMDC´s possibility to arrange courses in indexing for scientists from different European universities and organizations and also to interact and help in resolving local software problems and computer operations.

Purposes and software development

In the early days of the 1960s computer searches of medical and chemical literature were started on a commercial basis in some countries in Europe. Department heads of KI realized the importance for basic and clinical medical research to be involved in this new technique. Through a donation by the Wenner-Gren Foundation, KI acquired a Wegematic which became the first computer of the institute but also the first one on which to try running the MEDLARS tapes. Bruno Lundberg was head of BMDC at that time, with his large interest and skills in this field he managed this period together with interested persons at the institute and at MFR. The major obstacles for a more rapid development and the introduction of new features were the lack of computer capacity and funds. Key persons in the project were Professor Arne Engström, Department of Medical Physics, Professor Bengt Gustafsson, secretary of MFR, and naturally Professor Sune Bergström, now President of KI.

The MEDLARS system itself grew quickly and the files became larger and larger, demanding more and more computer capacity. After approval by SAFAD, arrangements were made to lease an IBM 1401 which was installed at the Medical School of KI in late 1965. However, it was soon apparent that its capacity was too limited, which caused long delivery delays for the customers. The following years the MEDLARS procedure was carried out in three phases, namely the input phase on the KI IBM 1401 or the IBM 360/40 (located at the Karolinska Hospital); the search phase on the IBM 7090 (located at QZ, Stockholm University Computer Center) and the print-out phase on the IBM 360/40. This made the operation geographically complicated and time consuming.

The waiting times for the results of searches were almost unacceptable and caused considerable irritation among users. For more than 90 % of the retrospective searches the delay was more than 40 days. It ought to have been no more than a week.

To try to solve this problem the Documentation Center first used the larger university computer IBM 360/75 at QZ. Still, however, there was too little memory capacity for the files and it was not until the offer by KI itself in 1975 to provide own funds for more memory disks that this problem was resolved.

It lasted until 1989 before a computer was acquired for documentation activities at KI. A computer, an IBM 4381, with a large mainframe could be installed thanks to a donation by the Swedish bank Handelsbanken and a substantial loan from the institute. The new computer had a processor capacity that was three times greater than that used earlier by BMDC/MIC (BMDC changed name to MIC, the Medical Information Center, in 1975) and had advanced communications equipment that allowed connections from all sizes of computers. The storage capacity was 40 GB.

The new computer became operational on April 1, 1989, and was operational with surprisingly few complications from the very beginning. A few months later a seminar and reception with a formal guest from NLM was arranged to celebrate that the database MEDLARS now was run on its own computer housed within the premises of KI. Invited to this occasion were also representatives of the foremost Swedish co-ordinative partners such as the Drug Information Center of Huddinge University Hospital, the Swedish Institute of Occupational Health (Arbetsmiljöinstitutet), the Swedish National Chemical Inspectorate (Kemikalieinspektionen) and the Association of Swedish Engineering Industries (Sveriges Verkstadsindustrier), etc. All of these had databases operating at MIC - Medical Information Center - and another advantage was that the clients of these organizations could search all the databases with the same search language.

One early problem was that all the MEDLARS programs were written for a Honeywell computer and there were no such computers in Sweden. The programs had to be rewritten for the IBM machine. This was time consuming but successful and stirred up an interest also in the US because most American universities had IBM machines as well. In fact, in 1968 the Head of the Information Center, Bruno Lundberg, was invited to Harvard and gave a highly appreciated demonstration of the Swedish program version. Of course, this was also of considerable interest to other countries outside the US that planned to run the MEDLARS tapes.

The German Institute of Medical Documentation and Information (DIMDI) in Cologne signed a leasing contract, and began running MEDLARS in 1970 with the use of BMDC software programs. Also in 1970, BMDC negotiated a contract with the Australian Government according to which they bought the MEDLARS programs from KI. During this time there were also discussions on whether BMDC would provide MEDLARS services to the Eastern European States. In 1969 the director of NLM offered the possibility of a limited-time license for that purpose via BMDC. However, this was not used at that time. Later on, a new license was agreed upon and was used by Poland from 1974 and by East Germany from 1981.

The initial contract with NLM was followed by a number of amendments over the following years, related to the extension of the data base (MEDLARS II), software (Elhill), indexing procedure and other European Centers (1974), etc. The development of on-line access to the different files required specific amendments and agreements, in our case for MEDLINE, Toxline, Chemline (1976), Cancerline at NLM (1978) and other interesting biomedical databases. By the end of 1997 the formal agreement was terminated, which unfortunately in some respects meant that the nature of the collaborative activities between KI and NLM changed.

Many individuals from BMDC, both indexers to be and system analysts passed through NLM in Washington DC during these years. Stories could be told about many of them but let me just refer to one very capable young systems analyst (Rune Isaksson) who spent some periods over there. Staff members at NLM were interested not only by his knowledge but also by the fact that he did not say much. Of course, they wanted him to have an impressive view not only of NLM but of the US as well. Every time when he was showed something or they took him out to visit a place, the answer was: "*I know of a better place*". – Now, what could this marvellous place be? Of course, the fellows at NLM were curious and I was asked about it a couple of times during my visits. The answer – a small tiny village some Swedish miles from Kiruna far up North!

Not only MEDLARS …

As early as 1965, a significant body of information in biomedicine for researchers was identified within the field of biochemistry and the Department of Chemistry at KI started to subscribe to Chemical Titles (CT). It was, however, the intention of BMDC to expand its services and an opportunity occurred in 1967 when the US Government offered all member-countries of the OECD to use the complete Chemical Abstracts information material for one year free of charge as soon as the individual country could have the necessary hardware operational. The capacity to operate the tapes was already at hand at KI as the subscription to the CT tapes had already required a search software for some years (EPOS/VIRA). The Department of Chemistry also subscribed to Chemical Biological Activities (CBAC) and on the European scene there were subscribers to these tape services also in Germany, Holland and England.

In 1967 the Council for Engineering Research (TFR) provided funding for a study visit of associate Professor Anders Kallner to the USA, and their documentation committee allocated some money for staff and operating costs of CT, CBAC, Basic Journal Abstracts (BJA) and Chemical Abstracts

Condensates (CAC) at BMDC. Financial support for the chemistry project was also provided by the Swedish Council for Scientific Information and Documentation (SINFDOK). Searches in Chemical Abstracts Services tapes were provided not only for researchers at KI but also for other groups of academic researchers by the Library at KTH.

When the Swedish Parliament in 1969 decided to allocate money for four positions at BMDC to specialize in activities concerned with biomedical information, the center quickly developed and later became the second largest provider of such information in Europe. Staff members during the next years were Bruno Lundberg, Anders Kallner, Christina Olivecrona and Gunvor Svartz-Malmberg. It was fundamental to have such a capable staff and for the first time material from the three major sources on tape was run together within the same organization. This provided the basis for a large integrated system covering in depth the whole published biomedical field. No other organization in Scandinavia was at that time able to provide such services. In 1970 access to the US database Psychological Abstracts was also acquired (operated at BMDC by Berit Aschberg).

In 1973 and 1975 KI was awarded grants to develop a documentation system in reproduction research (the "*Human Reproduction Project*").

Figure 4.5 Ingela Byfors och Christina Olivecrona in action at BMDC.

The MEDLINE era

In the 1960s MEDLARS covered articles from about 2500 journals. A concentrated computer database system of the most significant ones was then developed by NLM and in October 1971 put into operation in the US and accessed online by telephone. It was called MEDLINE – "*MEDLARS on line*" – and BMDC was the first regional center outside the US to get access to this software package. The system was installed during the winter of 1971-1972 at BMDC and QZ by the computer and data expert Robert (Bob) Burket from SDC in Los Angeles, California.

It was an exciting moment when on the first trial-night the system became operational, connecting two separated localities in Stockholm. Even more fascinating was the opportunity 1-2 months later to demonstrate the system for the first time outside the Stockholm area, at a clinical conference held at the Department of Internal Medicine of the regional University Hospital in Linköping, about 200 km south of Stockholm. By July 1972, the system was installed on a temporarily leased computer and after just a few months eight terminals, all over the country, were connected to the system on a regular basis.

At about the same time a contract was signed for operating MEDLINE on the QZ IBM 360/75. The database then covered a three-year period and contained about 320,000 references from the 1,200 biomedical journals and increased yearly by 140,000 new references corresponding to an updating of about 10,000 monthly.

MEDLINE at that time could be accessed in direct dialog with the computer through a typewriter terminal, TTY, meaning that the end users (the physicians or the librarians) had to learn negotiating their own searches. This made it necessary for BMDC to arrange courses and information meetings. It became apparent that MEDLINE eventually would replace MEDLARS and a project to create a Nordic Network for medical information based on this system was approved by the Nordic co-operative committee NORDDOK. The Biomedical Library of Gothenburg became the first non-KI online user and was followed in 1973 by the Central Medical Library in Helsinki and the university libraries of Oslo and Copenhagen.

Figure 4.6 Photo taken at Bob Burket's visit to Stockholm 1972. From left: Professor Sune Bergström, President of Karolinska Institute, Robert C Burket, SDC Calif., Rune Isaksson, head of systems development at BMDC, and the author Carl-Eric Elwin, director of BMDC.

NORDFORSK initiated the first asynchronous (packet switched) Data Communications Network, SCANNET, and MEDLINE was one of the first five online services to be included. The network used leased telephone lines, started in 1976 with nodes in the four Nordic capitals and Gothenburg. NORDFORSK covered operational costs through 1979 while communication via the network was free of charge for users. The number of online customers increased quickly to around 1,600 in 1979.

Retrieval functions in MEDLARS and MEDLINE

The basis for the functioning of the two data files is a controlled vocabulary, MeSH, a hierarchically controlled vocabulary, a thesaurus. The first issue of MeSH in 1960 held about 10,000 terms, but today the vocabulary contains more than 19,000 terms and is annually updated to reflect changes in the medical sciences. The alphabetical list is also arranged hierarchically by subject categories with the broadest terms on top and the more specific, narrower terms at the bottom.

A specially designed group within NLM works on definitions of suggested terms and many terms are defined and used within the system but do not appear in the printed Index Medicus. These so called "provisional headings", or "qualifiers", in the computer, are often defined in co-operation with specialized consultants and/or scientific organizations outside NLM. In the meantime the frequency and usefulness of these terms is carefully monitored and sooner or later they may become full MeSH-terms.

The system was initially built to produce Index Medicus. Skilled subject analysts examine the journal articles and assign to each one the most specific MeSH terms applicable, usually between 10 to 12, using this vocabulary whatever may have been the author´s words or suggested index terms, and this makes sure that all material is uniformly indexed into the system.

The system developed for publishing Index Medicus was found to allow the production of recurring bibliographic lists on special medical topics but also the retrieval of subject specific journal citations, so called search on demand.

The searching procedure allows the combination of different terms via an AND search through and within several fields of the citation. The search strategy could also include the Boolean operators – AND, OR, NOT – written in upper case. The search procedure could be further improved by using "MeSH subheadings", to help describe more completely a particular aspect of a subject.

Figure 4.7 MEDLINE was marketed by participating in different meetings and conferences in Scandinavia. The photo shows Gunvor Svartz-Malmberg demonstrating the system at a meeting of the Swedish Medical Society in 1973.

The Drug Literature Program

In 1962 prominent persons in a presidential committee suggested that a National Drug Information Clearinghouse be established at NLM and this was further strengthened by the President´s Science Advisory Committee 1966, which recommended the formation of a computer-based file on toxicological information in their report "*Handling of Toxicological Information*". The later program was established within the Department of Health, Education and Welfare. As a result of the first group´s proposal a special program had been operational for a few years compiling data on new drugs and their adverse effects. This was supported by professional associations and societies and they also assisted in developing drug terminology for NLM within the "DLP" (Drug Literature Program) headed by Ms Winifred Sewell who had a long experience in drugs and drug information. She was supported in her work by a team of trained pharmacists, chemists and pharmacologists.

Two major problems were of concern to the DLP. The first was the deficiencies in chemical terminology. In co-ordination with the Food and Drug Administration and the Cancer Chemotherapy National Service Center, DLP provided the funds for the Chemical Abstracts Service to register about 30,000 compounds related to drugs so that journal articles related to a specific chemical entity could be indexed.

The second problem was to develop terminology relating to drugs and drug actions, adverse effects and toxicity. I myself had the opportunity to work on this as a DLP staff member 1965-1968 and under contract through 1970. In co-operation with ASPET (American Society for Pharmacology and

Experimental Therapeutics) new subheadings such as "Adverse Effects, Chemically Induced, Toxicity and Poisoning" and other ones related to drug actions were carefully developed, designed, defined and tried out. Journal retrievals using these subheadings led to the information product entitled the Toxicity Bibliography published between 1968 and 1978. At my last visit to NLM in 2001 I noticed that almost no changes of subheading definitions had been undertaken over the years and it is my personal belief that this standardized, controlled input to MEDLARS-MEDLINE files is a major factor behind the high quality of these files.

Figure 4.8 From a Medline user seminar at MIC in 1989.

Since the activities of the Toxicology Information Program and DLP were similar in nature, both programmes were merged into a new unit at NLM called "*Specialized Information Services*" (SIS) and the Drug Literature Program was abandoned in 1970.

Summing-up

NLM is perhaps best known for the bibliographic database MEDLINE. However, the NLM's collections are locally available onsite and on the global level through the Internet. Due to the technical development in later decades and the increase in research and published data an information explosion has occurred in a variety of fields and created a necessity to deal with it. NLM has caught up with this but the basis has always been the categorization-, classification- and indexing procedure that has gone on for decades and still is developing continuously. One of the more important areas is the drug literature and distribution of drug information. A good example of this is the action of NLM in developing the program of MEDLINE for CD-ROM (SilverPlatter), where a number of universities and organizations were involved in the evaluation of the most feasible system. Drug information is an essential part of life sciences online databases today. Since 1996 a number are available on the Internet, and NLM has developed specially designed files for various user groups and their needs.

Today MEDLINE contains about 16 million journal articles and abstracts from about 4,600 journals in the US and 70 other countries. Figures indicate that 400 million searches of MEDLINE are performed yearly. Examples of drug related files are MEDLINE/PubMed, Genbank, Hazardous Substances Data Bank, AIDSInfo, Toxnet, Specialized Information Services, Medlineplus (for laymen, introduced in 1998 – unfortunately not much used in Sweden). Of concern is that Internet is not a controlled medium, it is unstructured and to a larger extent relies on the quality of the input. NLM seems to a great extent being aware of this.

In 1975 the name of BMDC was changed to MIC, Medical Information Center, to better correspond to the organization's orientation towards information. Two years later it was suggested that a "joint organization" be created between KIB and MIC, which came into being 1979 and was called KIBIC (Karolinska Institutets Bibliotek och Informations Central), from 2000 just KIB. The computer issue

Figure 4.9 Photo from the 25th anniversary of BMDC/MIC in 1992. In the middle Göran Falkenberg, head of MIC at the time, with his predecessors Carl-Eric Elwin (to the left) and Bruno Lundberg (to the right). Source: MIC 25 år - 1967-1992, en tillbakablick.

was finally resolved in 1989 when due to an agreement between KI and IBM an IBM 4381 could be installed on the MIC premises with a capacity superior to the one at QZ.

In 1974 I left to become a clinical pharmacologist at the University Hospital, Huddinge, and to be involved in building up a Drug Information Center. Ten years later – 1984 – a drug database named DRUGLINE was formed from the collected material and constructed in a way similar to MEDLINE. Today this file contains about 14,000 records. Since 1996 it is searchable via the SilverPlatter program and from 2003 also via a search-module within the Stockholm County Drug Unit.

In the 1990s many more databases than before had become available from MIC, 14 with MIC as the host and 31 via NLM. The same search language (Elhill) could be used for all databases. An automatic electronic communication link was also created between the computers at NLM and MIC (Micgateway).

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To all staff members at NLM, section heads and people that I knew of since my stay, I should like to express many thanks for making my visit in 2001 so memorable and valuable in preparing this section. Special thanks to Elliot R. Siegel, at that time Ass. Director for Health Information Programs Development, for providing the literature on the Development in the US, and to Ms Winifred Sewell, my boss during the DLP period as visiting scientist to NLM, NIH, who arranged for my introduction and interest in drug information and documentation. She passed away in 2005.

At the former BMDC thanks go to all the staff members mentioned in this section, to the head of MIC for valuable contacts and to co-workers not mentioned by name. Gunvor Svartz-Malmberg gave me the opportunity to carefully look through all her pictorial material from BMDC. To Margareta Almling, Head of Administration during my time at BMDC and who also wrote the “25 years” history, which has been a most valuable document in my work on this section. Finally my thanks go to the memory of Sune Bergström, professor of Biochemistry and President of Karolinska Institute during my BMDC time for his visionary views on biomedical documentation in Sweden and his never failing efforts to achieve this vision. He passed away in 2004 and it seems significant that already the day after his death the renowned newspaper, the Washington Post, had an obituary of this Nobel laureate in medicine 1982.

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4.3 Early access: Other online systems used in the Nordic countries

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Reading the regular electronic bulletin on Online and Web news that Lars Klasén produced during 1999-2006 (1) for the members of the Swedish Association of Information Specialists (SFIS, former TLS) one is overwhelmed by the "business" aspects of this industry, the multitude of the company names, the mergers, acquisitions and sales and still from time to time actual technical changes.

This was not the case in the early 1970s, the beginning of the online era, when two large systems names were on the screen: RECON, the online search system developed in the NASA's sphere in the US and Orbit, the system developed by Carlos Cuadra at System Development Corporation (SDC), USA. The RECON software is at the origin of the successful information services developed by Roger Summit at Lockheed Missiles and Space Company. I remember well the excitement and almost incredulity when the services acquired the trade name DIALOG, a usual everyday word becoming a brand name. We thought the choice was genius.

About the same time search services developed in Europe where also looking for good brand names. QUEST became the name of the search system developed by ESA (European Space Agency) at Esrin in Italy, after having used the RECON software for starting their services, and Questel the name of the services based on software originally developed in France and commercialized by Télésystèmes.

ESA/IRS

The early period of the European Online Activity is described in Noel E.C. Isotta's (2) talk at the celebration of the 25th anniversary of the information agreement between NASA and ESA in Frascati, Italy, on April 14, 1989. Commenting the first SDS (Space Documentation Service) remote terminals he notes how desperate they were to increase remote access to the NASA database having only one remote terminal (in Paris) at the time. Quoting from his talk: "*we were fortunate enough to meet a*

pioneering attitude from Sweden, where Björn Tell, an eventual DAG (Documentary Advisory Committee) chairman, but then the Chief Librarian at KTHB (Royal Institute of Technology Library) in Stockholm decided that his library should be connected... and SDS/IRS was on the way".

Björn managed in 1972 to extort for his budget a half persons salary dedicated to SDS/IRS (SDS/Information Retrieval Service). This person was Åke Nord (known internationally as Aake Nord), a KTH-graduate in electrical engineering who now had to handle the intricacies of communication lines, servers, minicomputers, terminals and remote printers and not the least the contacts with the Swedish PTTs (Televerket). Åke was at the same time responsible for the training of his colleagues, all concentrated at KTHB, for the use of the system. The department of avionics at KTH had access to the ESA computers in Darmstadt, Germany, and in exchange of providing reports of interest for the space industry could order retrospective searches in the database to be executed offline in Paris. This activity was now taken over by the library that made the searches on behalf of the Swedish users and administrated the collecting of "space reports" in exchange.

Figure 4.10 NC (National Centre for ESA/IRS) meeting in Frascati 1980-1982. Persons mentioned in this book, from right to left: Åke Nord, IDC-KTHB, Ulla Karlsson, IDC-KTHB and Peter Rosenbrand, COBIDOC (NL), and at the far end of the table David Raitt, ESA/IRS.

An early promotion of the SDS/ESA in the Nordic countries was done by none other than David Raitt, since then well known as the chairman of the yearly International Online Information Meeting in London, a position he held 1980-1999. David reminded us of this during his talk at the celebration of the IDC-KTHB 25th anniversary in September 1992. Another part of his talk gave us insights in the future developments of microcomputers, most of them well realized by this day. The ESA/IRS (European Space Agency/Information Retrieval Service) had its own network ESAnet with nodes in all member states and since 1976 National Centres to promote the services and train the users.

Until 1988 the Swedish centre served also as node for Finnish users. Communication went through computers in Darmstadt and from there via a dedicated line to Copenhagen. From Copenhagen to Stockholm traffic was in the hands of Televerket. Televerket provided us with a high capacity line. Users could dial-up the ESAnet minicomputer at IDC-KTHB using 1,200/75 bps split speed terminals but at the centre itself we also had a HST-High speed terminal, allowing dial-up at 2,400 bps for the "fastest" online searching of international databases in our countries at the time.

Communication failures had to be traced across three national borders and as many at the time still "national" monopoly telephone companies. Both the National Centre in Stockholm and the National Centre in Copenhagen were thus involved when things went wrong and this happened a lot more often than nowadays Internet failures. Occasionally, when lines were being cut in some field by an excavating machine, the helpdesk telephone would start ringing incessantly and Åke from another telephone would try to come in contact with Durga Nag in Copenhagen to find out where the

breakdown could have occurred. Durga in turn would contact the Danish PTT and it could take hours before the fault was diagnosed.

The managers of the national ESA/IRS centres met twice a year to report on usage in their respective countries and discuss news and policy. Especially deciding on prices was a difficult matter as revenues never covered the entire costs of the services. The ESA-DAG on the other hand was composed of "experts" representing the member countries. They supported the development of this European system at the time when no national systems were yet existing and the Nordic countries, never having had such ambition as setting up systems in competition with the large commercial ones, were good supporters of the continuous technical improvements.

Figure 4.11 ESAnet with nodes as of June 1974 with planned extensions (- - - -). Source: KTHB brochure 1974.

The delegates from the Nordic countries would meet before the DAG meetings and discuss the questions at hand possibly deciding on concerted actions. As they were directors of documentation centres for scientific research and development in their respective countries, technical improvements and quality were prioritized over income from usage.

Also the maintaining of small "national" or European databases side by side with the larger databases of broader interest, was supported. In that sense ESA/IRS often developed pioneering services. Some of these were the adoption of CCL besides its own search language, a function called "zoom" listing the keywords of the retrieved records to help improve search precision, the possibility to order documents online from ESA's own technical reports collections or soon later from co-operating libraries, databanks besides bibliographic databases and the possibility for database producers to hire "private" space on the system, that gave them the possibility to set up databases online with usage restricted to authorized users.

The transition from not so intelligent terminals to microcomputers at least at IDC-KTHB went on in a rather "slow motion". At some time there were only two of this "modern equipment" placed in

different rooms and Åke was the first to arrange Tetris competitions after working hours or chess parties; all with the rationale that such practice was good for our training in interactivity and faster keyboarding!

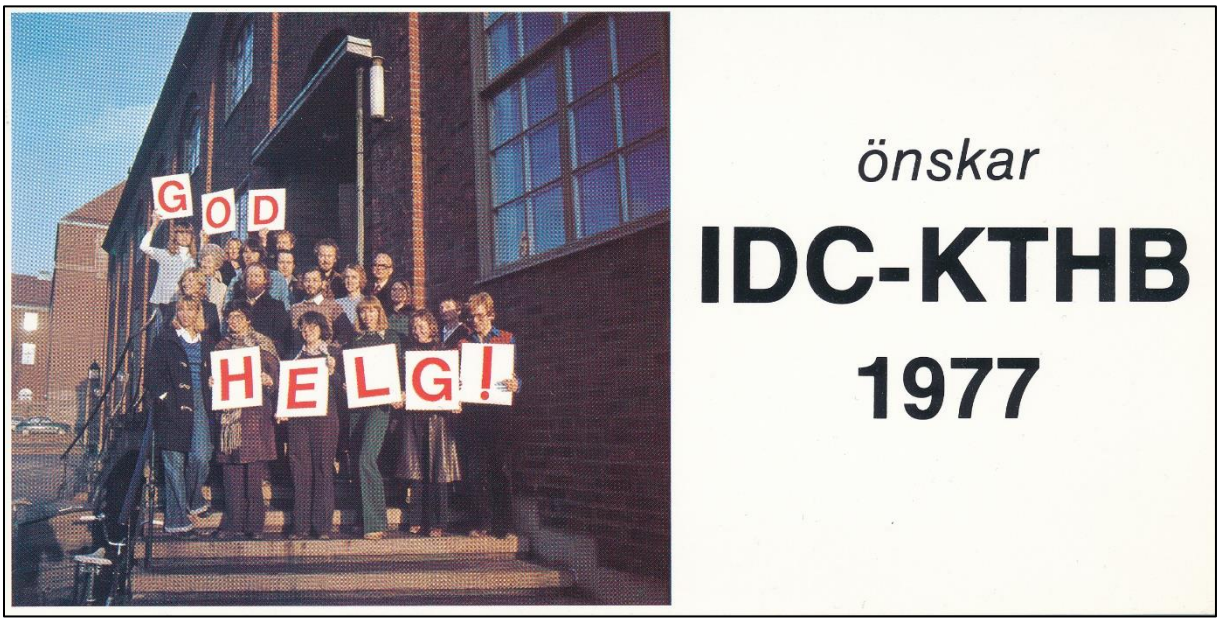

Figure 4.12 Staff of IDC-KTHB wishes Merry Christmas 1977. This kind of Season Greetings was sent to all customers as a part of the centre's marketing efforts.

SDC/Orbit

The SDC/Orbit system was first introduced in Sweden by a visit of Carlos Cuadra to KTHB on the invitation of Zofia Gluchowicz, then head of the documentation department. Perhaps the fact that Orbit very early had a free text searching function led Zofia to quote a poet saying "*give me words, give me words*" when introducing our visitor, implying that only the searchers vocabulary puts a limit on the systems retrieval possibilities.

Data-Star

Data-Star, with much discussion on how to write the name, one word or two, all in capital letters or only to start each part of it, hyphenated or not, made its entrance on the market in Europe 1981. This system, set up by the broadcasting company Radio Suisse, Switzerland, was the first system in Europe with an outspoken intention to make money from providing online information and declared itself ready to compete with DIALOG in Europe. As it from the beginning included several files with also European business information and as communication on the Data-Star network was cheaper, it had some success.

For their first board of counselors the managers choose representative users from the different countries in Europe, for Sweden the pioneer user Malin Edström. Her experience in using several different IR systems from the beginning and also in participating in the evaluation of the search software TRIP (developed by the project team at IDC-KTHB that later became Paralog) made her involvement very valuable for the Data-Star system developers.

Many other systems …

In the scientific documentation centres in the Nordic countries most of the information systems available at the time were being used, and by several persons, intermediaries, on behalf of external users. New features and costs comparisons were being discussed continuously and proactively reported to the service producers with whom these centres had good working relations. When the same database was being offered on different systems the tenants of one system argued fiercely with the tenants of another on the qualities and drawbacks of the implementation and created a vivid feeling of participating in the overall development of the industry. This emulation was perhaps also due to the fact that these users were close to IR systems being developed in their own country like TRIP in Sweden, HELECON in Finland, ALIS in Denmark and Polydoc in Norway. They could self assess the technical possibilities and they hoped to influence. As communication costs were high, pricing models based on online time or not, character transfer or not were very debated issues.

By the middle of the 1980s systems first developed for mini-computers were now transferred to microcomputers like the international Mini-ISIS and Polydoc. Both these systems presented the STAIRS feature of having different working modes. During a search session you had to change from browsing mode to searching mode to print mode. For Poly-doc for example the command word for changing from search to print was preceded by two dots (two full stops instead of one for the other command words). An enthusiast of the system got the nickname of mister "dot-dot" as he insisted so much on this feature when training colleagues.

Figure 4.13 Part of IDC-KTHB staff 1978 at a staff meeting in a crowded room. Clockwise from left to right: Malin Edström, Gunnar Carlsson, Ann-Marie Brundin, Lilianna Kanafarski, Lars Klasén, Ulla Carlsson, Bo Johansson, Åke Nord, Luise Kaiserfeld.

In our book on how to search databases Ulla Karlsson and I (3) list fifteen information services in use in the Nordic countries in the first years of the 1980s. We designed a one-page standard description for information services to make it more practical for the reader to decide on the usability of the system for his/her needs and the means of access through international communications networks.

In the larger scientific documentation centres in the Nordic countries there was an ambition to keep updated on all of these services if not for own use at least for being able to inform and help the patrons of the centres. Of course for reasons of subject specialization some centres were better informed on some services than others.

Below are comments on some of the online services used at these times.

BLAISE - the first automated British Library public service was a book catalogue and not an analytical bibliographic database as most of the databases on the other services. The difference was not always so easy to explain to literature engineers (i.e. information specialists with subject knowledge in scientific areas who usually had not received any library education at all before working with information retrieval). In their view books were of little use as they did not represent "scientific information" as this was published in referee journals!

DIALOG - is the service that very early developed a very readable and systematically updated documentation for its users as well as an informative newsletter. Unfortunately the CD-ROM produced by DIALOG to celebrate its 25th anniversary does not mention its early uptake in the Nordic countries and the early active users it found in those countries.

Symptomatically in her report on 25 years with IOLIM, Irene Wormell (4), also an early user of online and now professor at the library school in Denmark, tells about her use of file 7 in DIALOG rather than her searches in SCI (Science Citation Index) or SSCI (Social Sciences Citation Index), i.e. the databases from ISI (Institute for Scientific Information). This shows that the name of the spinner rather than that of the bibliographic index was getting used, although researchers had been using the paper versions of these indexes rather trustfully for a long time mainly for checking the impact of their or other author's papers.

It took some time for other services to follow DIALOG's good standards regarding user information. Those of us who were participating in the development and distribution of "home-made" systems can appreciate the continuous effort and staff capacity requested for such quality and timeliness. DIALOG grew at first in the Nordic countries by "word of mouth" advertising but after a while relied on agents for its marketing and user training. These were not, as for other systems, located at the main documentation centres but were freelance professionals who had been using the system and had good professional contacts with the documentation centres or professional information organizations.One of them was Ulla Retlev in Denmark, who did write about the needs of the users (5).

DIALOG's competitive price policies and especially the initiative of pricing a downloading format in the beginning of the 1980s as a solution for copyright handling were applauded, in particular by us at IDC-KTHB. Indeed we had been struggling with database producers regarding special leasing contracts since 1985 to be able to offer references in e-format in our DOREF service (6).

The entire community of database producers was very sensitive on this issue as they feared the "easy" copying possibilities of electronically transferred information. Sales of printed indexes was declining and they were losing control over their revenues. The advent of CD-ROM technology in the middle of the 1980s that revived direct distribution and even favoured local proprietary online services helped them regain part of this control but in no way lightened the burden of the intermediaries who knew that you have to search several databases when seeking information.

DIMDI - this system is based on the GRIPS software originally developed in Germany. This has a natural attraction for Sweden where the only other system with left truncation capacity had been developed. This is required for free text retrieval in the German and Nordic languages as words as well as significant "stems" can be embedded in composite words. Biologists all over the Nordic countries have been using this system in parallel with MEDLINE and the marketing agent for the system is co-habiting in the same "documentation centre" as this, i.e. MIC at KIBIC.

ECHO - this service was developed by the European Commission to promote the usage of information services in Europe and establish an European online information market. Based on the German GRIPS software it was available for free on a server in Luxembourg from 1980. Communication costs were the users own responsibility. Used mainly by the DIANE centres to train

information retrieval it became better known when the European CORDIS database or even more the Electronic TED (Tenders Electronic Daily) database appeared on the system. ECHO promoted CCL and also featured instructions in several languages well before DIALOG. Other systems in Europe most often limited themselves to their national language and English.

HELECON - was an entirely Nordic system developed in Finland and the base for a tight co-ordination between the national schools of economics in the different countries. Communication access was through SCANNET and later Datapak (of Finland).

INKA – a German online service also based on GRIPS system software. This service was for a long time difficult to use for non-German-speaking people. When the providers of the service tried to market it outside the country they contacted IDC-KTHB to be their representative. As we had been using one of their main databases, DOMA (Dokumentation Maschinenbau), in our SDI service we expressed our interest, and in 1982 became their representative. But usage was low and so the profit. No large marketing efforts could be afforded. The situation improved when INKA joined STN-International (see below).

Figure 4.14 Ylva Rosell of IDC-KTHB demonstrates CAS databases, online at STN International, at a medical fair in Älvsjö in 1996.

A funny anecdote related to this service was that once Sweden entered the European Union in 1995 bills started to come in German instead of English as had been the case for some time now. The reason was that the administration applied at once the principle of non-discrimination for EU-countries, here interpreted as the same prices and the same language for all! Later on, INKA replaced GRIPS with another software, Messenger.

STN International – INKA together with FIZ Technik, another German online service, in agreement with Chemical Abstract Service, USA, developed the STN International (Scientific and Technical Network), based in both Germany and USA. Since 1987 IDC-KTHB has been the agent for this service. For a part of it, CAS Online, it was also the representative for some years in Denmark and Norway. In Finland VTT was the STN International and CAS Online representative from the start.

I/S Datacentralen **-** the Danish online service (situated at the I/S Datacentralen af 1959) was based on the well-known STAIRS software and provided Danish databases and the early Chronos Eurostat.

NSI A/S Online TJENSTE - a service offered by the private Norsk Senter for Informatikk (NSI) was based on the Polydoc software developed at the centre and was later adapted to microcomputers.

TESS – a commercial service based on 3RIP (a predecessor of TRIP) software which provided Swedish databases on steel and mechanical engineering for a short while but had a too small market to succeed.

Pergamon InfoLine - was also one of the early online services used in our countries. It was based on the search software BASIS developed at the Battelle Research Institute in the US. One of its advantages was that it provided access to patent databases and business information - something scientists learned to use as well as scientific databases in their search for research information, much thanks to the availability of these on online systems.

IMDOC – was another information (text) retrieval system (7) developed in Sweden by Industri-matematik AB as early as in the middle of the 1960s. It was mainly used in the field of legal information. Transformed to Find-It the system was used and still is by InfoTorg online services in Sweden and for a long time also to search the national library catalogue system LIBRIS. A version of IMDOC called MINTTU was used in Finland for legal information and other information.

The list of services and systems used in our countries and even their names has certainly been changing all the time. For example in 1992 the services and systems used at IDC-KTHB were: Affärsdata, Artikelsök, BRS, Byggdok, CAS Online, CIS, DAFA (for EPOS/VIRA), Data-Star, DIALOG, DIMDI, ECHO, ESA/IRS, FIZ Technik, FT Profile, MEDLARS, Nordres, Orbit, Statens Datasentral, STN International, Télésystèmes-Questel, Transguide, and Waterlow Signature (former PFDS).

Figure 4.15 Staff of IDC-KTHB on the stairs of KTHB at its 25th anniversary in 1992.

And the list certainly has changed since!!

… but also people

More certain even is that the interactive retrospective information searching had a very early and enthusiastic start in all our Nordic countries thanks to the keen interest of the information officers in the specialized documentation centres who struggled with the hardware and the software of the time, but were a part of the brainware nowadays more or less well implemented in the present user friendly interfaces. The so-called “infomediaries” (8) were usually very user friendly, indeed.

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4.4 Early database production

Elisabet Mickos

Manuscript received 2007

Introduction

The Nordic countries have always been keen on using and trying new technology. The breakthrough of information technology in the 1970s was followed by the rapidly developing EDP (electronic data processing) field, especially related to information services. Information providers took this opportunity to start transferring abstract and index journals into machine-readable and interactively searchable databases. In the Nordic countries the first public online databases appeared in the middle of the 1970s. In this survey of early database production I will concentrate on the production of bibliographic databases up to 1984.

This review is in many respects based on NORDINFO's early database policy and on the author's knowledge of Nordic co-operation on databases such as within the SCANNET network. I have also tried to find information on the current status of the databases, but I have not succeeded in all cases.

Sixten Abrahamsson, a member of the NORDINFO Council (1) stated in 1982 that "*NORDINFO is responsible for improving the Nordic situation in the library, documentation and information field. The Nordic countries should therefore pursue an active database policy*."

Origins of Nordic Database Production

The use and production of databases started early in the Nordic countries. Other authors in this book refer to the use of MEDLARS, which began in Sweden in 1967. At the same time IDC-KTHB started their SDI service EPOS/VIRA based on some international databases. I myself worked in the beginning of the 1970s as a young engineer for a company in Finland producing textile machines for texturizing nylon. In this small company IDC-KTHB´s SDI-listings concerning nylon-66 circulated for ordering interesting articles. It was something quite new and I believe that my interest in information and documentation started at that time.

For small countries such as the five Nordic countries, with three quite similar languages (Swedish, Danish, Norwegian) and two quite different ones (Icelandic, Finnish), the task to start building online databases was not easy. Anyhow, as described in many other chapters and sections in this book the online era began as early as in the late 1960s. The Nordic countries were eager to "jump on the train" and to produce electronic information instead of printed reference cards or publications.

The first database inventories

As Merja Lehti reports in this book, in 1978 NORDINFO sponsored the first study of databases produced in the Nordic countries. The result was an internal report to NORDINFO on nearly 500 databases of different kinds. A reduced list was published in a NORDINFO publication in 1981 (2). Of the about 130 bibliographical databases nearly 50 were reported as machine-readable and roughly 30 as online databases. At that time 20 online databases, including some international with Nordic input, were connected to the SCANNET network. The rest were mostly library catalogues or other

similar databases for internal use. The non-bibliographical databases included nearly 70 online and about 80 other machine-readable databases. Several of these online databases concerned public administration and law for internal use only. Some were later on developed into online databases for external use.

In 1975 Tove Molvig presented a report on databases on magnetic tape in Norway (3). There were more than 50 such databases in use at 18 libraries or information centres. Most of them were international databases, while 8 were of Norwegian and 2 of Nordic origin.

Nordic online production environment

In the end of the 1950s the idea arose of converting existing card files, index and reference journals etc. to databases suitable for IR services. The existing indexes were in printed form or on magnetic tapes. It was natural for libraries, information centres etc. to start the conversion of their archives into machine-readable form, or to transform those that were already machine-readable into databases for online use.

In order to make online databases accessible to external users, connection to a network was essential. In the beginning of the 1970s there existed some international networks such as Tymnet, Telenet and MARK III. Tymnet and Telenet were used since 1974 in the Nordic countries to connect to online services in the USA, such as Lockheed (later DIALOG) and SDC via dial-up nodes in Amsterdam or London. Lockheed at that time provided access to five international databases (among them Chemical Abstracts and COMPENDEX).

To take advantage of the new technology and promote database production, the Nordic body NORDFORSK in 1974 decided to establish a Nordic network for information retrieval. The result was the SCANNET network, which started in August 1976. It is described in another chapter in this book. The Commission of the European Community as early as in 1971 passed a resolution to establish an information retrieval network to be called Euronet, but it did not become operational until 1979. Both networks were later merged into the networks of the national PTTs.

The early start of SCANNET made it possible for Nordic online databases to become more easily accessible to Nordic users. As a matter of fact, there is almost no information published on Nordic online databases before the SCANNET era. In addition, it is difficult to find published data on the start of a database. With the start date I mean when the database went online. Nordisk Databasguide and SCANNET Today mention only the time span of references included in the database and no start date. Therefore I have principally based the start date of a database on the information on new databases connected to SCANNET as well as on reports in NORDINFO-Nytt from producers of databases sponsored by NORDINFO.

The development of a new database as well as the transfer of existing cards, reference and index journals into machine-readable form and further to interactive online databases was a long and time-consuming procedure. You had to choose the proper system, a suitable host and search language. From NORDINFO's point of view it was essential to advise database producers on how to produce databases and how to make them accessible online via SCANNET. In the beginning of 1978, NORDINFO sponsored a project called "*ABC för databasbyggare*" ("*ABC for database producers*").

It was also important to instruct and help users about this new information resource, including Nordic as well as international online databases. NORDINFO decided to start a project aiming at a textbook in Swedish about interactive information systems and how to use them. The project set off in 1979 at KTHB, and was later updated and published in 1985 as "*Att söka i databaser*" ("*How to*

search databases") (4). Authors were Ulla Karlsson and Marie Wallin. This book in a Nordic language was at the time very much used and appreciated by information specialists, students and librarians.

Figure 4.16 Elisabet Mickos at the secretariat of NORDINFO summer 1987.

As new online databases were produced in the Nordic countries by different organizations in different ways, the result was a collection of small databases in different languages within the same network, using different search languages. At the same time existing online users had access to large international information retrieval systems such as Lockheed and SDC. In these systems it was possible to search hundreds of databases with the same search language.

To encourage the use of Nordic databases it was essential to find a way to harmonize the databases. Sixten Abrahamsson recommended in 1978 (5) that when NORDINFO funded an online database development project, it should encourage the use of standards. He suggested the use of the common command language, CCL, developed by and recommended within Euronet. Unfortunately this recommendation was not taken seriously, or was too difficult to apply in all those diverse systems. As pointed out in SCANNET Today, 1989 (6), one had to use 18 different "known" command-based, 64 menu-based, 53 proprietary and 30 unnamed languages to perform searches in the 377 Nordic databases that were available at the time. Today most of the databases are searchable on the Internet by simple user interfaces and search systems, but complicated questions still demand the use of the native search language.

Helge Skov mentions in 1978, in his frequent reports on databases in NORDINFO-Nytt (7), that the leading USA-based online services SDC and Lockheed at that time provided access to about 100 online databases with 20-30 million references. Potential users were at least 500 million people. The planned Euronet had a population basis of about 250 million and the operational SCANNET about 25 million. In addition there were some European host organizations, such as ESA/RECON in Frascati, with about 10 million references. The expression "the online revolution" was coined at that time.

The first Nordic databases

Which was the first online database produced in a Nordic country? It is not so easy to answer this question. Byggdok, later called BODIL, was certainly one of the first Nordic online databases for public use, maybe the first one.

The SCANNET network started in August 1976. The following year SCANNET started a newsletter, SCANNET Today, which was published roughly twice a year until 1992. The first issue listed five databases connected to the network: CIS (Chemical Information System), IRRD (International Road Research Documentation), MEDLARS, Byggdok (then called Nordbyggdok) and EPOS/VIRA. EPOS/VIRA, produced by IDC-KTHB, provided SDI service on 21 international databases.

In this respect Byggdok was the first pure Nordic online database. Byggdok started in 1975 as a bibliographical database in Swedish for building, construction and civil engineering in the Nordic countries. It was produced in Sweden by Byggdok (The Swedish Institute of Building Documentation) with input from the other Nordic countries. The command language was first ISIS and then a Swedish version of Golem (which was later replaced by Minisis and finally BASIS). To develop the system NORDINFO granted Byggdok money in 1978. The Byggdok database and other databases of Byggdok, offered online under the generic name Byggtorget ("The Building Market Place"), was in 2003 acquired by Infodata AB and set up online on its online service InfoTorg. It was however discontinued as of 2006.

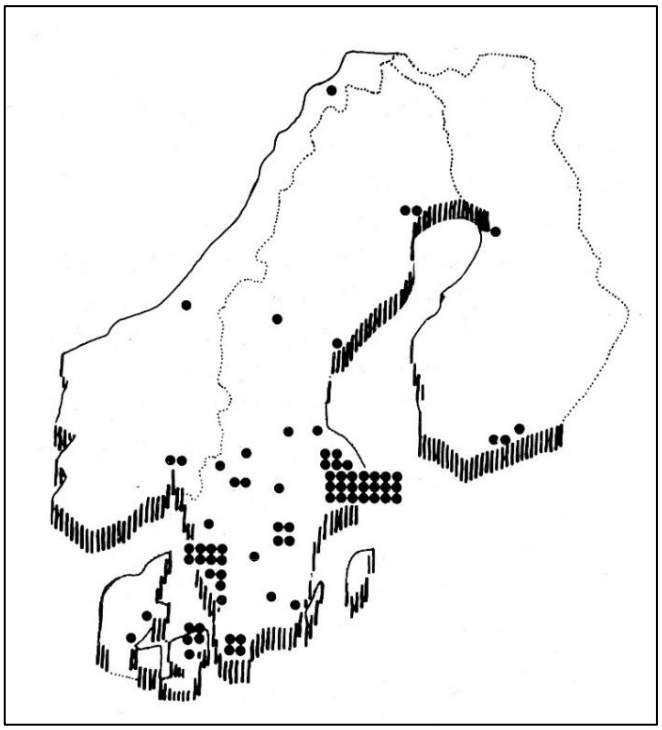

Figure 4.17 Organizations in the Nordic countries accessing Byggdok and the BODIL database in 1984. Source: Nytt från DFI 5(1984)1.

The October 1977 issue of SCANNET Today contained information on two more Nordic databases: the Norwegian FoU-Indeks and Olje-Indeks. FoU-Indeks was a reference database of research and development reports produced by Norges Teknisk-Vitenskapelige Forskningsråd (The Norwegian Council for Scientific and Industrial Research). Olje-Indeks, with references to Nordic literature on petroleum technology since 1974, was produced by Oljedirektoratet. Host for both databases was NSI - Norsk Senter for Informatikk (Norwegian Centre for Informatics), which had developed the search system Polydoc. The Oil database is not updated since January 1st 2007.

Databases in 1978

SCANNET Today of April 1978 informs that the international medical database Cancerline, the chemical dictionary Chemline and the two Nordic databases SERIX and Ship Abstracts had been connected to SCANNET. SERIX (Swedish Environmental Research Index Information) was an environmental reference database produced by the library of the Swedish Environmental Protection Agency (Statens Naturvårdsverk). The host organization was ARAMIS, which used the CCL command language.

Ship Abstracts, with references to ship technology, ship operation and ocean engineering, was a joint Nordic database produced in co-operation with the Netherlands Maritime Institute.

The next newsletter, in October 1978, introduced one international database, INIS (International Nuclear Information System) as well as one Swedish and two Finnish databases. The Swedish RECODEX (Report Collection Index), from Studsvik Energiteknik, was a computerized index for locating reports in Nordic libraries on energy and environment. The Finnish databases were SCANP and SCIMP. SCANP, referring to Scandinavian periodical articles and university research reports, was produced on a co-operative basis by Nordic business school libraries. SCIMP contained references to European and international articles in economics and business (European Index of Management

Periodicals). The databases were produced and hosted by the Helsinki School of Economics (HSE) using their own HELECON online service. SCIMP changed in the middle of the 1990s to SCIMA. Both databases are still accessible at HELECON. SCANP has not been updated since 1999.

Databases in 1979

In March 1979 SCANNET Today reports on two new Norwegian databases, one Swedish and the first Danish database. ALIS (Automated Library Information System), the database of monograph and periodical holdings of the technical libraries in Denmark that was produced by Danmarks Tekniske Universitetsbibliotek (Technical University Library of Denmark, DTUB). The computerization of the library catalogue started in 1970 by publishing monthly catalogues and yearly COM-films or fiche. In 1971 DTUB decided to establish an online system for localisation and ordering. Forskningsbibliotekens EDB-kontor (FEK) worked between 1973 and 1976 to develop the system. ALIS used the CCL command language. Since the beginning of 1979 ALIS was an online system for catalogue searching, combined with circulation control. It was developed by DTB and the Danish host I/S Datacentralen af 1959 with financial support from among others NORDINFO.

The Swedish database VA-Nytt contained references to literature on environmental technology, water and air pollution, waste management and work environment. The original documents were mainly in the Nordic languages. It was produced by K-Konsult and the search language was ISIS. The production of VA-Nytt was eventually transferred to Byggdok.

NSI offered two new Polydoc databases. Eksport Indeks contained bibliographic information on export markets and international business. The database Artikkel-Index (AI), based on the corresponding reference journal, received financial support from NORDINFO during 1978 and 1979 for transferring the database to SCANNET. AI was a much used index journal with references to Nordic, English, German and French business and technological journals. NSI developed the search system for AI, where the storage of data started in 1965. This search system was developed into the Polydoc system.

The Summer 1979 issue of SCANNET Today reported on two new Nordic databases and the international database CIS/ILO (within occupational safety and health, from the International Labour Office). Ajour Product Guide, a Polydoc database, covered Norwegian producers and suppliers of technical equipment. The Swedish MechEn was a bibliographical database within the field of mechanical engineering. It contained articles, notes about new products and technical notes from 150 journals (60 % English and 40 % German) with no overlap with COMPENDEX or ISMEC. The database was produced at IDC-KTHB since 1968 and was set up online under the new IR system 3RIP, developed in Sweden. 3RIP later supported the command language CCL.

Databases in 1980 and 1981

SCANNET Today of spring 1980 reported many new databases. One of the more remarkable databases within the SCANNET network, sponsored by NORDINFO, was EXTEMPLO, an electronic newsletter. The development of EXPTEMPLO started in Gothenburg in autumn of 1979 by Göran Nilsson and Gunvor Svartz-Malmberg together with participants from all Nordic countries. The first issue of EXTEMPLO was published in 1979 as one of the first electronic journals in the world. The scope of the newsletter was forthcoming courses, conferences, seminars and lectures within I&D in Denmark, Finland, Norway and Sweden. In 1981 news about Icelandic events began to appear. The aim was also to be a universal model for electronic publishing within science. The journal was published twice a month and the financial support of NORDINFO made it possible to offer EXTEMPLO

free of charge. In the autumn of 1980 the newsletter was extended with reports from the Nordic online groups.

NSI released a database on Norwegian standards, STANDARD, produced by Norges Standardiseringsförbund. The database is now online at the Web site of Statistics Norway. The Swedish Building Centre (AB Svensk Byggtjänst) established a database within building and construction, called Byggvaruregistret (BVR), with information on products and suppliers on the Swedish building market. The centre still offers similar services at its Web site.

In Finland the Central Medical Library in Helsinki had started to transfer their Finmed-publication to a database called MEDIC. It contained references to Finnish medical literature not included in international databases. MEDIC is today accessible via the Web site of the same library, now called National Library of Health Sciences (Terkko) in Finland. The HELECON online service was also enlarged with the database FINP, which consists of references to journal articles in business, management and economics published in Finland. The database is still in operation at HELECON.

SCANNET Today of Winter 1980-1981 informed that the first database with references to market information, the Swedish Marknadsbanken (Swedish Market Information Bank) was connected to the network. The producer was Pressurklipp. Marknadsbanken covered practically all Swedish press, i.e. 200 dailies, 600 trade press journals, popular press and also radio, TV and government documents. About 30,000 references starting from 1975 were available online. New Polydoc databases were Nordisk BDI-Index containing references to Nordic literature within the library, documentation and information sector, and Etablering, a survey of Norwegian industrial establishments abroad.

The Nordic BDI-Index, hosted by the library at Högskolan i Borås (University College of Borås), is still online searchable on the library's Web site. Today the database contains references from Sweden from 1979 onward, from Denmark between 1979 and 2002 and from Norway from 1979 to 2000. The database is periodically updated. The Nordic BDI-Index has several times got support from NORDINFO, most recently in 1998.

The same issue announces that the Nordic PTTs have established a packet switched service in the telephone network. The previous node computers in SCANNET now function as front-end processors for the host computers connected. The user-friendly help functions of SCANNET are still there and will be expanded.

SCANNET Today of October 1981 informed that DC Host Centre in Denmark had connected three new databases to the network: the international database AGREP (Agricultural Research Projects), the Danish EDE-database (environmental data and ecological parameters) and Nordic Energy Index, NEI. The NEI database contains bibliographic references to energy literature published in the Nordic countries. NEI is today produced by the Secretariat for the Nordic Energy Information Libraries. The database is still searchable free of charge at the NEI Web site.

A new Swedish database, Termdok, an experimental term bank for technological terms, was also launched. The database is currently only available on a CD-ROM, TNC-term. A small selection of answers to terminology questions is available at the web site of TNC (Swedish Centre for Terminology).

Figure 4.18 Anna-Liisa Toivonen at Helsinki University of Technology Library instructing students in information retrieval using the OPAC and the database TALI in the spring of 1981.

The HUT Library began in 1980 to create their TENTTU system using the 3RIP software. TENTTU was released in 1981 consisting of three databases: Books, Serials and TALI. TALI is a database with references to technical journal articles in the Finnish language. These databases were not connected to SCANNET until 1984. The TENTTU databases are now online at the library's Web site.

VTKK, the Finnish State Computer Centre, developed the MINTTU system, whose first database was KOTI, the Finnish national bibliography, which had been accessible since 1980 by modem and telephone lines and via SCANNET since 1984.

Databases in 1982

SCANNET Today of May 1982 announces that LIBRIS (LIBrary Information System), the EDP system for the management of various library routines at the Swedish research libraries, is available via SCANNET. The National Library of Sweden was and still is responsible for the maintenance of LIBRIS. The database is now searchable at the LIBRIS Web site.

SCANNET Today of September 1982 gives information on how to use COM, a system for exchanging electronic messages/letters between users of SCANNET. COM was installed at the QZ computing centre in Stockholm and at Medicindata in Gothenburg. New databases were FUTU (references to literature on forecasts, trends and the future) and NORDICOM (references to literature on mass communication in the Nordic countries). NORDICOM is still searchable on the NORDICOM Web site at the University of Gothenburg.

Databases in 1983

SCANNET Today of May 1983 for the first time lists the Swedish host DataArkiv and its databases, including the above mentioned Marknadsbanken, Affärsdok (full text business articles), TT Kalendern (future conferences and events) and TT Nyhetsbanken (full text of news articles from the Swedish news agency, TT).

I/S Datacentralen af 1959 also announces many new databases, among them the international databases Chronos-Eurostat, ECDIN (factual databank about environmental chemicals) and GATT (trade directives) and the Danish databases DCJURA (a full text database on Danish fiscal law) and DVJB (references to agricultural literature).

TT Kalendern and TT Nyhetsbanken are still online at the TT Web site.

Databases in 1984

SCANNET Today of May 1984 includes a number of new Finnish databases: KATI, KAUKO, TALI (references to articles in Finnish technical journals), the TENTTU system with databases from the HUTL and TUVU (research at the VTT Technical Research Centre of Finland). Two Swedish databases are also included: ArtikelSök and Tidningsdatabasen. The December edition includes the Swedish databases ADA, ALCDOC, Företagsdata and Idrottslitteratur and the Finnish THES. The research register at VTT is today searchable at the VTT Web site. ArtikelSök and Tidningsdatabasen are still online at AffärsData. Some of the MINTTU databases are today included in the LINDA system, the union catalogue of Finnish University Libraries.

Figure 4.19 Byggdok online access by means of 1,200 bps modem in the 1980s.

Missing: University catalogues etc. not connected to SCANNET

During the years 1978 to 1984 there were, of course, a lot of databases, especially university library catalogues, that were developed without NORDINFO support and which were later incorporated into the SCANNET network. However, as they were not at that time mentioned in SCANNET Today, they are not included among the databases listed above.

Support from NORDINFO and the SCANNET impact

One of NORDINFO´s spheres of interest was databases and networks. During the years 1978 to 1985 NORDINFO used about 50 % or more of its grants to support the production of databases and networks. Many Nordic databases repeatedly got support from NORDINFO to help them to develop and later go online. Such support was essential for the survival of most of the non-commercial Nordic databases. The NORDINFO project register is still searchable.

The financial support from NORDINFO to databases and networking, from 1978 to 1984, in absolute numbers and as a percentage of total expenditure on projects, was roughly (8):

Year	1977	1978	1979	1980	1981	1982	1983	1984
FIM 1000 (EUR 1000)	417 (70)	508 (85)	605 (100)	683 (115)	1014 (170)	1095 (180)	1183 (200)	1278 (215)
%	45,8 %	43,7 %	45,1 %	50,1 %	54,6 %	54,6 %	54,6 %	54,6 %

As described in other sections of this book, the SCANNET network, since 1980 partly financed by NORDINFO, had a significant impact on the creation and development of Nordic online databases. Initially, the physical network made it possible for users to access the online databases in all the Nordic countries by local telephone calls. Later on SCANNET contributed to the dissemination of information on Nordic databases via SCANNET Today and personal contacts, and to the marketing of the databases by exhibitions, articles and the publication of Nordisk Databasguide.

The guide, as described by Merja Lehti in this book, was published as five printed editions from 1985 to 1996 and as a database online in all the Nordic countries. The database is, as Merja Lehti also notes, still online. The last update, 2003-05-27, was made by VTT Information Service. Some of the databases listed are not current any more, but the guide gave a lot of information on databases that were unknown to me. In 1996 it listed 831 databases; the last online version has information on 1056 databases.

The support of the Nordic co-operative organization NORDINFO and the SCANNET project for the development of online databases was quite unique in Europe. Being small countries, co-ordinated Nordic support was essential for the development of their databases and online services. I am quite sure that the rapid online development in the Nordic countries and the many Nordic databases born in the late 1970s and early 1980s was a result of our strong Nordic co-operation. We owe many thanks to NORDINFO and SCANNET for supporting the development of Nordic databases, the online environment and the policy for database structures.

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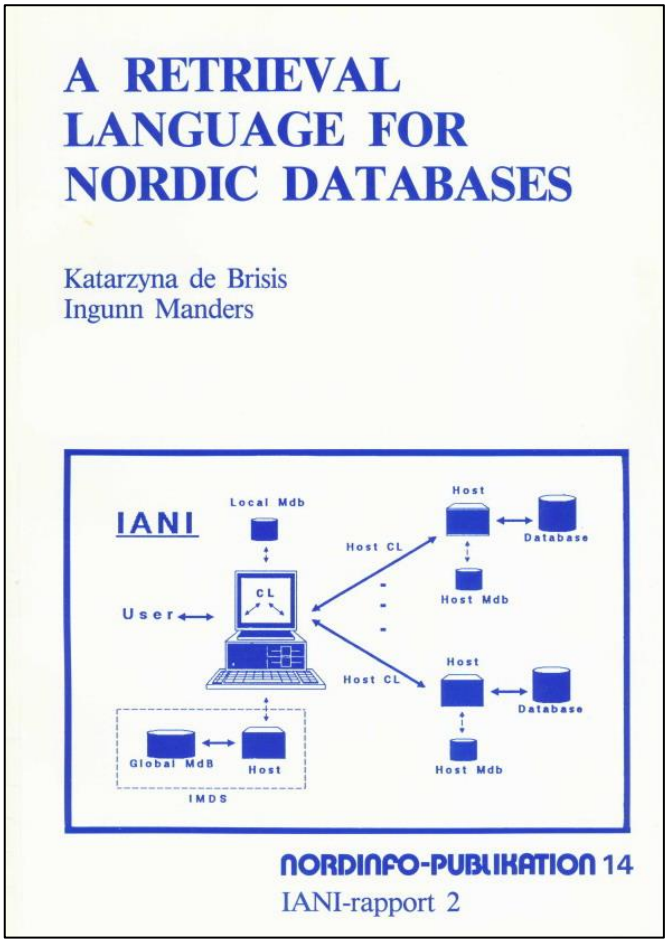
4.5 IANI – An intelligent tool for Nordic Information Retrieval

Maria Schröder

Manuscript received 2002

At the time when the IANI facility was developed there was an increasing demand for easy and uniform access to online databases. The major online search services have traditionally been available through command-mode interfaces. Attempts to provide simplified end user interfaces emerged in the 1980s. In the mid 1980s the technical development brought personal computers with communication capabilities into the work place and many users were able to access online databases all over the world. By the start of the IANI project the total number of publicly available online databases was about 3,400 (1).



In 1987 the directory of online databases in the Nordic countries contained over 300 databases on almost 150 hosts. These databases were small and specialized and were used very little. Half of them were reference databases, the rest of them were factual and full text databases (2). They were in different languages and they displayed a variety of different database structures, search languages and login procedures. Many did not even have a database structure and their documentation was often non-existent (3).

Front end packages and gateway

Despite the increasing amount of databases on the market there were technical, economic and administrative factors hampering a wider use of databases. A market survey of commercial gateways and front ends made by the Technical Research Center in Finland in 1987 listed the barriers:

- Nearly all retrieval languages are command-based and quite complex to use.
- Nearly every host system has its own or a modified retrieval language.
- Database structures are producer-dependent and not standardized.
- To get started, the user has to overcome contract bureaucracy with telecommunications networks authorities, with each host service and sometimes also with database producers.

And the obvious consequences were:

- An individual professional searcher or a small information service unit may in practice have access only to the most frequently needed databases.
- Most end users feel the difficulties too severe to start searching at all.

According to the survey there was no reason to believe that all the problems related to the diversity of databases and the multitude of retrieval languages would be solved by means of standardization and co-ordination. Therefore the authors thought that it would be worthwhile to develop systems that will be capable of unifying and simplifying the use of databases.

The market survey compared the functional features of four commercial gateways and front end packages; EasyNet (Telebase Systems, Inc.), IT (UserLink Ltd), Pro-Search (Menlo Corporation) and SciMate (Institute for Scientific Information). None of those provided an adequate coverage of databases from the Nordic point of view because the Nordic databases were totally missing (4). There was a need for publicly funded research and development projects within this field on Nordic and national level.

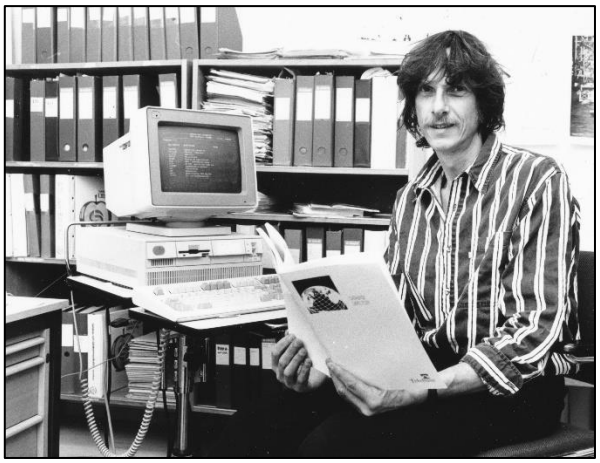


Figure 4.20 International front-end/gateway service EasyNet (of Telebase, later Brainwave) was 1992-2001 represented in Sweden by InfoTorg. It was managed by Lars Klasén, here with the EasyNet menu on the screen and user manual in his hands. Photo: Kerold Klang, 1992.

IANI – a shared front end system

It is not to exaggerate to say that the Nordic intelligent interface project IANI - Intelligent Access to Nordic Information - was along with NOSP and SCANNET one of the most ambitious ventures NORDINFO has promoted during its 28 years of existence. With the IANI-tool NORDINFO intended to build up a strong instrument for further co-ordination and development of the Nordic library, documentation and information field. The main goal for the project was to develop a general advanced interface to Nordic information systems. Another aim was to reach new potential users also in the field of business and industry. Standardization of interfaces was encouraged and a high level of Nordic knowledge in modern technology was promoted.

The terminology of these new computer systems was not well established at that time. Terms such as interface, front-end, gateway, intermediary system, transparent system, user friendly system, database access software, searching aid software etc. had been used in the literature. (4). The IANI was called a shared front end system by its developers.

The IANI project evolved through many stages. The project started in 1986 and was sponsored entirely by Nordic organizations. The whole venture was funded by grants not only from NORDINFO but also from the Nordic Senior Executives' Committee for Industrial Policy. The work was carried out by CRI A/S (Computer Resources International) with BRODD (Department of Consultancy and Research at the Norwegian School of Library and Information Science) as a subcontractor. BRODD performed many of the special tasks such as formulating a command language (5) and creating acceptance tests for the IANI prototype. (6). A Nordic Steering Committee and a co-ordinator was also appointed.

When NORDINFO decided to embark on the rather ambitious and costly interface project the organization was aiming at several different goals:

- to make the Nordic databases accessible via a standard command language (CCL – Common Command Language)
- to present a set of guidelines for database production, presentation and use for the Nordic database producers
- to interconnect Nordic library online catalogues in order to utilize the Nordic library collections as efficiently as possible
- to apply the most advanced technology for further development of the two central projects of NORDINFO, SCANNET and NOSP (the Nordic Union Catalogue of Periodicals) (7).

In the proposal for the IANI-facility the developer CRI suggested a distributed database approach. In the design document the IANI-system was described as a front-end software at the user´s workstation which gives the user a possibility to have access to all major Nordic hosts.

The first letter in IANI stood for ”intelligent”. In other words tools and techniques from artificial intelligence were used to develop the IANI system. The knowledge in IANI was made up of database descriptions, the search languages and the host computers. IANI uses this knowledge to make the complicated steps of an information retrieval search invisible to the user.

IANI adapted a shared system approach, where the entire conversion of the host command languages occurred in a personal computer but for updating and other control purposes the metadatabase system was created. The knowledge of the system was distributed on the metadatabases of the PC, participating host systems and on a global metadatabase. The global metadatabase includes all the host descriptions. To increase the system support it was planned that other central facilities such as document ordering and central accounting would be developed in the future (8).

The prototype of IANI, IANI2 and IANI UNIX

The prototype of IANI was launched in 1990. It proved more difficult than expected to develop the IANI system. The difference in search languages used by the host systems resulted in a comprehensive translating module. This led to instability, and the memory capacity did not seem to be sufficient in the personal computer environment. Three different Nordic host systems, the FEK (ALBA) in Denmark, VTKK (MINTTU) in Finland, The National library of Sweden (LIBRIS) were connected to the IANI prototype when it was launched. The Norwegian host BIBSYS was connected 1991. These four hosted the national union catalogues in the beginning of the 1990s. During the summer of 1991 LIBRIS moved to another computer environment and was no longer searchable via IANI.

When the prototype was being developed a PC version was ordered by the Nordic technical attachés. The PC version IANI2 was the first software product of the project. In addition to the existing online search facilities the IANI2 had a hierarchical database selection system which adapted to the needs of Nordic technical attachés. IANI2 gave access to three Nordic and six international hosts. The international systems were DIALOG Information Services, ESA/IRS, FIZ Technik, G.CAM Serveur, Profile Information and STN International.

The IANI kernel was also transferred into a UNIX environment which was especially well suited for different network solutions. The UNIX screen layout differed from that of the PC version. Otherwise the basic functions were the same with the exception of the database selection module which was not included in the UNIX version.

A retrieval language for Nordic databases

In spite of the difficulties in developing the IANI the main goal was achieved – the creation of a common search language for hosts and databases. A comparative study on existing retrieval systems was carried out by BRODD as early as 1987-1988 in order to decide on the language definition (5). Very high requirements were set on such a language from the start. The IANI command language was to replace the existing search languages of the host systems and was to be used for online search of reference databases, library catalogues and full text databases. If possible the command language was to include all the search functions of the participating Nordic host systems. In addition the interface was to cover the search features in the international online systems as well.

The search language of the IANI was designed to aid two different groups of online searchers and thus worked on two levels. For the experienced users there was a command based interface while the beginners were provided with a menu search system. The menus were developed out of the command language, which in turn was based on the proposed standard ISO/DIS 8777. The IANI search language has the following commands: BASE; DELETE; FIND; HELP; INFO; MORE (BACK), PRINT, REVIEW, SAVE, SCAN, SHOW, STOP, TRANSP and VIEW SAVE. The TRANSP facility enables the online searcher to have access to databases not connected to IANI. It was also possible to switch over to the search language of the host system during an IANI search session with the help of the transparent facility (9).

A lesson from the project is the realization that it is a laborious task to unify separate search languages as the search functions of the host systems do not have the same meanings. Straight semantic translations were in many cases impossible to do. This became quite obvious when the prototype was first tested in 1989. It was clearly understood even then, that the demand for flexibility and generality were incompatible with the requirements that IANI should be entirely adaptable to search languages of the host systems (6).

The IANI interface like so many other general interface systems on the market suffers from the simplifications. During the testing period 1991 many compromises were made both for the better and the worse.

The evaluation of IANI

In 1992 NORDINFO was at the crossroads. The prototype had been accepted, the PC version IANI2 had been approved by the Nordic technical attachés. IANI UNIX had to pass through a testing period with system, installation and user tests. In order to estimate the demand for an IANI-type interface NORDINFO decided to do an evaluation of the product (10).

Through the evaluation NORDINFO wanted to find out the general attitude towards IANI among librarians and at the same time receive a valuable feedback from the libraries. The shortcomings and the problems were very much in focus in the study.

Installation of the IANI2 package was so difficult that the majority of the evaluators were aided by EDP personnel. Many of the libraries experienced problems with the modems. Most of the respondents were able to use the automatic log in procedure through Datapak. The others had PCs that were connected to a local network with an exit into Datapak. In Iceland there were difficulties in the communication over the national Datapak.

Those taking part in the evaluation presented a list of shortcomings and inflexibilities which were adjusted in the new IANI2 version distributed among the technical attachés. The results from the evaluation showed that future development work should be concentrated on six issues.

- The installation process of the software should be easier.
- The menus should be more flexible
- More Nordic databases should be searchable via IANI
- The online document ordering facility should be implemented.
- There is a need for a network version of IANI (11).
- A gateway for interlending and document delivery should be added

Since IANI included access to three large union catalogs in Denmark, Finland and Norway it was quite easy for the user to locate the desired documents. To get a picture of the situation in the Nordic countries NORDINFO ordered a survey of online ordering facilities and systems and also a state of the art report on the standardization in this field. The result showed that there were only few systems in the Nordic countries with online ordering facilities. The authors suggested a document ordering facility based on the NORDUnet university network co-operation (12).

The implementation of an IANI online ordering network within already existing networks with mailbox functions would have reduced the investments in developing further software. The biggest problem was organizational although the direct ordering had been solved technically. The infrastructure of the Nordic interlibrary loan environments varied from country to country. Different policies concerning customers and fees constituted a big obstacle. It was very enlightening to recognize that IANI could not solve all the organizational and administrative problems. It was just a modern technical tool for co-operation (13).

Today in 2002 we are discussing the rules of interlibrary loans in Finland and in our new library system Voyager there is a feature named Universal Borrowing that will give the customer a direct access to documents. But still the libraries are the controllers of the process.

What did we learn from the project

Inge Berg Hansen said at the AGARD Conference in 1992 that after almost a decade of research and development in the field of intelligent interfaces, and after great investments the need for this type of products as IANI is as high as ever, but that most of the prototypes developed as result of the R&D investment never managed to reach a commercial state. As a result every call for proposals in the field of information technology will inevitably attract several proposals suggesting to produce yet another prototype interface which should make it easier for the user to access the databases of the world (3).

When the products of IANI were delivered and NORDINFO finally ended the project in 1993 the attitudes towards IANI were rather mixed in the library world. Some thought that with further improvement the IANI software could be a useful tool for searching in unfamiliar databases. Others seemed to hold the view that the problems of maintenance were too difficult to solve. At the same time many of the larger host systems had developed their own menus and the need for user friendly interfaces was no longer so great. The fact remained that the use of Nordic host systems would not increase without some kind of standardized search language.

The biggest problem was the maintenance because of the frequent changes in the host systems. The concept of IANI or other front ends could not change this situation and the only way out was that all the hosts served by the interfaces should adopt common communication standards. When the OSI

Search and Retrieve standard became an ISO standard those vendors who wanted to promote communication between hosts had a tool to pick up.

So it was not a coincidence that the IANI project was followed by another very interesting NORDINFO project called SR-Net. Five main library systems in the Nordic countries agreed to use the OSI application protocol SR (Search and Retrieve) for transfer of messages between them. Three of those hosts also participated in IANI. The SR-Net project started in 1991 and was finished in 1994. The project was based on the services offered by the Nordic academic networks (DENet, FUNET, ISNET, UNINETT and SUNET). In SR-Net the computer systems in the libraries communicated with each other. There were also plans to merge the results of the SR-Net project with the IANI interface.

During the first two phases the project team planned to include IANI as one of the search systems since the software ALBA of the main Danish library catalogue was not well suited for the SR-protocol at all. However the design and development of the new system DANBIB for union catalogues in Denmark made the plans less interesting and the IANI was not included as one of the systems (14). The Nordic SR-Net project was followed by larger European projects such as ONE and ONE –2. “ONE” stands for OPAC Network in Europe.

The IANI experiment showed that the communication between IR systems and databases should strongly involve standardization on a low level so that the systems are able to communicate through the standard protocol. Today we call this protocol Z39.50 (one version of SR-Net) and every modern library system has this feature. The widespread use of Z39.50 and its implementation in nearly all modern library systems means that there should be no major technological barriers to a distributed solution. Or, so it seems (15). Today we know that the developers are still struggling with the differences and that the Z39.50 search capabilities are not the same as local OPAC search capabilities.

The work of getting a virtual union catalogue for the Nordic countries is still going on. In 1999 NORDINFO sponsored a project called Scandinavian Virtual Union Catalogue (SVUC) (16) and in the spring of 2002 SVUC was demonstrated to the Nordic users.

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5 USERS

Introduction

Elisabet Mickos

Manuscript received 2007

Since I begun as an online user as early as in 1974 at the Kone Corporation Information Service, started by Sauli Laitinen one year before, I have followed the online revolution very closely. I have worked with SCANNET and the Finnish DIANE centre, with online conferences and education, exhibited at IOLIM with Nordic database producers, being responsible for many of VTT's online and EU information courses. I am therefore happy to introduce this chapter.

The users are an important part of the online development. Along with the information revolution it was urgent for the users to get information faster and easier than before. The users' need was an essential challenge to database producers. User organizations, including the European DIANE Centres and their following up organizations, online user groups and conferences, courses held by database and online system producers or other organization as for example IDC-KTHB in Sweden or VTT Information Service in Finland, played an important role in the education of users.

The Nordic countries have really been in the lead in the development of online in Europe. The early start of producing Nordic database guides, the incorporation of the European DIANE concept, the many online conferences and the many online courses were all due to the strong Nordic co-ordination. These matters are discussed in this chapter.

The majority of the sections concern intermediaries, i.e. information specialists and librarians who supplied what we in "online slang" call "end users" with the information they needed. An end-user could be an engineer, a student, a physician, a researcher, a businessman and so on. Nancy Fjällbrant's section about user education deals principally with end users, especially students and not intermediaries.

As the sections in this chapter include very specific, not easily retrieved information from all the Nordic countries, the respective authors have contacted - and obtained relevant information from - experts in the other countries. This reflects especially the Finnish situation where most of the writing is made in Finnish, a language normally not understood in other Nordic countries.

5.1 SCANNET for the users

Malin Edström

Manuscript received 2007

SCANNET

Initially SCANNET was a physical network, a packet switched network for Nordic information services. When the Nordic PTTs managed their own packet switched networks, the role of SCANNET changed to a co-operation network, an information network for the Nordic information services supported by NORDINFO.

Purpose of SCANNET

In the first number of the irregularly issued publication SCANNET Today, the new objectives of SCANNET were presented as follows:

Who can benefit from SCANNET?

Users of information services

- SCANNET will help in co-ordinating and act as intermediary for wants and demands on Nordic systems, databases and computer communication
- SCANNET will compile and distribute information about Nordic databases, systems and their availability

Data base producers

- SCANNET will help and advise in the structuring of databases
- SCANNET will forward requests from the users

Host service organizations

- SCANNET will market available databases and services
- SCANNET will forward the wants and demands from the users

The services from SCANNET are free of charge, but how can it be used

- By subscription to SCANNET Today, the newsletter published by SCANNET
- By direct contact by letter or telephone to the SCANNET co-ordinator

My role as co-ordinator

I was employed as the SCANNET co-ordinator in 1983. Before that I had been working with information retrieval since autumn 1967, when I was employed at KTHB as an information specialist. I analysed data from bibliographic databases as a basis for converting them into our retrieval system VIRA, prepared search profiles for VIRA and performed online searches in local and international databases. Later on I became head of IDC-KTHB, and as such I participated in national and international activities. Preferring practical work to administration, I resigned from that position.

Early in 1983 NORDINFO began financing a research project, "*SCANNET- in its new role*". They now announced a position as co-ordinator, for which I applied and got the job.

SCANNET as a packet switched network had its service centre at Medicindata in Gothenburg, with Sixten Abrahamsson as executive chairman of the board of directors. The demand for information about databases available through SCANNET was recognized and an irregularly published information bulletin, SCANNET Today, was started. Kate Bivins Noerr was appointed to co-ordinate information about available resources.

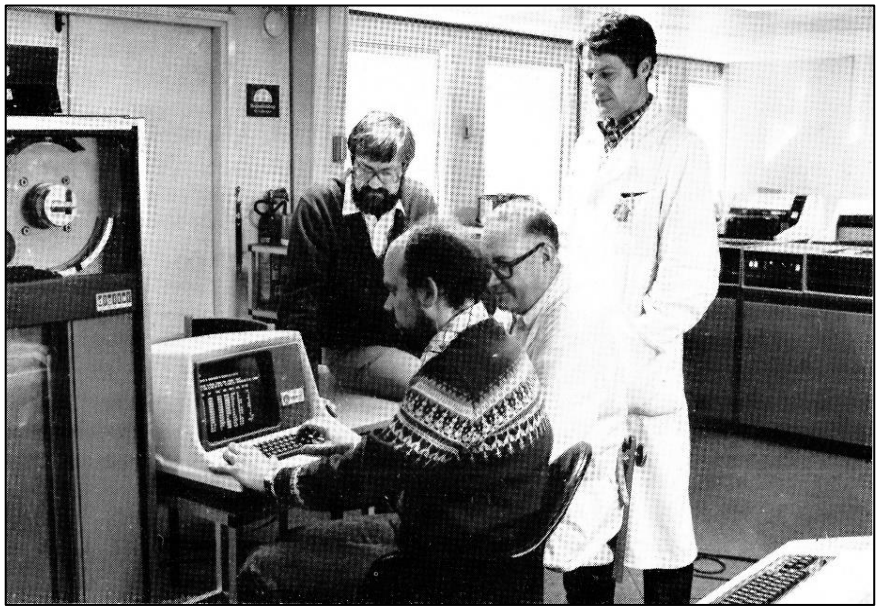


Figure 5.1 Interior from computer centre Medicindata (Gothenburg) 1983.

When SCANNET in its new role transformed from a physical network to an information network, now under the auspices of NORDINFO, the computer service centre was no longer needed and Kate went back to London.

SCANNET was governed by a board composed by representatives from four of the Nordic countries as well as from NORDINFO and NORDFORSK. Together we prepared a plan for the future SCANNET, its purpose and target groups, as well as a budget. This was sent to NORDINFO for approval. Of course there were reductions in the approved budget, but there was enough to start up the job.

In my role as co-ordinator, I soon found that marketing services and databases, and compiling directories wasn't enough. What the information community demanded was help: help in accessing databases, help in searching, help in disconnecting from systems, help about equipment and communications, and more. SCANNET became, among other things, a help desk.

My office

A room was rented at the premises of the information centre Byggdok at Hälsingegatan in Stockholm. The room was large and furnished with two desks and a conference table and had ample space for work and meetings.

It was decided that I needed a PC, a personal computer, but since they were expensive to buy and under development, I was told to rent a machine.

The machine should be equipped with a word processor and a communications program. After a tour at the annual computer fair, I ended up renting an Osborn computer with WordStar as the word processor. WordStar was THE word processor at that time and it really was very good. Hardly any machine on the market had a communications program, and of those only Osborn was available for renting.

Osborn was ”almost” IBM-compatible (in those days there were no really compatible machines) and ”portable”, weighing about 15 kilos! It looked like a fair sized suitcase where the top long side could be removed. That long side was the keyboard and the rest of the ”suitcase” contained the computer with two 360 Kbyte floppy disk (magnetic storage media) drives and a screen about 20 cm in diagonal (an 8 inch screen)! So I had to rent a small monitor to be able to see what I was writing. With the addition of a modem, a STAR matrix printer and a telephone with an answering device my office was complete!

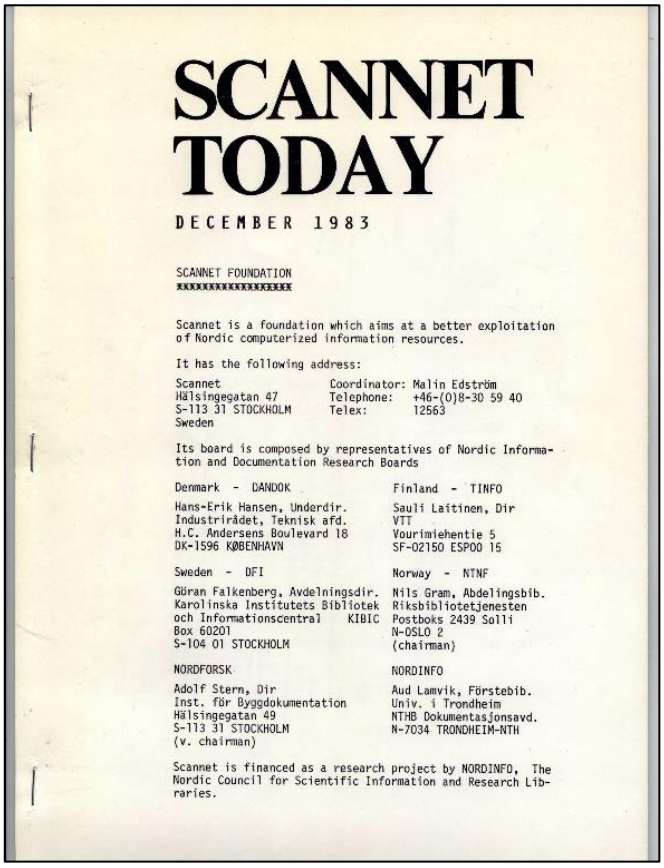
When starting the computer I had to insert the DOS-diskette (DOS = disk operating system, diskette/floppy disk) to initiate the system and the applications. The other drive held the diskette with my texts. My office had a wall-to-wall carpet, so static electricity was a problem. I had to remember to save my files before getting up from my chair, otherwise my work was lost and the computer restarted itself.

I also had some problem establishing communication with the database hosts. This was not because I had never worked with a PC before – it was because the modem cable was faulty. When I called the company from which I hired the Osborn, they only said: "*We can't help you. You know more than we do about communications.*"

SCANNET Today

I started straight away to prepare an issue of SCANNET Today. The name of the newsletter was already used by NORDFORSK and I saw no point to rename it, especially since I also got its old mailing list.

The first issue was published in May 1983. I engaged an agency for the typing of a fair copy for the first issue, but the subsequent issues were all prepared by myself at the Osborn. I had to drag Osborn to my old office at KTHB where they had a printer sophisticated enough for the printout to be of a quality good enough for printing.



SCANNET TODAY

DECEMBER 1983

SCANNET FOUNDATION

Scannet is a foundation which aims at a better exploitation of Nordic computerized information resources.

It has the following address:

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Scannet is financed as a research project by NORDINFO, The Nordic Council for Scientific Information and Research Libraries.

Then I manually enclosed the issues in envelopes, put on the stamps and finally dragged them on a cart to the post office.

Already from the start, the newsletter consisted of two parts:

- Short articles with news, information and tips about services, databases and telecommunications
- List of available services and databases with prices and how to access them.

In the first issue I presented 22 hosts with 52 databases. New databases appeared but other ceased and as a result a year later there were only 42 databases in the guide.

Telecommunications

An important issue for SCANNET was how to access the hosts and databases. The reason for transforming SCANNET from a computer network into an information network was that the Nordic PTTs now had own packet switched networks, all called Datapak and jointly connected. In order to access a host over a network you had to know its NUA, Network User Address. Note that the user here is the server and not the "online user". The NUAs were a string of digits identifying the network and the host within the network. It can be compared with country codes, area codes and numbers on the telephone. In some cases there were special NUAs to access a host, one for access in 300 baud (about 30 characters per second) and another for 1,200 baud.

Not all hosts were accessible via Datapak. These hosts decided that direct access to them via telephone and modem was sufficient.

The last two pages of the directory in SCANNET Today was a list of NUAs and telephone numbers to the hosts. There was a problem keeping this list up-to-date, since the hosts sometimes thought this information was of no importance to outsiders. I had almost daily contacts with Gunnel Kling at the Swedish PTT Data Section, to exchange information on changes and new servers. We had different sources of information so we complemented each other. Many of the telephone calls to me as SCANNET co-ordinator were related to access to hosts and databases.

At that time access to databases was mainly performed by the use of TTY terminals, equipped with modem at a maximum speed of 1,200 baud. You had to know how to set the switches on the terminal for the correct speed and duplex (half or full), just to mention one of many settings that was due to the adaption of equipment for use in Scandinavia.

I also participated in many meetings with the PTTs to discuss developments in data communication and what they planned to do. Also in the other Nordic countries I met with representatives of the local PTTs. The hosts sometimes took the opportunity to make a friendly point about differences in culture between the Nordic countries – as when during my visit to a meeting with the communications committee of the Nordic Council held at the Danish Parliament, the Danes insisted on offering schnapps at the luncheon – something that would have been absolutely impossible in Sweden.

Hosts, systems and databases

Most of the hosts in the list in SCANNET Today in December 1984 were commercial or obliged, in one way or another, to cover the costs for operating their services. They were therefore happy for the help I could give them in their marketing efforts and I could benefit free passwords for access to a number of the hosts. Thus I could demonstrate their databases for free on seminars and exhibitions, but also assist them when testing the communications to their services. The demand for this was frequent as regards hosts in another Nordic country.

Almost every host used its own IR system and each system had its own command language. For this reason the users avoided using too many systems and stuck to one or two systems that they were familiar with, in spite of relevant databases on another host. In order to stimulate use of more hosts and databases I made overviews of the commands for the IR systems listed in SCANNET Today. As a matter of fact I also was actively involved in the implementation of CCL, the proposed search language developed for Euronet. When asked why I was so engaged in the standardization of command languages, my reply was that I wanted to find one single common command for ending a search session and log off from the host. Everyone agreed with me about that. As an example, just in

SCANNET Today I identified the following commands for ending a search session in Nordic systems: S, SL, SLUT<CR>/BYE, STOP, STOP YES, /EOF, E, EXIT, LOGOFF, ..OFF, CLOSE.

Most databases on the Nordic hosts were locally produced in-house and often, but not always, got initial support from NORDINFO or national bodies. After about three years with public funding, the databases were supposed to carry their own costs. This policy led to large and frequent changes in the number of databases available online, where many simply disappeared. But in some cases the databases met a real demand and survived. Among those were databases in business and economics, law, and newspaper articles in full text.

Travels and meetings

To make myself familiar with activities in the Nordic countries, I made round trips and visited the hosts, database producers and online user groups, on site. One meeting was arranged in Stockholm with representatives from all online user groups in order to identify the most important user issues.

In Oslo I tried to explain the packet switching technique to nurses and at the International Online Information Meeting (IOLIM) in London I had a session on Nordic databases.

At the Nord IoD-meeting in Helsinki in August 1985 I left SCANNET in the competent hands of Elisabet Mickos. And as an omen, the last day in my office at Hälsingegatan my Osborn computer had stopped working.

5.2 The DIANE Centres in the Nordic Countries

Even Hartmann Flood et al

Manuscript received 2003

Background

The DIANE centres which came into existence in the 1980s made a lot of people curious - *what is it*? People assumed that it was a) fan clubs for the British princess, b) an office for a safari hunting agency, c) a cover for scientologists; and that is just a few of the options available. Several times we had to patiently explain that it was a government supported activity to get people to use electronic information on remote online information services and that DIANE stood for "*Direct Information Access Network for Europe*". We were definitely not trying to convert people to Dianetics. Most people accepted that fact grudgingly, but could not see any use for it and probably not why the taxpayers' money should be used on something like that.

The origin of the centres was the interest for better international networks for data transmission that came in the end of the 1970s and early 1980s when several international information services were coming online and providing very valuable information in online databases. Among those early database hosts outside the Nordic countries were Lockheed (later DIALOG), Data-Star, SDC (later Orbit), ESA/IRS (later replaced by EINS, European Information Network Services), Questel and STN

International. The users of electronic information had very difficult connection possibilities at that time. If for example, we wanted to search the American databases we had to call long distance to a node in Amsterdam to get connected. So we needed a better way to get online.

The Commission of the European Communities (CEC) realized the importance of a packet switched telecommunications network for information retrieval services in the early 1970s and founded the Euronet project. Euronet was implemented as a separate network by the PTT's. Sweden and Finland joined Euronet by a special arrangement in 1982. CEC continued to promote the offer to use European online services within their Euronet-DIANE concept. In 1981 a European X.25 packet switched network named Euronet was established to great fanfares, the online society was coming. Later on, from the beginning of 1984, Euronet was replaced by interconnection of the national packet switched networks like the Norwegian Datapak, developed and operated by the PTT's, as was planned from the beginning.

Now what could be done to get people to use the network? The Euronet was not exactly user friendly. I remember a demonstration of the login procedure, it required the user to input a string of often more than thirty characters to get connected, no errors allowed. And other networks were just as unfriendly. Long, strange numbers and in the case of use of the Amsterdam node for getting to the US services we had to apply to the PTT for which network we wanted to use and which hosts we should connect to. In addition, the lines were unstable and noisy and the systems were intolerant to faults. Users needed several tries just to get where they wished. And above all this was the important question: Why should one want to get anywhere in the first place? What was going on out there? How to get people to use the networks?

The Euronet DIANE project included establishing national information centres called DIANE centres in the participating nations to help users to access the electronic information, for the benefit of the network providers, for the benefit of online service providers, and most important, for the public who would benefit from access to much more information much quicker. The public was in this case everybody who needed the online data. In the beginning that was mostly research scientists and information specialists in government, libraries, education and industry.

So the network was there, the potential end users were targeted, the DIANE centres were to be established.

Now the question was whom to put in charge of the national information centres. The answer was, go to the people who already were using the services, and ask them to help others get in on the act. And where were those users? In the libraries. Especially they were in the special and research libraries. After all, the early databases were extensions of major paper based reference publications, which the libraries already subscribed to, so the content was well known to librarians. And since the cost of using the services was based on usage, such as time and output, and not on subscription, it paid to have information specialists who were likely to do the actual searching quicker and cleaner. So the main experts in using online services were information specialists in the libraries of the private industry, the large information centres and libraries that were connected to main universities and technical research institutions.

The DIANE centres were established in connection with the main research information centres in all the Nordic countries. In Denmark it started in 1981, situated at the Technical University of Denmark (DTU) in Lyngby, however the centre was not a part of the library, but an independent institution. In 1982 the Swedish DIANE Centre was established at IDC-KTHB. Next out was the Norwegian DIANE Centre which was established in 1986 at the then Documentation department of the then Technical University Library of Norway in Trondheim in co-operation with Riksbibliotektjenesten (RBT), the

National Office for Research Documentation, Academic and Special Libraries in Norway. Finally the Finnish DIANE Centre was established in 1988 at VTT Information Service.

All of the DIANE centres were established in co-operation with or close to information centres of technical universities. That is where the first major users of the online services were. It is also no coincidence that many of us early information specialists were chemists. Probably chemists were among the very first to realize what a huge leap forward it was to have the information online, and a chance to finally tame the savage beast called Chemical Abstracts. It is important to realize that this was nothing new for these organizations. They had already for many years shared their online experiences with other users, given advice in database choice and use, given courses and seminars when needed, in short carried out all the duties expected of the centres. So establishing the DIANE centres meant formalizing that part of the work, getting some extra people for it and more funding.

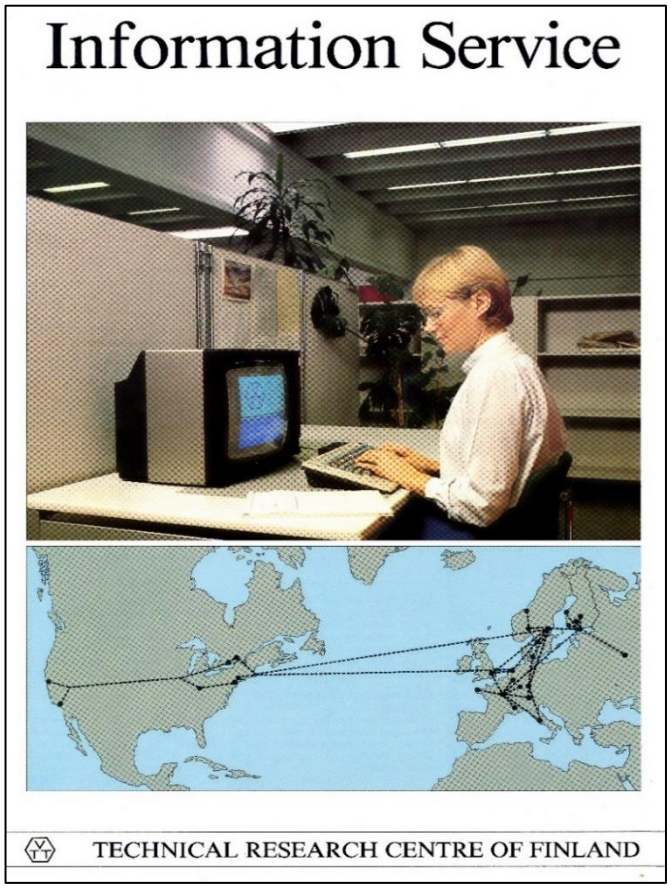


Figure 5.2 VTT information Service brochure 1986.

The main functions of the centres were:

- Advice and counsel users about choice of databases and access to the databases,
- Giving courses and seminars in the use of databases
- Write and publish materials promoting the use of databases
- Promote the use of national electronic information sources
- Provide end users with information about information centres which could help with searching
- Test new services and changes in existing services and introduce those to the users
- Give advice about technical equipment and telecommunications.

The last point was not originally planned as part of the activity, but turned out to be very important. For, while we were not experts on computers or networks or protocols, we were the only ones who actually used the material and therefore had the practical experience that the experts on the systems lacked. In the beginning, that was fairly simple: Dial the number, wait for the whistle tune, put the phone receiver on the black things on the Texas Silent terminal and hope for the best. But as soon as the use of personal computers, modems and networks became available the possibilities of improving the performance increased, while the possibilities of getting things wrong increased tenfold. The online information centres were the vanguards in using the new equipment and made all the errors early on. We got a very rich experience in handling all the things that could go wrong and finally getting it right. So we were well prepared for all those queries about how to set up and use the equipment. One example: The first years the centres spent time collecting and publishing lists of NUAs, small directories covering the X.25 Network User Addresses for the various information services, so users could get one place where all the most used numbers were collected.

Summing up: We were not experts in use of the networks, the experts were the telecom people. We were not experts in operating personal computers, for that we consulted the computer department, or the nearest teenager. We were not experts in using the computer programs, again they were in the computer department (or that same teenager). We were certainly not the experts in modem use or network use, these experts worked for the PTT services. We were not experts in use of the databases either. Many of the information services, or hosts as we called them back then, had good support services, although they were not local.

But we at the DIANE centres were experts in getting all this together to make a working information service and that is what counted. In short, we were that much sought after elusive beast, the User. Or even more important, we were super users who could disseminate our knowledge to others.

The target groups of the DIANE centres were originally supposed to be the end users as well as the current users who were the intermediaries. The goal was that the person actually needing and using the data should also be the one doing the searching. That goal proved to be elusive. The online services were complicated and expensive. So there were two kinds of training: The first was to show the end users what was out there, how they could use the information, and whom they could turn to, to get the results. The second target group was the ones actually doing the searching, showing how the services worked, how the search languages worked and how the databases were structured.

The online services recognized that the centres were very valuable customers and helped in the work. Some services gave permanent demonstration passwords, others gave us temporary passwords to try out the services and different features. It was also easy to get extra training passwords when we had seminars and courses in the use of databases. And the trainers from the different services rented equipment and rooms from the centres when they wanted to give their own courses.

So what happened to the DIANE centres in the different countries? That was different according to who funded the centres. In Norway and Denmark the funding came from the Ministries of Education, which meant that this was regarded as part of a government educational service, and not supposed to make money. In Finland and Sweden the funding came, at least in part, from the PTT and as their demands for profit increased the DIANE centres suffered. Here is a rundown of their different stories.

Sweden

Marie Wallin with Lilianna Kanafarski and Winnie Hemborg

The Swedish DIANE Centre was established and financed by DFI when Sweden connected to the Euronet, 1982. The centre was situated at IDC-KTHB as an independent activity and staffed with one and a half person: The leader of the centre Lilianna Kanafarski and the assistant Lena Sievert was a strategic choice as IDC-KTHB had the longest experience in the country of using databases and connecting to external systems.

A grand opening seminar was organized at the "*House for Industries*" in Stockholm with the Minister of Industry himself as the guest of honour. Nils Åsling was very pleased when Lilianna made the first connection and searched in Predicasts news for his name and this online dialog was unfolding on the huge projector screen used for the occasion.

The DIANE Centre especially marketed the systems connected to Euronet and their databases but of course also answered questions concerning other systems or the use of online information in general. The DIANE Centre participated with lectures and demonstrations in many seminars or

courses organized amongst others by Televerket (the Swedish PTT that was promoting its newly created packet switched communication service Telepak at the time). TLS (Tekniska litteratursällskapet, Swedish Society for Technical Documentation) and SOLUG (Swedish Online Users Group) even had awareness lectures and courses with CCL training at the library school in Borås.

At a first large seminar organized by the Swedish DIANE Centre the invited speakers represented the different systems connected to Euronet. It was attended by as many as 200 persons eager to learn about the "European" online systems. (A total of 1,160 persons participated in DIANE courses (98 in total) or other activities (100 in total) during only four years). Training material and free access to ECHO as a training database was readily provided to the DIANE centres.

Swedish as a language in the European community came much later. For example a simple leaflet in Swedish detailing the costs and procedure for connecting to online databases was a large success wherever it was distributed. A modest newsletter DIANE NYTT was issued irregularly. The Swedish DIANE Centre was also actively participating in meetings and other networking organized between the DIANE centres themselves.

When DFI closed down in 1986 the DIANE Centre was terminated as a government supported activity.

The experiences with the activities of the Swedish centre showed a great need for both qualified information on databases and services and also for more user support concerning telecommunications and problems with the equipment.

At IDC-KTHB Lilianna Kanafarski convinced the board of directors/management of the library that a more general helpdesk and online promoting service should be continued. It should be independent of system providers and specialized in the subject area of science and technology, the area for which KTHB had now become the national information resource library. This service was called REFLINE, headed by Lilianna and pursuing all the functions of the previous DIANE Centre and making heavy use of the qualified help from the other information specialists at IDC-KTHB. As was the case for the DIANE centres REFLINE was given free passwords to almost all online systems in order to be able to give demonstrations.

Also REFLINE organized larger seminars, like the more special one on factual business databases in 1991, but mainly now provides course facilities for database and system vendors and maintains a mailing list for more than 1500 active online users in Sweden. System independent advice on choice and use of online databases was and is provided free by REFLINE as a helpdesk but more technical questions on communication were referred to Databastjänsten as long as this existed.

Figure 5.3 Televerkets Databastjänst exhibits at the fair Info-On-Line 90, which attracted 4,300 visitors and 75 exhibitors.

Databastjänsten or Televerkets Databastjänst to use the official title (Swedish Online Center), was a unit created by the PTT at the termination of the Swedish DIANE Centre, taking over the promotion and counseling on use of online information. Databastjänsten had four persons from the start. This service was headed by Winnie Hemborg, an earlier employee of IDC-KTHB and DFI, also with long experience of information work. Among other things she is the author of the first catalogue of online databases in Sweden: DOLDIS (an acronym for Directory of Online Databases in Sweden but which in Swedish means the "hidden one").

Televerkets Databastjänst was mainly organized for helping the users accessing information wherever available online and using Televerket`s packet switched communication service by then named Datapak. The activities of that service providing courses, training facilities, demonstrations and most of all a helpdesk for the Datapak users is well documented in its regular newsletter Call Connected. This unit inside the telecom company after growing to a staff of seven people never became financially self-supporting (was any information counseling service?) and was dismantled in 1991 when Televerket in the wake of EU communications policy directive was privatized and became Telia.

Norway

In Norway the DIANE Centre opened January 1st 1986. The funding was from the Norwegian Department of Education (or whatever the name was at the time, it has changed several times over the years) through RBT and placed at the documentation centre of the then Technical University Library of Norway (NTUB) in Trondheim.

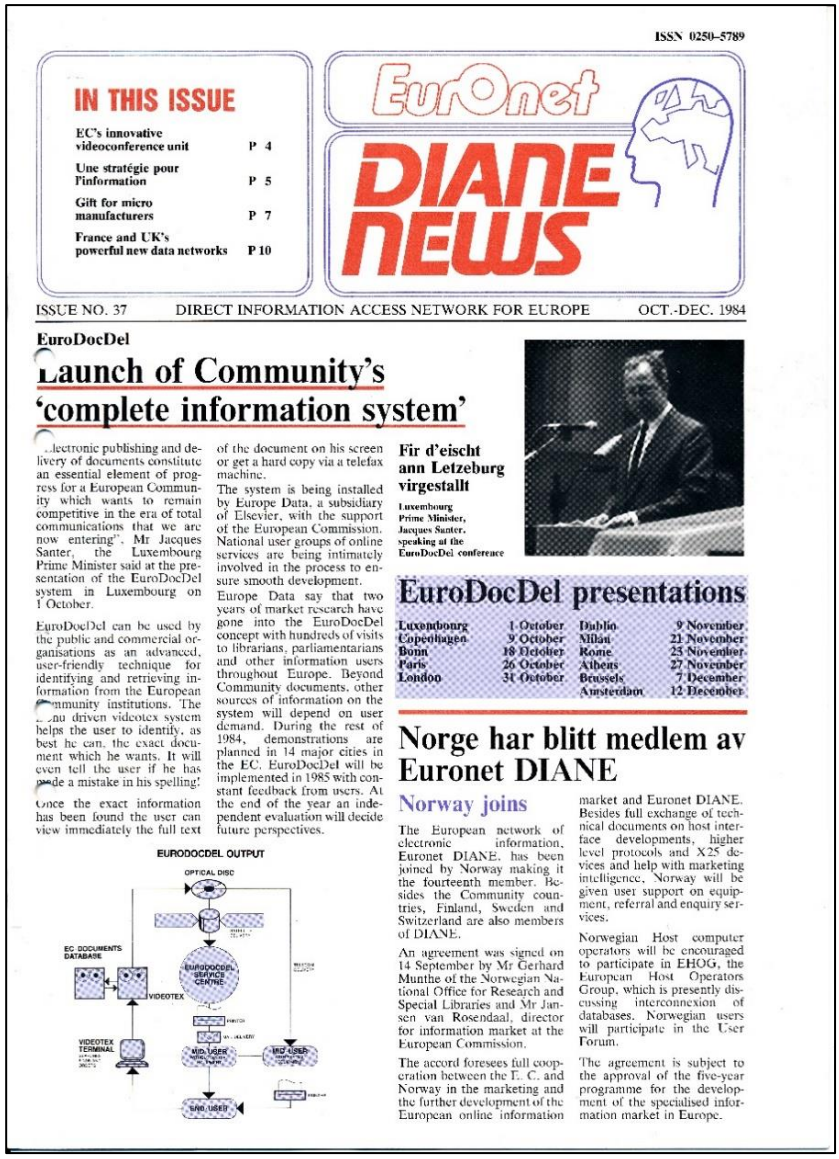
It was only staffed by one person full time. Even Hartmann Flood, who came from the University Library in Tromsø, and took the position one year later, January 1st 1987. He was employed by the RBT as leader of the DIANE Centre. However, the expertise behind the activities of the centre was in addition the whole staff of the documentation department of the library, at the time Aud Lamvik, Roar Storleer and Hilde Bakken. Since the author was the leader of the centre, this part will be a bit more personal than the others, for which I apologize (a little).

The first years were devoted to the general use of databases and information services. Also communication equipment was an important part of the information that customers wanted. There were lectures and courses in general use of databases and in communication equipment. The information services were quite helpful, after all better use of the systems was to their advantage too. Some, like Data-Star, DIALOG, ESA/IRS and STN even gave us permanent trial accounts so we could demonstrate the systems and try out new features. Others gave us a temporary passwords whenever we needed it in courses and seminars.

The centre published a small free newsletter, Norsk DIANE Nytt where news about the field was published. It was meant to be issued four times a year, but became more and more erratic. Eventually, after 32 issues in 1996 that part of the service became incorporated into RBT's journal "*Synopsis*" as a regular feature.

An important part of the activity was that the centre provided a free helpdesk for all users, anyone could call and get the benefit of the expert experience. The inquiries were first by telephone, later email would be a very important part of that service. However, early attempts to provide this service through electronic bulletin boards and electronic conference systems failed. An attempt was made in 1992 with a service called DIX provided by the journal Datatid. But in those pre-Internet days in the early 1990s, the market was not ready for this.

After some years the emphasis of the subjects people wanted to know about changed. The courses became less general, more subject oriented: Environmental information, business information, technical information and, most important, EU information. In the last two years leading up to the referendum about Norwegian membership in 1994 information about EU information was one of the prime activities. However another subject also became of interest in those years, the Internet.



ISSN 0250-5789

IN THIS ISSUE

EC's innovative videoconference unit P 4
Une stratégie pour l'information P 5
Gift for micro manufacturers P 7
France and UK's powerful new data networks P 10

EuroNet DIANE NEWS

ISSUE NO. 37 DIRECT INFORMATION ACCESS NETWORK FOR EUROPE OCT.-DEC. 1984

EuroDocDel

Launch of Community's 'complete information system'

...lectronic publishing and delivery of documents constitute an essential element of progress for a European Community which wants to remain competitive in the era of total communications that we are now entering", Mr Jacques Santer, the Luxembourg Prime Minister said at the presentation of the EuroDocDel system in Luxembourg on 1 October.

EuroDocDel can be used by the public and commercial organisations as an advanced, user-friendly technique for identifying and retrieving information from the European ...mmunity institutions. The ...nu driven videotex system helps the user to identify, as best he can, the exact document which he wants. It will even tell the user if he has ...de a mistake in his spelling!

Once the exact information has been found the user can view immediately the full text of the document on his screen or get a hard copy via a telefax machine.

The system is being installed by Europe Data, a subsidiary of Elsevier, with the support of the European Commission. National user groups of online services are being intimately involved in the process to ensure smooth development.

Europe Data say that two years of market research have gone into the EuroDocDel concept with hundreds of visits to librarians, parliamentarians and other information users throughout Europe. Beyond Community documents, other sources of information on the system will depend on user demand. During the rest of 1984, demonstrations are planned in 14 major cities in the EC. EuroDocDel will be implemented in 1985 with constant feedback from users. At the end of the year an independent evaluation will decide future perspectives.

EURODOCDEL OUTPUT

Fir d'eischt ann Letzeburg virgestallt

Luxembourg Prime Minister, Jacques Santer, speaking at the EuroDocDel conference

EuroDocDel presentations

Luxembourg	1 October	Dublin	9 November
Copenhagen	9 October	Milan	21 November
Bonn	18 October	Rome	25 November
Paris	26 October	Athens	27 November
London	31 October	Brussels	7 December
		Amsterdam	12 December

Norge har blitt medlem av Euronet DIANE

Norway joins

The European network of electronic information, Euronet DIANE, has been joined by Norway making it the fourteenth member. Besides the Community countries, Finland, Sweden and Switzerland are also members of DIANE.

An agreement was signed on 14 September by Mr Gerhard Munthe of the Norwegian National Office for Research and Special Libraries and Mr Jansen van Rosendaal, director for information market at the European Commission.

The accord foresees full cooperation between the E. C. and Norway in the marketing and the further development of the European online information market and Euronet DIANE. Besides full exchange of technical documents on host interface developments, higher level protocols and X25 devices and help with marketing intelligence, Norway will be given user support on equipment, referral and enquiry services.

Norwegian Host computer operators will be encouraged to participate in EHOG, the European Host Operators Group, which is presently discussing interconnexion of databases. Norwegian users will participate in the User Forum.

The agreement is subject to the approval of the five-year programme for the development of the specialised information market in Europe.

Figure 5.4 Diane News Oct-Dec 1984 announced Norway as the fourteenth member of Euronet DIANE. Its DIANE Centre opened January 1st 1986.

In fact it can almost be said that the Norwegian referendum about EU membership in September 1994 was the date everything changed. For the two years before 1994 EU information was the most important area, after that year the interest in the Internet took over completely. The first Internet seminars were about the fundamentals, and about the joy of telenetting, using email and Usenet and, most important, using Gopher. The Web was waiting in the wings until everyone had fast lines and computers with Windows, after that everything was about the Web.

In the last years, the main activities have been in two areas. 1) The Internet information, especially using the different search engines and Internet directories, and also evaluating the quality of Internet information. 2) A return to the commercial information sources. The RBT has made several national consortia agreements with online information services, and much of the work has been in user support and seminars in using these services. In fact, as more and more people realizise that it is not true that "*everything is on the Web*", at least not free on the Web, the need for information about the commercial services and evaluated information sources is coming back.

RBT was from January 1st 2003 merged with the museum, archive and public library sector in a new organization, Norwegian Archive, Library and Museum Authority or ABM-Utvikling. ABM-U decided not to continue the centre and it was officially ended on December 31st 2003.

A longer history about the Norwegian DIANE Centre was written in the Norwegian journal Bok og Bibliotek no 3, 2004.

Figure 5.5 Staff of Norwegian Diane Centre. From left to right: Roar Storleen, Aud Lamvik, Even Hartman Flood, Hilde Bakken.

Finland

Elisabet Mickos

The official DIANE Centre Finland was established in 1988, one year after the Norwegian, at the VTT Information Service. VTT Information Service had started using online information systems in 1974 and already acted as an unofficial advisory organization for online questions as well as SCANNET help desk. In the 1970s and 1980s most courses and seminars on international online databases were arranged at VTT. The Finnish online newsletter was also produced at VTT.

DIANE Centre Finland was partly sponsored by the Finnish PTT, the assignment including some hundred hours per year. Other Nordic DIANE centres had at least one full-time employee; the Finnish DIANE Centre worked in the same way but only part-time. One person was in charge of the centre and the other information specialists contributed to the advisory activities when required. The first co-ordinator of the services was Merja Lehti, who started and developed the whole DIANE scenario.

The service was a free help desk for online users, providing information about publicly available online information services, equipment and networks. Customers normally phoned the centre and got the answers either directly or by mail.

Information about DIANE Centre Finland was also available via Telesampo, the videotex system of the Finnish PTT.

Besides answering questions the DIANE Centre collected various materials, e.g. brochures of more than 70 online systems or databases. Contract forms were also available for the most important international online systems as well as for the Finnish data communication network. Contract forms were especially popular among users.

Other useful information was published in information leaflets which were regularly updated and very popular among users. In the summer 1989 the following information leaflets were available:

- Bibliography of online searching and databases
- International databases according to subject
- Domestic online systems and databases
- Domestic databases according to subject
- Online services in Finland
- Contact information and prices of Datapak and Telesampo
- Address number to data communication networks in different countries
- Network User Addresses (NUA) of online systems
- How to start online searching
- Costs of online searching
- Collection of training databases.

The emphasis of the DIANE activities lay on online courses arranged at VTT and on distributing printed material. The help desk was not used to the same extent. It was, however, rather cost-intensive to run these activities. VTT Information Service and the Finnish PTT therefore decided to install a payphone, a premium rate answering service. The payphone service started in January 1991 with a fee of FIM 11.70 per minute (about EUR 2). All questions concerning databases, online searching and telecommunications were directed to this number. At that time Elisabet Mickos was in charge of the service.

The funding by the Finnish PTT was discontinued in 1992 but the service itself still continued for a couple of years.

Denmark

Even Hartmann Flood with Ulla Retlev

Finally, we come to the Danish DIANE Centre. By any reasonable criterion (alphabetical, chronological, size, importance, influence) they should have come first, but I wanted to end this chapter with the best part of the story.

The Danish DIANE Centre (DDC) was opened on June 9th 1981 with four persons employed full time and situated at DTU. That was more staff than on the other centres put together. The office was in rooms rented from the library of the technical university, now the Technical Knowledge Centre of Denmark The opening was attended by the Danish Minister of Education among other dignitaries and it was obvious that the Danish government was providing a lot more resources into this than their neighbours did later on.

The four people present in the centre at the start were two documentalists or information specialists, Keld Drube as head of the centre and Ulla Retlev, a librarian Klaus Elkjær Søndergaard and a typist Bitten Danig, very soon to be replaced by Anette Due. In 1984 Keld Drube left the centre and was replaced by Mogens Johne as the new documentalist, while Ulla Retlev took over as head of the centre, and Klaus Søndergaard was replaced by Kirsten Thorkilgaard. Originally the centre was a five year trial project (same as in Sweden), but in 1986 it was given permanent status.

The centre was established by DANDOK, the Danish Committee for Scientific and Technical Information and Documentation, and placed under, and in the trial period fully financed by, the Ministry of Education. From the very start a well equipped training room was available and from the

very beginning it was decided to centralize the registration of all online training activities in Denmark. This meant that the centre also became responsible for most of the arrangements, the result of which was a better co-ordination, more training arranged and the information reaching more people, thereby helping the providers of online information. Finally it meant a relief of staff resources in the libraries where this type of training had traditionally taken place.

From 1982 basic host independent online training courses were offered free of charge as part of the goal to promote the use of online services and reach more potential users. In the four years 1982 – 1985 at least 24 open courses were held on Basic online training with a total of 457 participants. Besides this other courses were offered such as Introduction to online, CCL, Equipment and Advanced search strategy. The same sessions were often given to closed groups but no statistics have been kept on the number of participants. As mentioned, the training room could also be used free-of-charge by hosts and database producers. In the years 1981 – 1984 a total of more than 1,000 people attended training in the centre.

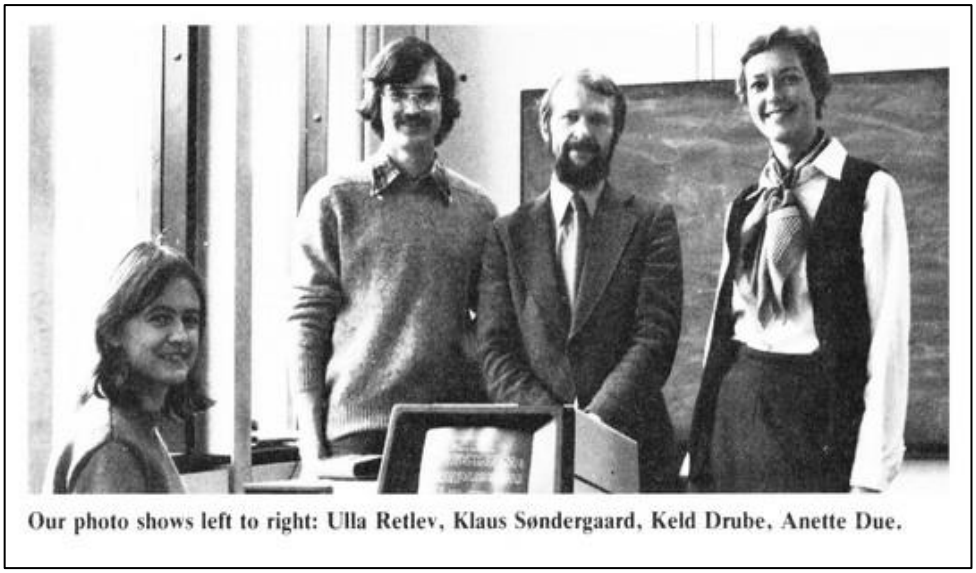

Our photo shows left to right: Ulla Retlev, Klaus Søndergaard, Keld Drube, Anette Due.

Figure 5.6 Danish DIANE Centre staff. From left to right: Ulla Retlev, Klaus Søndergaard, Keld Grube and Anette Due. Source: Euronet DIANE News, March/May 1984.

But the centre came in contact with more people through bigger arrangements like seminars on databases in the social sciences and the humanities. The last-mentioned attracted about 180 people (1984). The first mentioned had to be doubled due to the huge interest (more than 400 people).

As a result of the large government investment, the Danish DIANE Centre has been an inspiration and a help for all the others. Their newsletter “DISPLAY” has been an information resource for the other centres as well as for libraries and users all over Scandinavia. It started in 1982 as a free newsletter with four issues a year, but with the growing popularity and amount of information it was decided to extend to ten issues a year but then no longer free-of-charge.

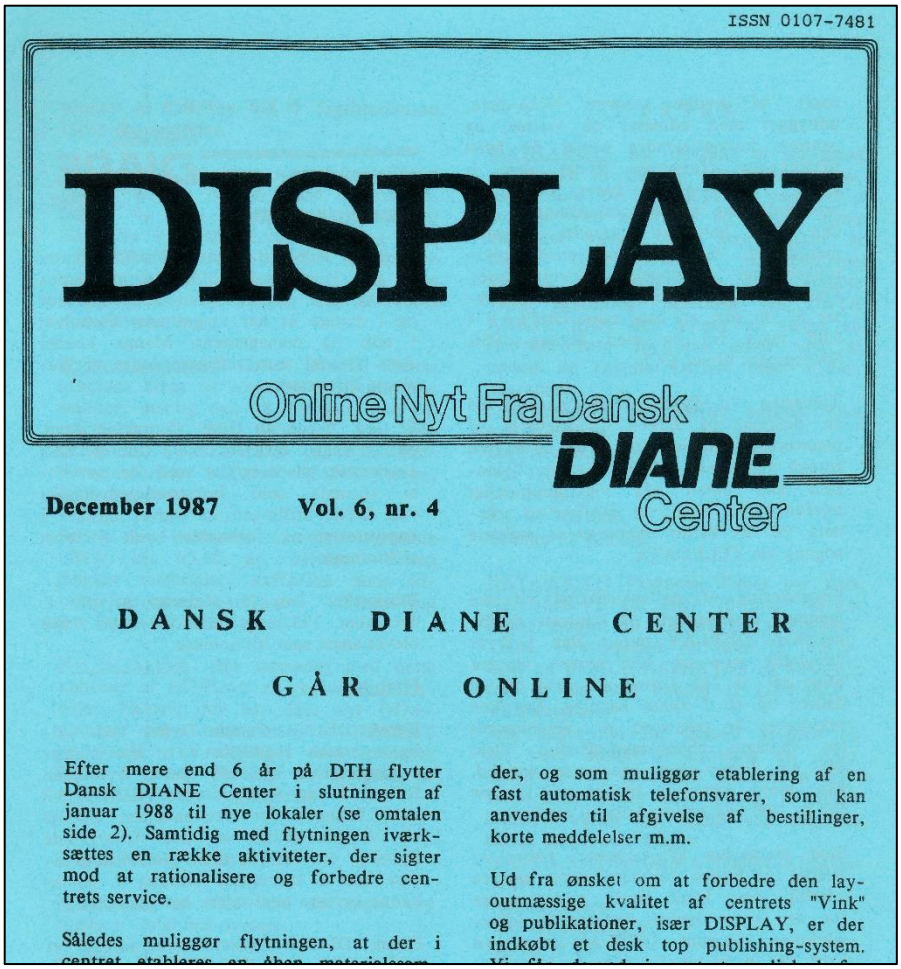
In 2001 DISPLAY was succeeded by the Web portal Informationsportalen which had a broader focus on electronic information. A newsletter with the same name was published for a few years. DISPLAY was after the first few years established as an online database which was free, but strangely enough the electronic version was not as much used as the paper version (which at that time was no longer free).

Also the special publications that the centre has published over the years have been very valuable. Many of them were humble publications with advice on (Vink om …) how to search and which equipment to buy, databases on a specific topic like free training databases or where to find

company information. A very popular one was the Price comparison which was regularly updated, giving information on search costs for an average search of a given number of much used databases at more than ten different hosts. Other publications were guides to online information centres in Denmark offering a broker service, to producers and providers of online information, and the Danish contribution to the Nordic Database Guide (NORDGUIDE).

A very important part of the activities was the enquiry service which as all other services from the centre in the first years was free-of-charge. During the end of the trial period 4,000 – 5,000 enquiries a year were received by telephone and mail.

Among all other assignments the centre has also been agent for the databases from the EU commission, including CELEX. The seminars they have had in the use of these databases have also been of great help to users of EU information in the rest of the Nordic nations. In an earlier period the centre acted as SCANNET helpdesk, and later, in 1993 it was appointed as National Awareness Partner for the EU IMPACT programme. During the years staff members from the centre have contributed to national and international work in many ways, e.g. lecturing at seminars and conferences, participating in working groups and writing articles to different publications. One example is the paper given at 6th Nord IoD meeting in August 1985 by Ulla Retlev: Informationer til informationssamfundet (Information to the Information Society) on the idea and importance of the DIANE Centres.



ISSN 0107-7481

DISPLAY

Online Nyt Fra Dansk DIANE Center

December 1987 Vol. 6, nr. 4

DANSK DIANE CENTER GÅR ONLINE

Efter mere end 6 år på DTH flytter Dansk DIANE Center i slutningen af januar 1988 til nye lokaler (se omtalen side 2). Samtidig med flytningen iværksættes en række aktiviteter, der sigter mod at rationalisere og forbedre centrets service.

Således muliggør flytningen, at der i

der, og som muliggør etablering af en fast automatisk telefonsvarer, som kan anvendes til afgivelse af bestillinger, korte meddelelser m.m.

Ud fra ønsket om at forbedre den layoutmæssige kvalitet af centrets "Vink" og publikationer, især DISPLAY, er der indkøbt et desk top publishing-system.

Figure 5.7 Excerpt of front page of DISPLAY December 1987.

From 1986 the Danish DIANE Centre received a permanent subsidy from the government, but at the same time the centre had to recover some of the costs for the activities, e.g. the subscriptions to the newsletter for a fee. In 1993 they changed the name to INFOSCAN, since the original DIANE Project was ended and the name DIANE was confusing. Several people wondered if it had anything to do with Dianetics, and thus with scientology. The centre also moved from the DTU in 1987 and established itself as an independent institution, at that time with Alex Gorski as head of the centre, after Ulla Retlev had left. Since then it has moved to new premises several times. The last years the staff has been Alex Gorski, Karen Bonnis, Katarina Holm and Peter Raben.

In 2000 INFOSCAN merged with Statens Information and in 2001 they moved once again and renamed to “Informationsportalen”. As mentioned it was also the name of the new journal that had replaced DISPLAY. After only 16 months the centre had to move again, as Statens Information and Informationsportalen were included in the new “IT og Telestyrelsen” (National IT and Telecom Agency). In 2002 it all ended. In December the Danish government decided to no longer subsidize the activities of Informationsportalen and close down the activities. Informationsportalen published the last issue in December 2002, but continued as an electronic newsletter for about half a year. At that time the newsletter had reached a lot of new users and was mailed free of charge to several thousand people.

The electronic newsletter Informationsportalen is continued by the library at the Royal School of Library and Information Science but only focused on articles related to the scope of the library. They also took over and maintain the archive of articles from DISPLAY and Informationsportalen.

An era had ended. Ironically the knowledge centre for electronic information could not survive, when Internet had made everyone his own information specialist, public subsidies were no longer attainable and chaos became a condition of daily life. It is hard to say how things would have been without the centre but at least a lot of taxpayers found they saved money when using the services from the Danish DIANE Centre.

Much more about the history of the Danish DIANE Centre can be found in Peter Raben’s history of the centre, published in DISPLAY, vol 19 (2000), issue 9/10 p 15-17. There is the full story, including how the centre was involved in both fictional and real crimes.

5.3 Nordic database directories

Merja Lehti

Manuscript received 2002

How to promote Nordic business and economy, industry and culture from the viewpoint of the I&D sector? A lot of special know-how is produced in the Nordic countries to facilitate decision-making and to benefit the society as a whole. For 20 years NORDINFO directories of Nordic databases have contributed in facilitating and encouraging more effective use of Nordic "computerized information resources". NORDGUIDE 2001 is a unique resource with information about 1,100 Nordic databases that are publicly available for searching.

The very beginning

Back in 1974, NORDFORSK (Nordic Co-operative Organization for Applied Research) took the initiative of an experimental data network for the information and documentation field. The project was called SCANNET and started in 1976 (1). Until 1985 SCANNET was a foundation and a project initiated by NORDFORSK and financed by NORDINFO. SCANNET was thus a data network for information retrieval purposes in the Nordic countries at the end of the 1970s. From 1980 to the end of 1992 SCANNET in its different forms was financed by NORDINFO. Its main goal was to promote use of Nordic online information resources and to co-ordinate Nordic co-operation in the field.

The first systematic inventory of Nordic databases was made in the late 1970s. NORDINFO set up a working group in 1978 to make an inventory of computerized information resources produced in the Nordic countries. Representatives of four countries made up the group: Ms. Lena Hakulin from Finland (chairwoman), Mr. Mogens Dahl from Denmark, Ms. Tove Molvig from Norway and Ms. Luise Kaiserfeld from Sweden.

The primary goal set for the work was twofold: to make an inventory and estimation of databases produced for science, education, business and the economy and society as a whole, and to gather the results in a machine-readable catalogue (2 and 3). *(Ed:s note: The inventory made by Lena Hakulin was an internal report for NORDINFO (Hakulin, Lena et al: Inventering av databaser i Norden 1978. Esbo (Nordinfo) 1979. 106 p) and published 1981 as an appendix to a more substantial inventory (3)).*

Information of as many as 470 databases was gathered by an enquiry in the Nordic countries; even about manual catalogues and systems that could be foreseen to be later converted into a machine-readable format. About 80 % of the databases were machine-readable and 30 % could be used online. The work resulted in an internal report to NORDINFO in April 1979, with further recommendations. A later outcome was NORDINFO publication No. 1, "*Databasproduktion i Norden 1978*" (3), published in 1981 and presenting information about 300 databases, both bibliographic and non-bibliographic.

The members of the group e.g. recommended updating the information thus gathered, and even converting it into a database of publicly available Nordic databases, itself available online on the SCANNET network. This recommendation resulted in a project proposal called "*Nordisk databasguide online*". The main tasks of a new project group were (2):

- specifying the contents criteria and definitions of the database
- gathering the necessary information nationally about online information systems and databases
- planning of building up and testing the database
- estimating the costs for the various phases
- choosing information retrieval systems for testing.

Within SCANNET, NORDINFO in 1984 started an inventory of all Nordic databases that are publicly available for online information retrieval.

Co-ordinating

The work was first co-ordinated as a project within SCANNET from 1984 onwards. SCANNET was to promote usage of Nordic information resources and co-ordinate Nordic efforts in the information and documentation field. After incorporating SCANNET into NORDINFO's activities, the co-ordinating tasks were continued within NORDINFO by a special NORDGUIDE co-ordinator from 1993 to 1997. In 1998, the tasks of co-ordination, maintenance and development of the NORDGUIDE database were outsourced and commissioned to the VTT Information Service in Finland on an annual contract. Malin Edström in Stockholm was the first co-ordinator at SCANNET in the 1980s, followed by Elisabet Mickos and later Maria von Hertzen at NORDINFO.

A Nordic team in co-operation

National contact organizations, the same from the very beginning, have been responsible for gathering and updating their own data in NORDGUIDE ever since the co-operation started. In 2001 they are:

Denmark INFOSCAN / Statens Information (previously Dansk DIANE Center) (*From April 1st 2002 named Informationsportalen. In December 2002 the centre closed down. /Ed:s note*)

Finland VTT Tietopalvelu (VTT Information Service)

Norway RBT, Riksbibliotektjenesten (National Office for Research Documentation, Academic and Special Libraries)

Sweden KTHB, Kungliga tekniska högskolan. Biblioteket (Royal Institute of Technology Library) Ämnessökning - IDC

Iceland Landsbókasafn Íslands - Háskólabókasafn (National and University Library of Iceland)

Faroe Islands Føroya Landsbókasavn (National Library of the Faroe Islands)

The most recent member Faroe Islands joined the Nordic database co-operation in 2000.

The following persons have been involved in national updating or as national contacts during the numerous years of co-operation:

- Denmark: Birgit Pedersen, Kirsten Thorkilgaard, Eva Kastrup, Pernille Kofoed, Karen Bonnis, Grethe Svendsen and Katarina Holm
- Faroe Islands: Arnbjørn Ó. Dalsgarð
- Finland: Pirjo Sutela, Elisabet Mickos, Merja Lehti
- Iceland: Andrea Jóhannsdóttir, Sigrún Hauksdóttir, Sveinn Ólafsson
- Norway: Tove Molvig, Sigrid Tollefsen, Signy Irene Karlsen
- Sweden: Helena Fernholm, Ylva Rosell, Lena Fahlén.

National information and documentation bodies in the Nordic countries have separately financed national updating and inventories.

Where to find it?

Continuing from the first NORDINFO publication, six printed directories were compiled and published by NORDINFO from 1984 to 1996 for sale to those interested. The guidebooks and directories usually were titled "*Nordiska databaser*", "*Nordisk databasguide*" or NORDGUIDE (4, 5, 6, 7, 8, 3). In 1983 and 1984 lists of Nordic databases were published in the newsletter SCANNET Today twice a year (1). Before that, in 1982, NORDINFO-Nytt in a special issue on SCANNET contained a list of all the databases accessible via SCANNET (9)

The first online version of NORDGUIDE became available in 1988 for information retrieval in all Nordic countries supplied by one or two large national hosts. The online version was updated once or twice a year. The following hosts were involved during the past years:

- Finland: VTKK (Valtion tietokonekeskus, Statens datorcentral, Finnish State Computer Centre) -> TT-Tietopalvelut Oy (TT-Information Services Ltd.)
- Sweden: DAFA Data AB -> Sema Group Infodata AB -> InfoTorg and MIC-KIBIC
- Norway: NSI A/S (Norsk senter for informatikk) -> Fabritius, Statens Datasentral SDS (Norwegian Government Computer Centre, until March 1995) and Riksbibliotektjenesten RBT

- Denmark: Forskningsbibliotekernes EDB-Kontor FEK (Danish Research Libraries, Computer Department), Dansk Bibliotekscenter DBC (Danish Library Centre) as well as INFOSCAN
- NORDGUIDE was made available via NORDINFO's gopher in 1994 and via the Web since 1998 via NORDINFO's Web site.

Some of the partner countries have published national database guides, either printed or online. DANDOK in 1984 made an inventory of Danish databases (10). Danish DIANE Centre/INFOSCAN started collecting and updating information about Danish databases in 1987; "*Danske databaser*" has been online since 1988. (In December 2002 what was left of INFOSCAN was closed by the parent body, National IT and Telecom Agency. "*Danske databaser*" was for a short time after that published as a Web database.)

RBT started to gather information about Norwegian databases and registers in 1974. The first overview was published in Synopsis No. 1-2 in 1975 (11), listing also databases that were available in Norway even though not of Norwegian origin. Regular updates were published in Synopsis up to the winter 1994-1995. NUBA directory was published in Norway listing Norwegian databases 1981- 1982 (12). From 1995 to 2000 RBT updated and maintained NORBASE, a database of Norwegian databases.

VTT Information Service compiled a printed directory of Finnish databases, which was published by the newspaper company Uusi Suomi in 1988 in their Business books series (13). No special online database of only Finnish databases was made.

IDC at KTHB, the Swedish partner organization, has not published any national directories covering Swedish databases. Nevertheless, three directories have been published about all Swedish databases in the 1980s and 1990s, by DFI and Televerkets databastjänst together with TLS (14, 15, 16). Furthermore a number of directories about Swedish database supply in different fields have been published.

NORDGUIDE: how and why?

NORDINFO's main aim is to promote co-operation in Nordic scientific information and documentation. The focus lies on improved availability of information resources, i.e. better and more efficient ways of disseminating information to researchers and other users of scientific and technical information in the Nordic countries. The NORDGUIDE co-operation is thus well in line with NORDINFO's tasks.

NORDGUIDE is a good example of long-term Nordic co-operation and a unique information resource. Close and keen co-operation, common methodology and structure, a number of links and various alternatives in searching - these are some of the main strengths of NORDGUIDE.

A co-ordinator and national partner organizations contribute to guarantee the quality and uniformity of information presented. National partner organizations are responsible for gathering and updating their own data annually according to the principles and policy commonly agreed upon. Co-ordination, maintenance and further development of NORDGUIDE are the duties of the co-ordinating organization.

Technical background

NORDGUIDE has technically undergone a number of phases from a printed directory to an online database and further to a Web database.

Information for the database register and guide was first recorded and updated with an ordinary word-processing program. Soon the partners moved over to CDS/ISIS, a freeware information retrieval system from UNESCO. In the mid-1990s they started using MS Access for updating and editing the national data (17). It was the co-ordinator's task to convert and input the data to the Nordic register, database and directory. The present NORDGUIDE, available via the Internet as a Web database, is run under TRIP, an established text retrieval software in the I&D sector. TRIP Highway enables searching on the Web.

Criteria for selection

Criteria for selecting databases to the register and the database guide are commonly agreed upon. Well enough formulated at the very start, it has been possible to apply them throughout the years - with some alterations, of course, due to rapid development in the I&D sector. The following criteria are applied in selecting a database:

- it is produced in a Nordic country (the main criterion) or is available through a Nordic host or online service
- it is searchable (cf. Gale directory: "*organised for rapid retrieval via a computer*"; not any Web site whatsoever qualifies) (18)
- it is available online through telecommunications or other networks or direct dialing
- it is available to the public either direct or by subscription, contract or membership.

Portable databases either on CD-ROM or on diskettes are also included, as well as databases on the Web, mainly those for professional purposes.

Structure and searching

Structuring and designing NORDGUIDE was the principal task of the SCANNET co-ordinator Malin Edström. Thanks to her pioneering activity, we have a solid basis, which - with minor changes - is still applicable today (19).

NORDGUIDE is structured into three sections: database descriptions, producer information and host information. Each section has a number of fields to give extensive information to the searcher. The contents of all fields are searchable.

- *Database descriptions* include among others information about the name of the database (in a Nordic language and English), type of database (modification of the Cuadra and Gale directories' classifications), contents, language, geographic coverage, total size, annual growth, time span of contents, main subject and other keywords, availability media and URL address of the database and a link to it.
- *Producer-related fields* contain information about the name, address, telephone, fax number, country, email and URL address of the producer and a link to the producer.
- *Host-related fields* contain the host's contact information as well as information about the command language, conditions for use (subscription fee, charges, restrictions, permissions) and connection (telecommunications network, Datapak, Internet, direct dialing, telnet etc.).

The structure allows both simple and advanced searching of the present Web version. Besides searching, single terms can be browsed. One can use Boolean operators and truncate words. Searching is also possible according to “all Nordic countries” or country wise. A simple search implies "all fields". The advanced search form has ready-made fields with some pull-down menus or field notations to assist in searching. "Searching all fields" includes the possibility to use field codes.

In a simple search, records are sorted according to relevance: those in which the search terms appear in title, keywords or subject field will appear first in the list. As regards advanced searching, one can sort the results by database name (alphabetically), producer, host or country. It is also possible to choose the number of records to be displayed from 50 to 500.

Contents

NORDGUIDE has grown steadily; showing a fivefold increase from 1985 to 2001 in the number of databases presented, see table 5.1 (19).

	1985	1987	1990	1992	1994	1996	1998	2000	2001
Denmark	24	70	100	119	138	159	171	290	290
Finland	27	70	124	172	221	261	299	326	329
Iceland					1	3	6	6	6
Norway	45	73	91	125	173	213	231	251	255
Sweden	91	109	124	138	171	195	200	196	211
Faroe Islands									1
Pan-Nordic							8	7	8
Total	207	322	439	554	704	831	915	1,076	1,100

Table 5.1 Number of Nordic databases. Sources: Hertzen 1997 and NORDGUIDE on the Web 2001.

Type of database

Classification of databases in the present NORDGUIDE is a modification of Gale directory's definitions a few years back. It was changed from the previous classification (1985 and 1987: reference, factual, full-text, mixed) and based on Cuadra's directories in 1990 and further slightly modified by the Nordic partner team. Two main groups, reference and source, have both been divided into various subgroups:

- reference: bibliographic or referral
- source: full-text, numeric, textual-numeric, image, sound, software, transactional.

For many years, bibliographic databases were the largest group; see table 5.2, though down from 61 % share in 1985 to 38 % in 2000. During the 1990s they had a steady share of 33 % to 35 %. Full-text databases have increased their share from 7 % in 1985 to 24.5 % in 2000 (6, 20).

Type / Year	1985	1987	1990	1992	1994	1996	2000
Bibliographic	61 *)	53 *)	33	35	33	33	38
Full-text	7	8	19	20	19	19	24.5

**) 1985 and 1987 classification: Reference*

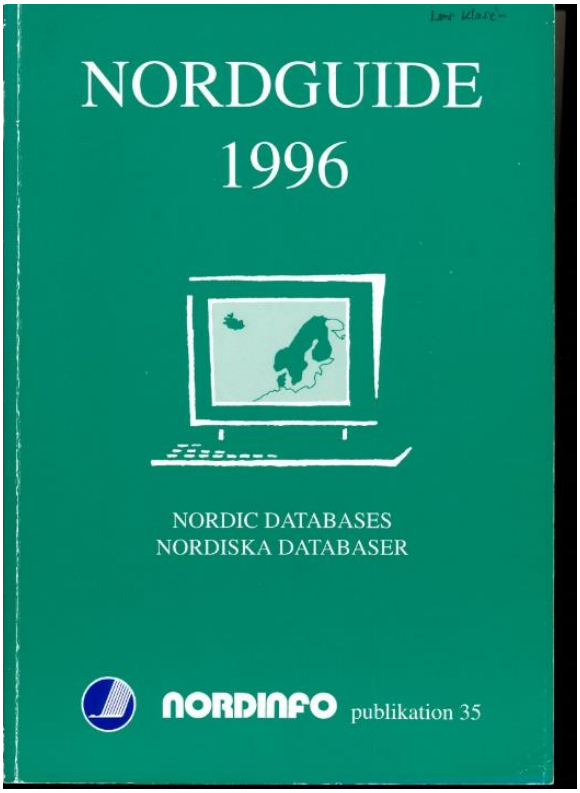
Table 5.2 Percentage of reference/bibliographic and full-text databases in the classification of Nordic databases. Factual and other databases account for the rest. Sources: Nordiska databaser 1990, NORDGUIDE 1996 and NORDGUIDE on the Web 2000.

Main subject

Each database is given a maximum of three main subject terms in English to describe the contents. These terms are taken out of a short and concise list compiled by the national partners according to

well-known thesauri. Other terms are to be suggested by the producers themselves and listed as "keywords" in the national language or English. Science, technology and business prevail as important sources of information in Nordic databases. Databases about law and legal matters also account for a significant share. Library catalogues form a large part of the databases. Scientific and research libraries have traditionally been the core of the network of information resources in all Nordic countries. Libraries were also the first to convert their registers to online format (17).

The list of main subject terms has been revised a few times so successive years are not exactly comparable. “Business” (business, economics or companies) as the main subject term has, however, ranged from 13-15 % (in 2000) to 24 % (in 1990) during the past years. The share of “science and technology” has ranged between 16 % (in 1990) and 20 % (in 1985) and “law and legislation” between 9 % (in 1992) and 17 % (in 1985).



Available media

ASCII (American Standard Code for Information Interchange) online databases could first be retrieved for searching via packet switched networks, national or international. Accessing Nordic databases via such networks was possible as follows: 68 % of Nordic databases in 1985, 77 % in 1987, 81 % in 1990, 85 % in 1992, 78 % in 1994, 73 % in 1996 (6, 7, 8). Due to very rapid development from mid-1990s onwards an ever-growing amount of Nordic databases has become available via the Internet. Online or Web databases cover in 2000 about 75 % of the Nordic supply. Offline media (CD-ROMs, diskettes, magnetic tapes) cover the rest, CD-ROMs being a majority. Still 16 % have a printed counterpart.

Use and supply

In 1994 NORDINFO conducted a survey about future aspects of a compiled catalogue and database of Nordic databases. The use of the printed directory of Nordic databases of 1992 was also surveyed. About 300 enquiries were sent to buyers of the 1992 printed guide, and the response rate was almost 70 %.

Over 80 % had used the printed directory. Most of them had looked for database contents and contact information. The directory was considered useful by the majority of those who needed only Nordic information and of those who looked both for international and Nordic information. Only half of the respondents knew about the online version of the directory and only a minority had used it (21).

NORDGUIDE 2000

Use of the present NORDGUIDE Web database is steadily growing, measured either by the number of user sessions or by the number of searches. From 1999 to 2000, the number of user sessions increased from about 6,200 to about 8,300 and that of searches from 12,200 to about 15,000. One half of the user sessions and searches are made by Nordic users, the other half by users elsewhere in the world.

NORDGUIDE 2001 lists about 600 databases producers and 400 hosts. Each country has but a few big hosts with dozens of databases, either in a certain field or related fields or covering various fields. The Nordic scene is, however, that of smaller hosts, even those with only one or two databases. A Nordic host supplies an average of 2.5 databases and a Nordic producer produces an average of 1.7 databases.

Besides the Nordic national partners, there are about 100 links to NORDGUIDE internationally on the Web. Most of the links are from the Nordic countries, but also from other European countries, as well as from domains .com and .org.

International co-operation

At the end of the 1980s NORDINFO and the NORDGUIDE co-ordinator gradually entered into co-operation with ECHO, the European Commission host organization, and Cuadra, publishers of well-known international database directories. They were regarded as a good contribution to promoting awareness and use of Nordic databases.

ECHO and I'M Guide

In the autumn of 1990 NORDINFO/SCANNET agreed with ECHO on providing information about Nordic databases for the extended DIANE guide. It was to include information about databases from non-EC countries as well (21, 22).

The DIANE Guide then was transformed into I'M Guide (Information Market Guide) and NORDINFO started to deliver information about Nordic databases annually to this. Such information was separately gathered for EIIA's (European Information Industry Association) I'M Guide. Its updating procedure differed from that of the Nordic guide, and was not of the same high standard. I'M Guide was published in print and also as an online version at the ECHO host and later as a Web version. In 1999 I'M Guide had a direct Web link to NORDGUIDE. The curtain was, however, pulled down for I'M Guide in 2000.

Cuadra, Gale

The 1990s began with other co-operative activities, too, i.e. discussions with Cuadra. SCANNET was to contribute to Cuadra directories (23) by providing Nordic database information (22). The Cuadra directories later turned into Gale directories, and NORDINFO and Gale entered into further negotiations.

Gale Directory of Databases 2001 covers 11,604 unique entries (24). Information about a large number (over 700) of Danish, Finnish, Norwegian and Swedish databases is included in the directory, though not so up-to-date as in NORDGUIDE. Nordic databases make up approximately 6 % of

international database supply - one proof of the marriage of contents and high-class technological infrastructure in the Nordic countries.

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5.4 Online user groups and conferences

Inga Elding

Manuscript received 2005

The advent of Online user groups in Europe

In the 1970s the online industry developed rapidly in Europe. At the end of the decade online searching had become common both at universities and within companies. The online users felt that they needed a forum, more or less formal, for exchange of experience and information. There was also a need to give feedback to and exert pressure on database producers, hosts and especially the telecommunications companies, with whom the "onliners" experienced most problems. Thus online user groups were established in many European countries. The Nordic countries were in the forefront, and user groups established in Finland as early as 1975, in Denmark (DOBG) and Sweden (SOLUG) in 1977 and in Norway (Online-gruppe, later NOLUG) in 1978. The still active UK user group, UKOLUG, also started in 1978. From the beginning the online groups acted as an important resource in database user training (1).

Co-operation between the Nordic online groups

In summer 1978 NORDINFO suggested to establish closer contacts between NORDINFO and the Nordic online users. A meeting was held in Helsinki December 12-13 1978, where two representatives from each of the Nordic online groups came together in order to evaluate the needs of the Nordic online users and the problems with the online systems. The meeting decided that the attending representatives should form an Online reference group and that suggestions for future NORDINFO projects within online should be discussed in that group. At this first meeting for example Holger Friis from DOBG was very critical of SCANNET calling it SCANDALNET considering performance and lack of training materials.

NORDINFO found the suggestions of an Online reference group interesting but could not give money to such a permanent project. Instead NORDINFO sponsored future meetings of the Nordic online users groups at the Nord IoD conferences, first at the 4th Nord IoD in Uppsala on June 14th 1979, where the Nordic Online Users day attracted 150 participants, and later in Trondheim on June 17th 1982, in Århus in 1989 and at the 8th Nord IoD in Helsingborg in May 1992, where the Swedish Online User Group was very involved in preparing the programme. In Helsinki in 1985 it was decided to integrate online topics in the conference itself, as described later.

Thanks to NORDINFO, a two-day Nordic Online group meeting could again be held, this time in Lund in October 1980 with delegates from Denmark, Finland, Norway and Sweden (2). The main discussions were about SCANNET, with suggestions of a common login procedure, searchable title fields, indexing in English, a common user manual and CCL. A letter was also sent to Lockheed (later named DIALOG after the search language) with suggestions that a printer be installed in Europe, since the delays in receiving prints had been unacceptable.

It was also suggested that Lockheed should appoint a Scandinavian representative, who could help with co-ordinating courses. Lockheed responded positively to this and promised to install a remote printer in Europe "by the middle of 1981". But after having tested the concept DIALOG decided it wouldn't work properly and tried instead to speed up the delivery of prints by using courier services and bulk mail: All envelopes with European addresses were sent to a mail service somewhere in Europe, from where they were sent by local postage. The European office of Lockheed also invited the four Nordic User Groups to "*participate in the organization of training sessions*". In Denmark the newly established Danish DIANE Centre soon took over that task. In November 1984 SCANNET organized a meeting in Stockholm with the chairmen of the Nordic Online groups.

The main problem for online users was still telecommunications, which needed improvements. For the 6th Nord IoD in Helsinki in 1985, where the theme would be IRM - Information Resources Management -, it was decided to recommend that papers relating to online be integrated in the main programme instead of holding a separate Online day. Moreover, an Online user's evening was held during the conference on August 20th 1985, where Elisabet Mickos talked about SCANNET and all Nordic online groups were presented. Aud Lamvik has written about this meeting in the Norwegian journal for information specialists, Synopsis (3).

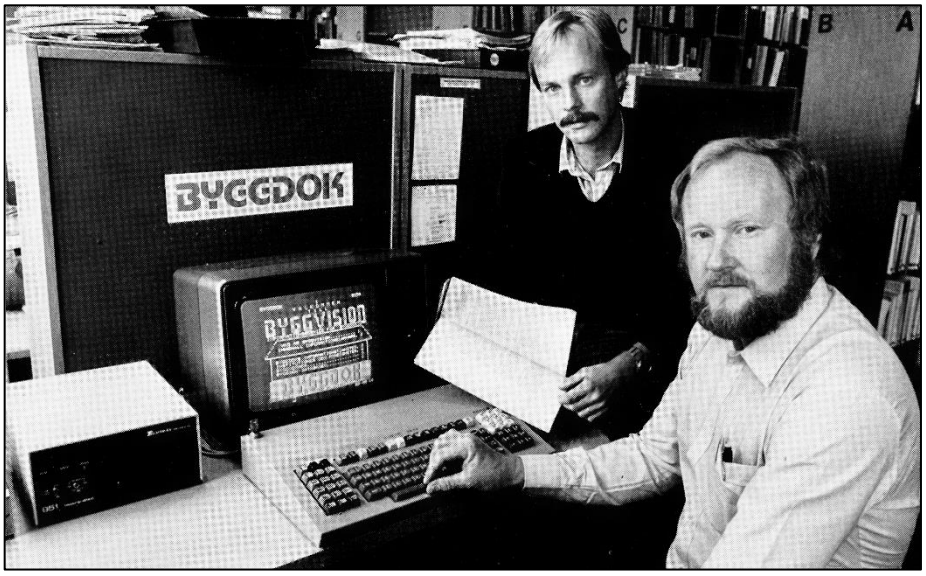

Figure 5.8 BYGGVISION was a videotex version of Swedish online service Byggdok. It was developed using project funds från DFI. Here demonstrated at the Byggdok office in 1982 by Bengt Eresund (in front) and Magnus Ryttarson.

The first Nordic Online conference, Databas 88, was held in Stockholm January 25-27 1988. *(This conference was preceeded two years earlier by Databas 86, acting as a "rehearsal" or test. /Ed:s note)*. NORDINFO, DFI and the PTTs of Denmark, Finland and Sweden were among the organizers. This event, called the largest Nordic Trade Fair for databases and videotex, featured conference seminars, an exhibition and product presentations. Ulla Retlev, in her review of this event for the Danish journal of information specialists, called it a success but pointed out that it was not another library meeting (4). Even Hartmann Flood also gave a report of this meeting, where he mentions that Elisabet Mickos, the SCANNET co-ordinator, got a prize by the Swedish PTT for her work with Nordic databases (5).

The fair Info-On-Line 1990 was held in Stockholm April 24-27 1990. It was a successor of both Videotex 87 (a special fair for videotex held in Stockholm 1987) and Databas 88. The Nordic online user groups took part in the arrangements together with the Swedish PTT. SOLUG arranged a user meeting that exemplified the geographical reach of online. The three guest speakers were Harry Collier, at that time the Executive Director of EUSIDIC, who talked about "*Information strategy 1990-1995: The coming convergency*", Dr. Roger Greatrex, from the Political Research Institute in Lund,

who presented Japanese databases, and Elisabet Mickos who presented a comparison between online in Australia, that she had visited thanks to the PTT's scholarship, and the Nordic countries.

Co-operation between the European online groups

EUROLUG:

The first International Online Information Meeting (IOLIM) took place in London in December 1977. This was probably the first world event focused on online retrieval. It was also the first time online users in Europe came together. During this event an informal meeting was organized for chairmen of the national user groups already in existence or soon to be. The participants at this meeting agreed that a forum for international exchange of experiences would be highly desirable and pointed to EUSIDIC (The European Association of Information Services, founded in 1970) as the right venue. Six countries were represented, of which three from Scandinavia: Sweden (Gunnel Hessler), Norway (Roar Storleer) and Denmark (Betty Vedel).

As a result of this meeting EUSIDIC in 1978 prepared a document proposing a mechanism by which EUSIDIC could be associated with the international activities of the national online user groups. A Working Group was constituted, consisting of representatives of EUSIDIC members, one for each country with a national user group, with the aim of providing a forum for the European users of electronic information services. This group was called NUG (National User Groups), later renamed EUROLUG (The European Online User Group).

The Council of EUSIDIC was willing to give support through its secretariat in organizing meetings and EUSIDIC's newsletter Newsidic could be used to inform members of the activities of the group in a column called EUROLUG News. Meetings were held first three and later two times a year, in London at the International Online Information Meeting in December (the first one in 1978) and in Luxembourg, Paris, Frankfurt, Heidelberg etc. in the spring. The European Commission paid travelling costs during the first years but was reluctant to pay for delegates of countries not within the EC. Among the Nordic countries, only Denmark was a member at that time. Members from the other Nordic countries had to apply for money elsewhere. NORDINFO and EUSIDIC sponsored for some years. In Sweden the National Library of Sweden (KB), DFI and sometimes TLS also helped with the travelling costs. In Norway Riksbibliotektjenesten gave travel support, but often also the employers of the groups' representatives, be it governmental agencies or corporations, would pay for their costs.

From the beginning 11 European countries were members in EUROLUG, which soon grew to 17. EUROLUG could act as a pressure group on the telecommunications agencies, the online industries and on the European Commission. Pricing policies, duplication of records within the same database, updating of databases, harmonization of invoices and restricted access to certain databases were discussion items on the agenda. Every year the member user groups prepared a country report, summarizing all interesting events in their countries during the year.

Monitoring week:

In 1983 EUSIDIC undertook a survey to obtain information on the attitudes of users in Europe towards European online services. The questionnaire was designed in collaboration with EUROLUG and the Euronet-DIANE Launch Team and distributed through the national online user groups.

In 1986 EUROLUG together with EUSIDIC decided to test the European data communications and check all calls during the last week of January from the European countries to online services via public data networks. The Online user groups were involved in sending out the forms to their members and collecting the answers. This was the first so-called Monitoring Week, which was then repeated yearly until 1993.

The result of this first Monitoring Week survey was published by EUSIDIC (6) and distributed to national PTTs: many countries reported a lot of failed calls, the mean rate of failures was 31 %. Most of the Nordic countries had about 30 % failed calls.

In 1989 the British Telecom announced an award to the online group with the most recorded calls during the Monitoring Week. Sweden had the highest call rate, and SOLUG won 12 bottles of champagne! The problems with getting the champagne to Sweden were enormous, due to the strict Swedish alcohol legislation. The champagne was stuck in the Customs, since only the Swedish Alcohol Retailing Monopoly (Systembolaget) was (and still is) allowed to import alcohol to Sweden. After many discussions the champagne could at last be fetched from the Customs. It was locked up in the room of the director of KTHB, where the Swedish representative in EUROLUG, Lilianna Kanafarski, worked, until it would be served at the end of the SOLUG day in November. In return for the champagne Harry Collier asked for a professional picture of Lilianna surrounded by the bottles and with a glass in her hand (water though!). This “marketing” picture was also published in TD, The Nordic Journal of Documentation (Tidskrift för Dokumentation (7). After that, champagne, now purchased at the Systembolaget, has been served at the end of each yearly SOLUG day.

In 1995 the aim of the Monitoring Week changed to survey document delivery services instead of communications (8). This was repeated 1996.

Awards:

EUROLUG Product award started in 1984. All the online user groups had the opportunity to suggest the best products of the year (online systems, software etc.). At the December meeting with EUROLUG one product was chosen and the winner of the award solemnly disclosed at IOLIM.

EUROLUG Personality of the year award also started in 1984. Members of the Nordic online user groups who have received the award are Sauli Laitinen in 1994 (9) and Lilianna Kanafarski in 1995. Sauli received his diploma at the 18th IOLIM in December 1994 while Lilianna received hers at the EUSIDIC’s 25th Anniversary Conference in Holland in October 1995 (10).

The Nordic user groups

Sweden

In 1976 Gunnel Hessler at Lund University Library gathered a group of online users in order to document and spread experience and knowledge of search possibilities in online databases (the systems most used at that time were ESA/RECON, Lockheed Information Systems and SDC Search Service). In order to enlarge, the group suggested in February 1977 to the board of TLS to initiate the formation of an online user group connected to TLS. The board accepted the proposal and Gunnel Hessler, Lena Göteson-Herber and Irena Vinters (later Gellerstedt) were chosen as members of a committee with the remit to start a national online group. At the end of 1977 this online group had 35 members.

At a meeting in Helsingborg in May 1978 (during the TLS Spring Conference) it was stated that the online group should be a discussion forum for people using literature and factual databases in their daily work, with the name of SOLUG, the Swedish Online User Group. SOLUG became associated with TLS as an Interest group, with Gunnel Hessler as the first chairman and Irena Vinters as deputy. Regional Online groups were at the same time formed in Stockholm, led by Irena Vinters, in South Sweden led by Gunnel Hessler/Karin Adler and in West Sweden, led by Rutger Irgens. A year later a regional group was started in Mid Sweden, led by Inger Melin, and in 1981 also one in North Sweden, led by Mats Berglund.

In 1981 the Stockholm regional group decided to start Subject groups, where members with common interests could come together and discuss databases within their subject fields and help and give advice to each other. The first of these subject groups was led by Inger Enander and later by Ylva Rosell, both at IDC-KTHB (Information and Documentation Centre at the Royal Institute of Technology), and gathered information specialists with interest within Biology, Agriculture and Food Science. This group is still active (2005) with about 15 members, but is now called Biosciences including Environment.

In 1982 eight subject groups were active, besides the Biology group Electronics and Computer Science (Anna Maria Magnusson), Material Science (Lars Klasén), Medicine and Pharmacology (Elisabeth Kjellander), Chemistry and Environment (Laila Gunnare), Marketing and Company information (Bernt Båvestam), I&D (Elsa Werngren) and Solitaries (Lise-Lotte Lindskog). (*Solitaries were the only online searcher in their organization or company, thus bound to carry out searches in all subject fields of interest for their organization. /Ed:s note*). An Energy group started soon after (Marie Wallin). In 1989 a Patent group was initiated (Helena Fernholm). The co-ordinators (in Swedish called summoners) of the subject groups met three times a year. Some of the subject groups were national, in that SOLUG members from other parts of Sweden could attend. But soon the other regional online groups also started subject groups. The last group formed was Datorstrulgruppen (“computer fuss group”) with its first meeting in Lund on the October 26th 1995.

The subject groups met several times per year and were very important both as a forum for exchange of experience between the members and for getting to know people with similar interests. They were often held at the member’s workplace and then usually included information on the company or institution. Very experienced members could sometimes find that the others were using them too much as teachers, but the stated policy was that all members should contribute to the meetings, and in most groups this functioned very well.

SOLUG had about 80 members from the beginning in 1978, which had in 1982 grown to 275 and was with its 300 members in 1984 the largest Interest group within TLS. Gunnel Hessler was chairman

(except for a period 1978-1979 when she was in the US and Irena Vinters took over) until May 1981, when a committee with one representative from each of the regional groups was formed. Irena Gellerstedt was the first chairman of this committee, replaced by Karin Adler in 1982. Later chairmen were Viveka Alton-Lundberg, Hans I. Holm, and Marjolaine Thulin. The chairman took part in the EUROLUG meetings.

From 1988 SOLUG became a board within TLS, led by a management committee of 7 members, one from each of the regional online groups and two independent ones. Lise-Lotte Lindskog became the first chairman of the SOLUG board and a very active and enthusiastic one. She was also in EUSIDIC council for five years and Honorary Treasurer from 1995 to 1998. When Lise-Lotte became the chairman of TLS in spring 1994 Inga Elding took over as chairman of SOLUG. Lilianna Kanafarski was from 1988 to 1999 SOLUG's representative to EUROLUG, where she took an active part. Even here a picture in Newsidic (12) of Lilianna, together with Oriole Arnison-Newgass, the chairman of EUROLUG, documents the facts.

At its inception, SOLUG had a column in TLS Information, the TLS newsletter, with information to its members. Then, from 1988 on, a special information sheet was included in the newsletter. The headline read:

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              (nw)              * $ ?
SOLUG                 INFO
              adj               : ! #
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… reflecting some of the different ways the retrieval systems used for truncation and adjacency.

A SOLUG brochure was also prepared in 1988 that could be distributed on its own.

Within the Regional SOLUG groups meetings were arranged 2-6 times per year. From the early 1980s the national group had been holding two meetings a year, one at the TLS Spring Conference and one at the Autumn Conference. In May 1985 SOLUG, under the chairmanship of Hans I. Holm, together with TLS arranged the Spring Conference in Tylösand. The theme was Swedish databases, and Erik Helmer arranged an exhibition with most of the database producers and vendors. Later it was decided that SOLUG matters could be included in the programme of the TLS Spring Conference. Only at the Autumn conferences in November would a special SOLUG day be arranged. The programme of that day typically included a Keynote speaker, reports from a Subject group, report from EUROLUG meetings and the Monitoring Week and often a panel discussion.

During the 1990s a well-known online personality was often invited as Keynote speaker, like Barry Mahon in 1991, David Raitt in 1992, Björn Tell in 1993, Marydee Ojala in 1994, Reva Basch in 1995, Ian Watson in 1997, Mary Ellen Bates in 1998 and Greg Notess in 1999. When Mary Ellen Bates visited Stockholm SOLUG arranged for a social event programme the evening before the conference called "*Unplugged with Mary Ellen Bates*" which was very much appreciated by all, users and non-users the like.

In 1984 the first of a series of theme days devoted to interactive online searching was arranged by TLS together with SOLUG and the Swedish DIANE centre. The first of these was called Online from the beginning, followed by the subject themes Market and Economy, Biomedicine and Toxicology, Energy, and Chemistry. When SOLUG became a board within TLS, one of the persons in the management committee also was a member of TLS Education board and initiated many courses useful for online searchers. One of these was called "*Online from the beginning again*". It was held in Stockholm in 1998 and repeated in Lund in October 1999 but with the name changed to "*Online searching - today's technology and amount of information*".

In 1992 TD had a Theme issue with the overall title "*Onlineanvändare är vi allihopa – snart!*" ("*We are all Online users – soon!*"), where each member of the SOLUG board contributed an article (13).

Lise-Lotte Lindskog initiated the so-called High-Tech days. SOLUG members got the opportunity to visit places in Sweden (once also in England), were interesting development within databases or systems were taking place (Linköping University in September 1991, UMIST in Manchester in December 1992 (just after IOLIM), Electrum in Kista in Stockholm in 1993 and SoftCenter in Ronneby in September 1997).

In 1999 TLS decided to discontinue the SOLUG board. Almost all librarians now used online searching, both in traditional databases and on the Internet, and it was thought that SOLUG's part was played out and that online matters now were a natural feature of TLS activities. This decision was not uncontroversial, since SOLUG had been working very well for such a long time. Some of the subject groups are still active. To give "onliners" something extra, a special quarterly newsletter with information on what happens within the Online industry, both in Sweden and abroad, is now being produced by Lars Klasén for the TLS (later SFIS) members only (14). The first newsletter every year is a report from IOLIM.

Figure 5.9 From the left: SOLUG members Gunnar Lager, Gunnel Arvidsson and LiseLotte Lindskog at UMIST in 1992, together with Diana Leitch (at the far right) and her colleagues, UMIST.

Denmark

The Danish Online User Group was established as one of the first user groups in Europe.

In July 1977 Betty Vedel sent out an invitation to a first meeting with Danish online users, which was held on August 22nd. The aim was that the users of online systems should be able to meet colleagues and exchange experience and help each other to solve problems. The group took the name Dansk Online-Bruger Gruppe (DOBG, Danish Online User Group). In the beginning the group had no chairman, no minutes were written and the group was not connected to any other organization. In April 1979 a charter for DOBG was established, the purpose of the group being to strengthen the Danish know-how with regard to utilization of the online systems for information and documentation by

a. being a forum for widening the knowledge about online systems
b. maintaining a general view of Danish expertise in the field
c. placing the group's knowledge at the disposal of national and international authorities
d. being an initiator of courses and seminars in order to increase the Danish expertise in the field

Membership of DOBG was open to everybody interested in the purpose of the group. All members made up the plenum of the user group, with plenum meetings held four times a year, first at DTB (Technological Library of Denmark), also housing the secretariat of the group for the first two years. Later the meetings were held in different places in Denmark. The agenda could include reports from EUROLUG meetings, information on progress in telecommunications, new databases and hosts and logon-procedures, reports from working groups, and information on courses and seminars. Minutes from these meetings were sent to all members.

In the April 1979 charter it was decided that DOBG should be led and co-ordinated by a steering committee of five persons, elected for one year, later changed to a two year rolling schedule. The first five elected were Jannik P. Davidsen, Elisabeth Henning Jensen, Alex Gorski, (soon replaced by Durga S. Nag), Birgit Pedersen and Betty Vedel (replaced by Karsten Weis in November 1979). In August 1980 Elisabeth Henning Jensen became SDC's representative in Scandinavia, and Inge Justesen was elected to the steering committee in her place. The committee met about eight times a year. Chairmen of the committee were Betty Vedel 1979, Jannik Davidsen 1979-1982, Pia Bune (later Jensen) 1982-1985, Helge Clausen 1985-1988, Durga Nag 1988-1996, and Troels Laurell 1996-. In 1981 there was a suggestion that DOBG should be connected to DTL, Danish Society for Scientific and Technological Information and Documentation (Dansk Teknisk Litteraturselskab), but after discussion at a plenum meeting this was refused.

At the same time that DOBG was reorganized in 1979, working groups were established, where more subject-oriented questions relating to databases or telecommunications could be discussed. Even a regional working group was established. The first groups were Business and Economics (led by Alex Gorski), Humanities and Social sciences (led by Karl Krarup), Bio-medical science (led by Ulla Retlev), Technology and Science (led by Karsten Weis), and The Western regional group (led by Inge Justesen). This group is still active, now forming a network group within the DFID, Danish Association for Information and Documentation (Dansk Forening for Information og Dokumentation, until year 2000 called Dansk Teknisk Litteraturselskab, DTL), and renamed The Online group. A Document delivery group was started in August 1980 by Anne Mette Emdal.

The first task of the new established DOBG was to send a letter in March 1978 to the Danish PTT with complaints about the high prices for telecommunications to the important US databases. Telecommunications costs consisted of a fee per minute and a fee for the number of characters transmitted plus maybe a special fee for a long distance call to the nearest data network node that could be as high as DKK 5-6 per minute to the US. This was on top of the costs for searching the databases.

In August 1978 DOBG decided to accept the offer from EUSIDIC to co-operate in NUG (later EUROLUG). Jannik Davidsen was elected as the first representative.

At the end of 1979 DOBG had 110 members, which in 1988 had grown to 300.

In August 1987 DOBG celebrated its ten years anniversary with a meeting followed by a reception for all members. In his speech the chairman, Helge Clausen, underlined the informal way with no paid subscription and people working voluntarily was the reason for the stability of DOBG. Helge Clausen also mentioned the important relations to national and international bodies like PTT, Danish DIANE Centre, EUSIDIC, other User fora etc. Especially the good relations to the Danish PTT, with representatives joining most meetings, had meant that the user questions, complaints and viewpoints were brought forward. During its first ten years telecommunications problems and pricing in the data networks had been the most discussed topics. Presentations of new services and databases and, in the first years, workshops and seminars were also organized by the user group. Later the Danish DIANE Centre took over this task.

When a Euronet-DIANE centre was established in Denmark in 1981 DOBG was active in it's planning and wanted the centre to be able to give advice on all available online information systems and not only those within Euronet-DIANE. DOBG also wanted to have a representative in the steering committee of the centre, which was accepted. Birgit Pedersen was elected as the first representative from DOBG. DOBG also sent a representative to Euronet-DIANE User Forum, which usually was held in connection with the EUROLUG spring meetings.

From 1989 it was decided that DOBG should "go online" and only write minutes from the meetings to an electronic mailbox, from which the members were supposed to download them. Unfortunately, the result was a diminished interest in reading the minutes and keeping an archive.

During the 1990s the meetings were held less frequently, only to stop totally in autumn 1997 due to lack of interest. However, due to its informal structure DOBG was never officially closed down.

Norway

Within the NDG, Norwegian Association for Documentation (Norsk Dokumentasjonsgruppe), founded in 1968, several interest groups developed. The chairman of NDG, Tove Molvig, proposed already in 1975 to establish a special interest group, Online-gruppen (Online User Group) (15). For whatever reason this group seems not to have been established until September 1978, when Anne Tveter Knoop took the chair of the first working group of Online-gruppen. It soon became the most popular group, in that more than half of the NDG members applied. The work in the group was driven by the members. It worked as a pressure group on the PTT and database producers and vendors. In the beginning of the 1980s the interest for the Online group diminished. After a restructuration, initiated by some fiery spirits, the group re-established in January 1987 as NOLUG, Norwegian Online User Group (Norsk Online Brukergruppe). Soon most of the members of NDG also became members of NOLUG. The members of the first executive committee of the "new" NOLUG were Jon Anjer, UBO, Per B. Kristensen, Norsk Hydro, and Ane Cecilie Røed, Axess Information Services.

Subgroups of NOLUG were later the same year established in Trondheim, with Even Hartmann Flood as the contact person, and in Bergen, Bergen Online Forum, with Øystein Wendelbo as the contact person. These groups arranged meetings in their region for some years before the activities ended.

NOLUG is a member organization for users of online information with the purpose to promote the interests of users of online systems by:

- Stimulating communication and exchange of knowledge/experience between members
- Organizing educational meetings and training events
- Representing member interests nationally and internationally through participation in EUROLUG and by liaising with the information industry regarding commercial databases, CD ROM products, software, and other (digital) information products
- Serving as a reference group for Norsk DIANE Senter (service centre for database searching) (16).

NOLUG has been involved in the EUROLUG activities, including meetings and the Monitoring Weeks. The Norsk DIANE Senter was each time the organization which did the work with the Monitoring Weeks on behalf of NOLUG.

NOLUG started in 1987 an electronic meeting, or mailbox or bulletin board, for the members. This was part of an electronic meeting system PORTACOM on a VAX machine at the University of Oslo and a first step to gain experience in this sort of communication, but it ended after a few years.

Also in 1987 NOF, Norwegian Online Society (Norsk Online Forening), was founded. This started as a forum for users, hosts, advisers and brokers of online services, together with suppliers of technical applications, telecommunications, and data processing. Tron Kleivane from Axess Information Services was the first chairman. NOF co-operated for several years with Axess Information Services in the arrangements of the Oslo Online conferences, with seminars and exhibitions. NOF later merged with the telecommunications society NORTEB (Norsk Telebrukerforening) to create NORTIB, The Norwegian Tele- and Information Users Group (Norsk Tele- og Informasjonsbrukerforening).

In 1987 NOF even started an electronic meeting, FORUM, which in the beginning could only be contacted by telephone. This meeting, or mailbox, was available for members of NOF, NOLUG and Den Norske Dataforening/Østlandet, The Norwegian Computer Society (Faggruppe for informasjonsdatabaser). Also this mailbox ceased after some time, as technology developed. NOLUG is the only Nordic online user group that has survived and it is still active! (2005). It is now associated with NFF, Norwegian Association of Special Libraries (Norsk fagbiblioteksforening), through a co-operative agreement. The meetings and seminars (4-6 per year) are often arranged in co-operation with the Oslo University College, Faculty of Journalism, Library and Information Science, and attract students, librarians as well as information specialists both from academia and from business and industry. Sometimes well-known international information personalities are invited as Key speakers. NOLUG had 169 members in May 2004.

Finland

The Finnish Society for Information Services (Tietopalveluseura) was founded in 1947, initially as the Finnish Society for Literature Services. It was an active organization bringing together information professionals in Finland. The core of the activities has been, and still is, sections and working groups. When the breakthrough of information technology came in the 1970s, a group of members suggested in 1974 that the society should set up an EDP section to handle and promote EDP applications in information services. The new section started with Helka Hollmén as chairman, followed in 1975 by Sauli Laitinen; both originators of the EDP section.

The aims of the EDP section were to follow the development in the rapidly developing EDP field, especially relating to information services, act as a co-ordinating body, make surveys, report activities and arrange training and seminars. As the online era at that time had already started in Finland, the use of online information retrieval systems became consequently a part of the new section. Thus the Finnish online group started as a part of the EDP section as early as in 1975.

The EDP section arranged several meetings per year concerning different EDP applications as well as online databases and systems. During the first year six meetings were held dealing with:

- domestic EDP-applications
- card files or EDP-lists
- EDP-training
- online systems
- IBM text processing
- the EDP-project at the Finnish research libraries

At that time 72 persons were members of the EDP section and in average about 30 members took part in the meetings.

The use of online databases expanded rapidly during the 1970s and consequently the need of information on new databases, online systems, search techniques etc., increased in the same way. To satisfy this need the EDP section decided in 1978 to start an online newsletter (Online-Uutiset) for members and other interested. The first editor was Timo Myllys, later on replaced by Ari Koivisto and Irma Salovaara, all working at VTT (The Information Service of the Technical Research Centre of Finland). The newsletter consisted in the beginning primarily of copies taken from Lockheed (DIALOG), SDC and ESA/IRS newsletters and of information on online and database courses. Online-Uutiset was published four to five times a year. Later on the contents were extended with reports from meetings and seminars, as for instance the regularly arranged Nordic online meeting days. At that time the Nordic online bulletin EXTEMPLO, accessible via SCANNET, was used for information on meetings and seminars.

The Online-newsletter was produced at VTT. VTT used a large selection of online systems and the majority of the international online databases seminars were held there, thus collecting news on databases, search languages and systems was a natural part of its activities. Online beginners did not at that time have resources to obtain all needed online documentation themselves. Online-Uutiset was therefore an important information channel for the growing number of online users in Finland. Online-Uutiset was published as a separate newsletter until 1985. In 1986 it was published as a column in Tietopalvelulehti (Finnish Journal of Information Services), which was launched by Tietopalveluseura in 1981. The last online column was published in 1997.

The EDP section decided in 1982 to finish its activities. Next year, Tietopalveluseura decided to start an online user group of which the leader was Sirpa Salmela. The practical work started in 1984 and was divided in two regional and four subject oriented online user groups. Leader of the group in North Finland was Sirkka Passi and of the Tampere district group (Pirkanmaa) Arja Valta. The group working in the fields of Natural Sciences was lead by Marita Rosengren, the Food Technology group by Hillevi Latvalahti, the Electronics group by Elina Savo and the Energy group by Tuula Kivelä (17). The groups arranged their own meetings for exchanging experiences and getting information on new databases and systems. The online group finished its activities as such in 1992 and the currently active working groups or special interest groups were incorporated in other subject-oriented groups.

The online group co-operated with EUROLUG, and arranged the yearly Monitoring Week, which during many years reported on the reliability and user friendliness of the European PTT´s packet switched networks. The practical work was done at VTT.

The production of Finnish online databases started in 1975 reaching a number of more than 70 in 1987. The databases were in general small and with different search languages, which made their use problematical. These factors led to the start of a spontaneous online consumer movement to improve databases and online systems by testing and informing producers and hosts. A work group for the evaluation of Finnish online databases (ARVI) was launched in 1988 within Tietopalveluseura. Tuulikki Jalkanen and Ritva Juntunen were the driving force. The ARVI group created and published a criteria list for evaluation of databases. Eight different databases from four online systems were evaluated with the help of 30 volunteers. The results were published and distributed among others to the database hosts in question. Ritva Juntunen reported about the Finnish quality system at the 1998 IOLIM. The ARVI-group continued its activities until 1993, when Tietopalveluseura decided to merge ARVI and the online groups. The new Database Work Group (Tietokantatyöryhmä) was active until 1996. After the start of the Web the need of help and support of using online databases diminished.

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More information about online user groups in the Nordic countries can be found in (11).

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- Newsidic (Newsletter of the European Association of Information Services)

5.5 Conferences covering the online field

Aud Lamvik

Manuscript received 2003

Conferences are an important arena for professional presentation of new developments and results as well as for discussions of ideas and experiences. From the beginning of the online era, which we count from about 1970 in the Nordic countries, there have been several conferences aimed at the online communities. In the present section some of them will be listed, namely the most important in the Nordic countries, besides the largest ones in Europe.

Conferences and meetings covering online library systems and digital libraries, i.e. prominent subjects at many library conferences in the Nordic countries and elsewhere, are not mentioned here.

The Nordic arena

The initiative of organizing symposia in the Nordic countries can be traced back to 1953, when NORDFORSK organized the first Nordic documentation symposium. That was long before "the online age" started. From 1970, however, Nord IoD (Nordic Information and Documentation) conferences were organized.

Nord IoD

Nord IoD are conferences taking place every third year. They are arranged successively in each of the Nordic countries by the Nordic I&D-societies namely:

- ***DFID***, Danish Association for Information and Documentation, until year 2000 called Dansk Teknisk Litteraturselskab, DTL.
- ***Finnish Society for Information Specialists*** (before 2003: Finnish Society for Information Services) (Finsk förening för Informationsspecialister), which earlier was called Samfundet för Informationstjänst i Finland, and still earlier Samfundet för Litteraturtjänst i Finland, SLF.
- ***NFF***, Norwegian Association for Academic and Special Libraries (Norsk Fagbibliotekforening), earlier Norsk Dokumentasjonsgruppe, NDG, which in 1991 was merged with NFF and got that name.
- ***SFIS***, Swedish Association for Information Specialists (Svensk förening för informationsspecialister), before 2002 called TLS, the Swedish Society for Technical Documentation (Tekniska Litteratursällskapet).

As you see the names of the I&D societies have changed during the years, and there are also some changes in the acronyms.

Later on, the ***Icelandic IoD society*** was included for the first time at the Nord IoD conference in Copenhagen in 1976. The Documentation group of Iceland (Dokumentationsgruppen i Island), DI, was later renamed IARL - Icelandic Association of Research Libraries.

The idea to form Nord IoD conferences stems from NDG inviting its Nordic sister organizations to a meeting over three days in Kristiansand, Norway, in April 1970. The purpose of the Nord IoD meeting was to establish a forum for discussions to promote an effective co-operation among the Nordic

countries in the development of information and documentation activities. Documentation methods, EDP systems, thesauri, library services as well as user education, new facilities and tools for documentation work, were all of common interest. The online field was included, to some extent, already from the beginning.

In turn, the conferences were arranged every third year by the Nordic countries, hosted by the local association in co-operation with the sister associations in the other Nordic countries. This is still the rule.

NORDINFO, established in 1976, has from the beginning supported the Nordic I&D conferences with substantial economic contributions as well as with encouragement.

That was also the case with NORDDOK, the organization preceding NORDINFO.

Without this support it would be hard, if not impossible, to arrange these conferences.

At the first conference, in 1970, with more than 100 participants, comprehensive national summaries were given for the status as well as the plans for the future. The EDP information services then provided in the respective Nordic country were presented. Orientations were also given by international organizations (1, 2). NASA's online system RECON with half a million references was presented. However most of the EDP services were then run as batch searches and SDI services. Services like these were already known in the early 1960s; one of the first articles on an SDI service was written by H.P.Luhn, IBM, in 1961 (3, 4).

The second Nord IoD conference was arranged in June 1973, in Otnäs, Helsinki, Finland. A main topic there was an evaluation of I&D services, based on the report given by NORDFORSK about evaluation of these services (5).

The third conference took place in Lyngby, Copenhagen, Denmark, in June 1976. The topics there were mainly about the information services and user needs (6). The conference gave broad presentations of information networks: SCANNET, Euronet, UNISIST-net and other networks were described. Further, online as well as SDI-services were of current interest, such services were by now fully implemented on the market. The need for information in industry in relation to the existing services, was also discussed. During the conference several discussion groups were formed in fields like civil/electrical/chemical/ mechanical engineering, and information technology, as at the first Nord IoD conference. Typical discussion themes were user-friendly information services and interfaces.

The fourth Nord IoD was arranged in Uppsala, Sweden, in June 1979, under the heading ”*Information support in the 1980s*” (7). During the conference many databases and co-operative projects were described, among them the first database under the direction of NORDINFO, a catalogue of the databases in the Nordic countries at that time. Many databases were then at their beginning, yet the collection resulted in NORDINFO-publication number 1 (8). By the way, one of the lectures at this conference had the title "*Do on-line systems have a future?*".

So far, four Nordic countries had in turn hosted the Nord IoD conferences, all except Iceland. A new round started in June 1982 in Trondheim, Norway. Here also an exhibition was arranged in connection with the conference. This would be the rule for the conferences to come. Elin Törnudd later mentioned (9) that the exhibition in Trondheim was "record-breaking".

The Nord IoD then continued on rotation in the Nordic countries as before.

At the seventh conference, in 1989 in Århus, Denmark, Elin Törnudd gave a speech under the heading "*How far have we got from the first Nordic I&D symposium?*" (9), in which she surveyed the meetings on documentation held in the different Nordic countries.

Figure 5.10 Speakers Jon-Erik Nordstrand, KTHB, and Kari Marklund, Linköping university library, in a discussion after a session at Nord IoD4 in Uppsala, Sweden, 1979. Photo: Lars Klasén.

The eleventh Nord IoD-conference, ”*Spring for Information*”, was arranged in 2001 in Reykjavik, Iceland. This was the first time in Iceland. The twelfth took place in September 2004 in Aalborg, Denmark, under the motto: ”*Knowledge and Change*”.

”Online days”

From the beginning of the Nord IoD-conferences EDP systems and information searching were a substantial part of their content. However, soon short meetings, "online-days", were arranged in connection with the conferences, as a consequence of the set up of online groups in the different countries. The first online-day was arranged at the fifth Nord IoD conference in Trondheim. Here the SCANNET was a popular theme for discussion, and the new Danish DIANE Centre was presented.

At the sixth Nord IoD in 1985 in Helsinki an "online-user evening" was arranged, where more than one hundred online users showed up. The online activity in each Nordic country was presented. The new SCANNET co-ordinator Elisabet Mickos informed about the SCANNET plans. She also gave an outline of the nearly 200 databases in the four countries (Iceland not included), emphasizing differences as regards language, search language and telecommunications access. Up to 20 different search languages had to be learned for using all of the databases that were offered, and in addition, knowledge of how to connect to around thirty different SCANNET hosts. Definitely a lot to be discussed!

Eventually, the separate online-days/-evenings were abandoned. Instead, it was decided to have the online topics included in the regular conferences.

The European arena

EUSIDIC conferences

EUSIDIC, European Association of Scientific Information Dissemination Centres, was established in April 1970 by a small group of organizations working with information services, using tape-recorded information. The founders came from institutions mostly in the field of chemistry, in the UK, Sweden, Denmark, France, and the Netherlands, besides from big international companies like Shell and Unilever. Nordic countries were among the founders of EUSIDIC.

The Association should be an independent forum and a channel for information between specialists within all kinds of industry, particularly companies producing and offering services using magnetic tapes, i.e. information in e-format. In time it turned into an association also for users as well as for brokers of information.

EUSIDIC had from the beginning a close connection to ASIDIC, American Association of Scientific Information Dissemination Centers.

A membership of EUSIDIC could be either Full or Associate Membership. Only institutions were qualified for membership, not individuals. DTB in Denmark and BMDC and KTHB in Sweden were among the first eight institutions to be members, according to NEWSIDIC, Newsletter of the EUSIDIC (10). However, in 1972, HUT Library in Finland and NSI and NTHB in Norway got associate memberships (11). Gradually a number of 25-30 Nordic organizations joined EUSIDIC.

Inge Berg Hansen and Helge Skov from DTB and Anders Kallner from BMDC were active in EUSIDIC from the beginning. Sauli Laitinen from VTT Information Service, Björn Tell from KTHB and P. Svare from I/S Datacentralen in Denmark were active contributors discussing electronic information at the first EUSIDIC meeting, held November 1970 in Frankfurt am Main, Germany (10). EUSIDIC has since then held annual conferences every fall - always with several participants and lecturers from the Nordic countries.

Figure 5.11 Computer room at the Norwegian Centre for Informatics (NSI).

In the first years the main topics of the conferences were databases and their application in services as well as user education. News in the field were presented by specialists leaving plenty of time for discussions that made these conferences extra fruitful. EUSIDIC Annual conferences therefore turned out to be very valuable in the world of information, a primary rendezvous for users as well as for producers of information and documentation services. The conference has during the years taken place in all four Nordic countries with full and/or associate members.

It is to say that EUSIDIC has always worked very actively for its members and in the online field as a whole. The conference is still held annually, in the fall. Special seminars may also be arranged as a part of the conference. At its 25th anniversary, in 1995, the conference was held in the Netherlands -

the country where EUSIDIC was founded. The theme at that occasion was "*Evolving or Revolving: 25 years of Electronic Information*". At the conference banquet all of the founders of EUSIDIC were honoured for their initiative. In NEWSIDIC (12) we can see Göran Falkenberg, Head of MIC (former BMDC), receiving "a founder Member' plaque" on behalf of BMDC. We also see that at the same event Lilianna Kanafarski from KTHB is awarded the prize "The EUSIDIC Information Personality of 1995" (12). A first time participant at that EUSIDIC conference asked very impressed: "*Are these conferences always this good?*"

It should also be mentioned that Sauli Laitinen from VTT Information Service in 1994 got the same award, the Information Personality prize (13). Laitinen also wrote an article about the first 25 years of EUSIDIC (14).

EUSIDIC participated early in the exibitions at the IOLIM conferences. EUSIDIC exhibited a stand there every time since the 1978 conference. The association took for many years the opportunity to invite its members and interested individuals to a "*EUSIDIC Early Morning Breakfast*" for discussions.

In 1977 EUSIDIC changed its name to European Association of Information Services, still, however, keeping its acronym. Then new groups of members got interested in the conferences and the other activities.

EUSIDIC has published the newsletter NEWSIDIC from its start in 1970; from 1978 as NEWSIDIC. The newsletter has during the years published a lot of information on databases and information networks, thus forming an important aid for keeping up-to-date in the early online age. NEWSIDIC has provided much information also from the Nordic countries. In issue No 77, May 1986, Göran Falkenberg described several of the Nordic databases, as guest editor. In October 1987 Marie Wallin from KTHB was guest editor. Issue No 88, April 1988, was partly dedicated to information and activities in the Nordic countries, with Helena Basilier and Sauli Laitinen, Finland, as co-editors.

During the first years EUSIDIC established several Working Groups (WG), where Anders Kallner from BMDC headed the WG-E: Coverage and overlap of data bases (15).

Another Working Group was EUSIREF, a network established in 1976 with one representative from each of the member countries. The task of EUSIREF was to be responsible for the "referral activities", that is the "service to answer any question", in Danish "spørretjenester" (16). Four of the Nordic countries formed this group from the beginning. Roland Hjerppe, KTHB, and others from the Nordic countries served as chairmen of the Group.

In 1977-1978 EUSIDIC established a new group: "*Online Working Group*". At that time several online user-groups were founded in many countries. The Group of the Netherlands at this time had 100 members, 90 of whom (i.e. almost everyone) were devoted to online searching in databases. This new EUSIDIC-group turned out to be very popular, not least in the Nordic countries. Eventually it was named Working Group of National Online User Groups. The interest in databases and online searching was great, and the EUSIDIC group met for years in connection with the annual EUSIDIC conferences and in connection with IOLIM (see below). EUSIDIC also became the base for EUROLUG that is described elsewhere in this book.

The Guide for databases, "*Databases in Europe*", was issued by EUSIDIC for the first time in 1975, from 1978 with the title "*EUSIDIC Database Guide*". New editions showed an increasing number of databases and other relevant information.

The number of databases and databanks increased from 386 in 1975 to 1280 in 1980 and to 1845 in the 1983 edition. Similarly the number of producers, networks and brokers

(originators/operators/spinners), increased from 284 in 1975 to 859 in 1980 and to 983 in the 1983 edition. "*Databases of Europe*" was introduced online at the host ESA/RECON in 1977.

In the 1980s EUSIDIC published several Guidelines and Codes of Practice, as for Billing for Information, Downloading, Telecommunications, Database and Databank Producers and Host Services, Electronic Mail, Information Brokers as well as for End Users.

EUSIDIC/EUROLUG was for years in charge of the so called Monitoring Weeks, i.e. an investigation and inspection of the official telecommunications systems for searching in databases. Checks were done one week every year 1986 - 1993 to find out how well the networks, PTTs, served the online services. In 1993 the telecommunications lines in every country had been so good that it was decided to terminate testing after that year.

Instead, EUSIDIC/EUROLUG decided to perform similar checks concerning "document delivery" for 1995-1997 (DocDel-investigation). All the Nordic countries with online groups also participated in these investigations. The Nordic PTTs were very interested to learn how the communication lines worked. In the DocDel-investigations few responses came from the largest libraries as they had limited capacity to answer, with busy daily schedules in serving their customers.

EUSIDIC each year published the analysis from the Monitoring Weeks, see for example (17). After one of them the Swedish Online Group was awarded 12 bottles of champagne from the British Telecom for their work. Tidskrift för Dokumentation documented the event with a picture of Lilianna Kanafarski sourrounded by the bottles (18). *(Ed:s note: The picture is reproduced on page 140)*. More on Monitoring Weeks can be found in the section on Online user groups in this book.

In addition to the annual fall conferences EUSIDIC arranges other meetings and workshops. The Spring Meetings and seminars are devoted to special topics relevant for the information field. The largest activities in the online field were, however, in its first two or three decades. Online was at that time a new field of great interest. Later on, new topics and new actors have joined, but electronic information is still an important part.

International Online Information Meeting (IOLIM)

The greatest breakthrough and success with conferences for the ”online communities” was mainly due to the International Online Information Meeting, IOLIM, an annual conference always held in London during three days in December. Since its beginning in 1977, IOLIM has been the conference with the broadest coverage of news and developments in the online field. It has always attracted online users as well as producers of databases and systems. IOLIM has managed to gather practically all news in all parts of the information field, forming the most central conference in the online field. It has attracted many participants, speakers and exhibitors from the Nordic countries during the years.

The first IOLIM took place on December 13 to 15 1977 with about 400 participants from 23 countries, 31 speakers and 13 exhibitors, thus small numbers compared with today. An exhibition including presentations of new products has always been an important part of the meeting. Vendors of services and products always take advantage of good marketing opportunities! The meeting was held at Tara Hotel, hosted by "*On-line Review, the International Journal of On-line Information Systems*". Notice the spelling: on-line was hyphanated. However, the next year it was changed to "online" in the name of the conference as well as in the name of the journal, acknowledging that ON is a stop-word in searching most databases.

The conference and exhibition in 1977 gave us an impression of a gigantic field, made up by databases, databanks, computers and their use in searching, communication and networks, terminals and data storage, as well as research in the LID-field (Library, Information, Documentation). In addition, political, legal, psychological and other non-technological factors were dealt with. Practically all topics related to the online field were brought up. In fact, it was an excellent conference!

Dr. Martha E. Williams, already a guru in the online field, gave a keynote address on databases and their future. Other speakers also gave their opinion about the future - but no one could anticipate the development of the Web. Not even PCs were mentioned. This was before the ”PC-era”.

It turned out that there was a strong demand for meetings like IOLIM.

The next year IOLIM took place at the Commonwealth Institute (London) in December. Again it was arranged by the journal "*On-line Review*" that by now had changed its name to ”*Online Review, the International journal of online and teletext information systems*". The field of teletext/viewdata had now been included, besides a great deal of online searching and user education.

The third IOLIM-conference was arranged at the Cunard Hotel in Hammersmith, London, to which it returned to for some years. The hotel changed its name to Novotel, its exhibition area had to be expanded by using tents on a terrace outside for some years. In 1988 the conference moved to a larger venue, and that was Olympia, not far away from the Novotel. Now the company Learned Information, publisher of Online Review, was in charge of the arrangements.

IOLIM celebrated its 25th anniversary in 2001, and is still an attractive conference, although the number of participants has declined in the last years. In the week of the conference many activities go on, not only the conference including a large exhibition and presentations of products. The days before and after the IOLIM-arrangements, several seminars and workshops take place, and of course, London is there as well!

IOLIM has all the years included several papers and exhibitors from the Nordic countries. Around 10-15 % of the conference delegates have been from the Nordic countries. Worth mentioning as regards exhibitors, is the joint Nordic stand organized at IOLIM 1986 by SCANNET, with online services like DAFA/Rättsbanken, CAN and ARAMIS from Sweden and HELECON from Finland. (See figure 6.1) Attempts have been made to arrange a special session for the Nordic participants, but did not get sufficient support until 2003, when Even Hartmann Flood from Norsk DIANE Senter/ABM-utvikling (Norwegian DIANE Centre/The Norwegian Archive, Library and Museum Authority) in Norway was in charge of this arrangement. The British Online user group, UKOLUG, had for years a special arrangement during IOLIM called ”*UKOLUG Annual Lecture*”.

It can be mentioned that Lars Klasén from Sweden over several years wrote reports from IOLIM in the TLS/SFIS newsletter Online- och webbnyheter (Online and Web news) as well as in the journal Tidskrift för Dokumentation (The Nordic Journal of Documentation). He also presented papers at IOLIM 1991, 1995 and 2005. Helge Clausen and Irene Wormell published a bibliometric analysis of IOLIM 1977-1999 (19, 20).

The conference has in the last years been called "*Online Information*", but it has kept the acronym IOLIM. Even Hartmann Flood, in the journal Information World Review, October 2000, p.22, presented a ”user guide” to Online Information. It gave advice on how to be prepared, recommended to be selective as regards presentations to attend, and how to approach the exhibitors and the satellite arrangements, all in order to get the best information out of the arrangements, and generally, the best of London during the visit in such a busy week. Even Hartmann

Flood has for years reported from the IOLIM in "Synopsis", the journal of RBT/Riksbibliotektjenesten (National Office for Research Documentation, Academic and Special Libraries), from 2003 merged into the Norwegian Archive and Museum Authority. His last report was from IOLIM 2002 (21). (The journal ”*Synopsis*” ended with its 34th volume in 2003).

In the USA conferences similar to IOLIM were arranged annually from 1980, namely the National Online Meeting. However, these conferences ceased in 2003 - did this mark the end of the ”Online age”?

Internet Librarian International

In the middle of the 1990s, the Internet revolutionized telecommunications and online searching. From now on, the Internet and the Web became important topics for IOLIM. However, since 1999 additional conferences have taken place in England: Internet Librarian International (ILI), with Information Today as organizer.

These conferences, which are far from the size and popularity of IOLIM, have been arranged in London in March/April each year, except in 2003, when the 5th Internet Librarian International took place in Birmingham (England).

The arrangements are organized in the same way as IOLIM, with parallel sessions, exhibitions and workshops, but on a smaller scale. Here too, Nordic participants were active, also as speakers. Internet and databases on the Web are by now in everyday use in our field. The 6th Internet Librarian International was back in London in 2004, this time arranged in October.

Infobase

The ”*Internationale Messe für Information und Kommunikation*” – ”*International Fair for Information and Communication (the Spring conference)*” takes place annually in Frankfurt, Germany, in April/May. The first one was arranged in 1985. Infobase takes place in connection with the Spring conference of the Online User Group of the German Society for Documentation (Deutsche Gesellschaft für Documentation DGD), with lectures and workshops. The society has changed its name to Deutsche Gesellschaft für Informationswissenschaft und Informationspraxis, DGI (2000).

DGD (later DGI) Online Tagung (Online Meeting) has been arranged annually since 1978, and from 1985 in parallel with Infobase. The arrangement has mainly been in German and has never attracted as many Nordic participants as IOLIM. Nevertheless there have been several speakers from the North. Nordic databases, systems and activities have been presented here.

European Association for Health Information and Libraries (EAHIL) - conferences

EAHIL has since 1986 organized European conferences of Medical and Health Libraries every second year. These are large conferences similar to IOLIM but within the biomedical information field. They have been important meeting places also for information specialists from the Nordic countries, involved as board members, arrangers, lecturers and participants. The association also arranges workshops, often in the years between the conferences. An important meeting place for the Nordic medical information specialists!

In the Nordic arena we gradually got several other conferences:

Databas

Databas started as a conference in 1986 called Databas 86. Preceded by occasional database seminars and exhibitions the years before, it was organized by the Swedish Telecom and took place in Stockholm. The intention was that Databas should be arranged semiannually and to be the largest exposition on databases in the Nordic countries. It should deal with all aspects of online activities, in particular having the Nordic market in mind, and with Nordic lecturers, but also open for specialists from abroad.

The second conference, Databas 88, included a plenary as well as several parallel sessions, an exhibition and seminars, similar to the IOLIM in London. The conference attracted about 800 participants, and more than 3,000 visited the exhibition, not far from the number visiting the IOLIM exhibition!

Figure 5.12 Databas 88 attracted 3,000 visitors and 110 exhibitors.

Among the topics dealt with was the use of knowledge technology in searching databases and a special workshop on use of PCs in online activities, databases with non-latin alphabets such as Japanese and Russian databases (by Esko Aho/Jon Sigurdson and Sauli Laitinen, respectively), CD-ROM-databases, etc. A problem emerged at the conference, as was the case also at IOLIM: rather few people are users of online databases, less than expected, and few actors are making money on online! The conclusion was: The end user must go to the terminal – to get more online users!

One of the databases that was introduced at Databas 88 was the SCANNET Guide to databases, at that time online at NSI in Norway. SCANNET also had a great stand at this exhibition, with a total of 12 online services from the Nordic countries.

In 1990 the conference Databas, combined with a similar event within videotex, was replaced by Info-On-Line 90. This claimed to be the largest conference and exhibition within the information field.

Unfortunately, these events were the last of their kind for a long time. In 1998 Learned Information Europe together with ExpoNova AB decided to make a new attempt, resulting in Online Information Scandinavia 98, OIS 98. It was arranged in accordance to the well established IOLIM model, including a conference with about 100 lectures, attracting 340 delegates, and an exhibition with over 100 exhibitors and about 2100 visitors. OIS was arranged also in 1999, this time however as part of a broader event including other areas within IT. Elisabet Mickos has described the Databas and OIS conferences in NORDINFO-Nytt (22, 23).

Oslo Online

Axess Information Services, later called Axess, started in 1985 as the first commercial information broker in Norway. It arranged the conference Oslo Online from 1986. This was a relatively large annual event at that time, lasting two days in the spring, and aimed at the Nordic countries. Oslo Online constituted only a small part of the online activities at Axess. The company early got the Nordic rights for the worldwide digital network ISPA-net, and also had rights for main databases as well in Europe as well as in USA. The company represented ”a fresh breath” among Norwegian online activities, which so far saw most of the online searching and other online activities within universities, colleges and hospitals, and less in industry and business.

Oslo Online was arranged much like the IOLIM with a main exhibition and conference with several seminars and panel debates. Most of the exhibitors were from Nordic countries, many also from elsewhere in Europe and from the USA, presenting database services and communication solutions. DIALOG, SCANNET, EU with their databases, Televerket (Swedish PTT), Reuters, IBM, banks etc. have all been present at Oslo Online to present their products.

For five years Norsk DIANE Senter (NDS) gave introductory seminars on online searching in databases at Oslo Online. NDS was also in charge of a ”*Beginner’s Corner*” at the fair, giving general advice on the use of databases online, including the equipment for starting up.

In 1987 Axess started the journal Norsk Online, containing updated information on all kinds of national as well as international databases, the markets etc. In 1989 the journal changed its name to Nordisk Online, a reasonable action since the Nordic market as a whole was covered. However, the journal was discontinued already in 1990.

The conference Oslo Online kept its name until Oslo Online 93. In 1992 NOF, Norwegian Online Association (Norsk Online Forening) took over when Axess was sold.

From 1994 Norsk Telebrukerforening, NORTEB, entered as a partner and the event was named Oslo Online & Telecom 94 respective 95. Gradually it changed its focus more and more into telecom and less online. Norsk Tele- og Informasionsbrukerforening, NORTIB, (a fusion of NOF and NORTEB) was in charge of the Tele & Online 96 and -97. Online@Tele 98 was arranged under the title "*Commercial Use of Digital Services*".

The online concept as we knew it from the beginning vanished. The NORTIB conferences are still arranged.

In 1988 NOF founded an award, "*The Golden Modem*", intended for a person or a company that has been prominent within online as well as information related activities. The award was given at the Oslo Online conferences. It consisted of a gilded modem and a diploma. The first award was given in 1988 to Tove Molvig, Riksbibliotektjenesten (National Office for Research Documentation, Academic and Special Libraries) for her achievement within the database and online fields.

Conferences in Sweden and Denmark

Similar events took place in Sweden and in Denmark for a number of years. Stockholm Online 89 was planned by Axess and arranged and marketed by Esselte Info, the new owner of Axess.

Esselte had at the same time acquired the Swedish online service DataArkiv which at that time was the Nordic representative for DIALOG. Stockholm Online 89 was held in Berns Salonger in Stockholm in October. Of the participants two were from Finland, three from Denmark, ten from Norway and 56 from Sweden.

In 1990 Axess (Esselte) arranged the same kind of conference in Copenhagen, in co-operation with DataArkiv/DIALOG in Denmark. It was named Copenhagen Online 90 - Electronic Info, a mini fair with seminars. The conference lasted two days, the first day on electronic information and online services, the next day DIALOG Update for Scandinavian DIALOG users. Copenhagen Online 90 attracted 56 participants, six of whom were from Sweden and three from Norway.

Obviously, these two events were rather small. Nordic online users preferred IOLIM!

Conferences in Finland

(by Elisabet Mickos)

In Finland a conference for Information Services has been arranged annually since 1973. Until 1981 it was called Informatiikkapäivät. The conference was arranged at several places in the country, as in Willmanstrand, Åbo, Helsinki and Björneborg, with lectures over two days by local and foreign experts and visits to some information services within industries. Exhibitors were local as well as international database producers, online and library systems. The number of participants varied in the first years from 70 to 100.

In 1982 the name of the event was changed to Tietopalvelupäivät, became more extensive and was arranged mostly in Helsinki in the Finlandia House, in the Chamber Music Hall there, and later in Dipoli at Otnäs (outside Helsinki). In the 1990s the society started a co-operation with other partners, resulting in Tietomessut (Informationsmässan, Information Fair), which was arranged in Wanha Satama (Gamla Hamnen, Old Port) at Skatudden in Helsinki, with a large number of lectures and exhibitors during two days. In 2003 the event was reduced to one day arranged by the Finnish Society for Information Specialists, but has later returned to a two days format.

Miscellaneous

Besides the variety of Nordic/national conferences, several online events of different sizes were arranged by the telcommunication companies. Their agenda was to present different aspects of communication technology, its potential in the online field and, of course, to attract more users to extend their service. Local telecommunications solutions were of course important.

There have also been many activities in each country since the start of the ”online era” with local conferences and courses, often subject-specific meetings, arranged by local libraries and library/information societies.

In addition, many interesting subject-specific conferences and meetings are arranged both locally, nationally and internationally, as the International Chemical Information Conference, which has been

arranged annually since 1989, and the annual meetings within patent-searching, architecture and other subjects. But now we have got most of the databases on the Web instead of the dial-up systems of the 1970s, 1980s and 1990s. However, the content is the same and the users have still to learn how to use the databases.

Closing remarks

The time span from 1970 to the end of the century represents a remarkable era of technological developments in storing and retrieving information for use by the public. It has in many ways changed the life of people in education and scientific studies and work. The easy online access to literature, of nearly all kinds, has made it possible to get the information directly to ones desk as an integrated part of ones research. The invention of computers is said to be one of the greatest achievements of the last century. This can be followed up by recognizing the PC and its use as the greatest invention in the information field, so to say a quantum jump in accessing knowledge. So, have we now entered a completely different information world? Do we not need the libraries any more? Are they to be fully replaced by the virtual library? Experience tells us, however, that one should be careful in predicting the future. At present it might be left over to the readers' imagination.

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5.6 The development of end user education in computerized information retrieval in the Nordic countries

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Introduction

This section will be directed towards the development of teaching/learning about computerized information retrieval for Nordic end users during the period 1970 to 1985, and the role that NORDINFO played in relation to this.

Online searching was introduced in the Nordic countries in the early 1970s, following the earlier batch processing systems. I still remember the delight of research workers and engineers when they first were able to search from a terminal directly connected to a remote computer at KTH in Stockholm for information related to their research topics! Often the connections broke down, and we had to negotiate with KTH for an extra hour of access, but for the user, who had previously had to search manually through years of abstract and/or index publications, or wait for weeks for the computer print-out of a batch search, online searching was often described as a miracle!

We who were lucky enough to be involved as teachers experienced a real joy in seeing our research colleagues delight in this new way of information searching. Several groups were involved in providing some form of online education: database producers, systems operators, institutions with

equipment for online searching - such as libraries and companies - library schools, intermediaries and end users.

In connection with computerized information retrieval, three different kinds of teaching/learning activities can be distinguished:

- **Promotion** concerned with increasing the use (and sales) of a specific database, a given online operating system or a specific Information retrieval facility.
- **Training** concerned with the learning relatively simple skills such as use of a terminal or a given command language - how to use a given service.
- **Education** concerned with concept formulation, analysis and synthesis, as for example in search question negotiation, search strategies, and the comparison and evaluation of alternative Information retrieval systems (1).

There are a number of target groups for these teaching/learning activities: end users of information (including students, research workers and practicing professionals), and intermediaries – library staff, information specialists, etc. Training seminars for the information specialists were often provided by the database producers and/or system operators. In some cases these seminars could also be attended by end users such as postgraduates or practicing engineers. This section will be directed mainly towards the development of teaching/learning about computerized information retrieval for Nordic end users during the period 1970 to 1985.

The introduction of computerized information retrieval - Selective Dissemination of Information

The enormous growth of published information in the 1960s resulted in long time delays between the *primary publications and secondary publications* such as abstract publications and indexes. In order to speed up the production of the secondary publications, computers began to be used in the printing process. The bibliographic records, keywords and sometimes any available abstract were stored on magnetic tapes. This stored information could then be used by a computer for printing the abstract and index publications. Most often the stored information was also made searchable. The early retrieval methods were based on batch processing. A search question was formulated and analysed into component aspects, which were then represented by keywords or descriptors. A search statement was developed and expanded by means of synonyms, broader and related terms and the statement was then keyed into punch cards and batch processed. The results were then posted to the person who had requested the search.

This process of Computerized information retrieval (or Selective Dissemination of Information (SDI) when the search was only performed in new information to be added to the system) was to lead to enormous changes in the work at libraries and documentation centres – a change foreseen as an exciting challenge by Björn Tell, Library Director at KTH in the early 1960s (2, 3).

This process of computerized information retrieval was initially based on a small number of systems, such as the MEDLARS system for the production of Index Medicus. MEDLARS was first used at NLM in 1964. Professor Sune Bergström introduced MEDLARS and founded the Biomedical Documentation Centre (BMDC, now the Medical Information Center, MIC) at the Karolinska Institute Library in Stockholm in 1966, and this system was in regular use from 1967 onwards (4). In the same year the Nordic Culture Foundation awarded a grant of DKK 200,000 in order to facilitate the start of computerized information retrieval activities in Denmark, Finland and Norway (4). Similarly, SDI systems in chemistry and chemical technology such as Chemical Titles (CT), Chemical Biological Activities (CBAC) and Chemical Abstracts Condensates (CAC) had been introduced at BMDC and other

Nordic institutions such as the Library of the Technical University of Denmark (DTB) at Lyngby in co-operation with Danish I/S Datacentralen af 1959 (5, 6, 7).

At KTH, IDC-KTHB was officially founded in 1968, although databases were already being used in 1967. IDC-KTHB provided SDI services, called EPOS/VIRA, within the fields of science and engineering (2). Advanced search programs for SDI were developed at KTHB (8, 9). By 1969, the SDI- system covered 12 databases: Science Citation Index, MechEn (produced at KTHB), POST – Polymer Science and Technology, Chemical Abstracts Condensates, INSPEC, Metal Abstracts, COMPENDEX, Nuclear Science Abstracts, ABIPC – Annual Bulletin of Paper Chemistry, Food Science and Technology Abstracts, ERIC, and Current Index to Conference Papers.

The first links to a remote terminal online system were ESA/RECON (later ESA/IRS) with direct access to the European Space Research Organisation (ESRO) in Darmstadt (IDC 1973, DTB 1974), and MEDLINE (MEDLARS online, 1972) at BMDC. In Finland the Central Medical Library got an online connection to BMDC as early as December 1972 and online access to the American services Lockheed (later Lockheed/DIALOG and DIALOG) and SDC (later SDC/Orbit and Orbit, now Questel-Orbit) started in 1974. By the beginning of the 1970s several databases could be reached through a number of remote terminal systems, and the online age had begun.

Early days - user instruction in computerized information retrieval in the 1970s

The first record of a course designed for users that I have been able to find information about is a course in information and documentation techniques given at KTH in 1968 (10). This paper states that a two months course ended on May 31st 1968. The course attempted to cover the whole process of information storage and transmission. The section about computerized documentation was “much appreciated.” There were 18 participants in this course, many with a Master of Engineering degree, or a degree in the physical or natural sciences. In a course evaluation “*most participants suggested that this type of course should be a compulsory subject in every academic degree*.”

Instruction about the new, and exciting, possibility of retrieving relevant information in the form of a computer printout, was given in the form of seminars of varying length for researchers, university lecturers, and for practicing doctors and engineers. These seminars were held by the staff at university libraries, documentation centres and other places where the new techniques were used.

During the 1970s there was a growing interest in library user education in Denmark, Finland, Norway and Sweden. This was demonstrated in a number of ways: by surveys, articles, and meetings about user education, by the introduction of the subject into the curricula of library schools, and most of all by the growing number of courses at individual libraries.

The focus tended however to be towards library orientation, and the use of manual tools for finding information, rather than computerized information retrieval. The higher education libraries that were most active in teaching about computerized information retrieval during the 1970s were those within the disciplines of medicine, science and technology. This is hardly surprising for many of the early databases covered subject areas relevant to these disciplines.

Denmark

The Library of the Technical University of Denmark (DTB) at Lyngby was particularly active in promoting user education for engineering students and for practicing engineers from industrial concerns. These courses were arranged in modules, so that students could select and combine different units to suit their own particular needs. From 1976/1977 onwards these courses were available for all the engineering departments of the university. The Documentation Department at DTB arranged the courses for retrospective online literature searching. The ESA/RECON system was introduced to users in 1975 and this was followed by courses on the DIALOG and SDC systems.

The length of the courses varied from half a day to two days. Participants in the retrospective online literature searching courses were lecturers and researchers from the university and the Engineering Academy and scientists and engineers working in research institutions and industrial concerns. A special Chemical Abstracts Workshop dealing "*with the newest search techniques in the CAS system*" was also arranged by the Documentation Department. This attracted about 100 participants from the Scandinavian countries (11).

The Documentation Department at DTB became the Danish center for the ESA/RECON system in 1974, with the responsibility for training. Betty Vedel describes these early days: "*In the first years we had mostly demonstrations. We made, however, the discovery that people want to try for themselves and changed the demonstrations to online courses and developed a 3 hour course…. It is my sincere belief that this online technique is so strange and unbelievable that unless you try it for yourself, you will not understand it well enough and will not gain confidence in the idea of computerized information retrieval. For me as a teacher, I still share the amazement and joy of the beginner when he/she tries the system, sees it working and all of a sudden relevant references come pouring out. Usually I hear the words – It's a fantastic system!*" (12).

An important part of the work in an educational programme is the production of suitable textbooks. It is interesting to note that the textbook - Informationssøgning for ingeniører (Information retrieval for engineers) - was published by DTB, in 1972. This book was directed toward students, but could also be used by practicing engineers who wished to keep up-to-date with the new possibilities for information searching.

In the biomedical area end user presentations were given on request by staff at the University Library, Medical and Scientific Department (UB2), in Copenhagen on how to search the MEDLINE and BIOSIS databases. UB2 had made agreements to use the SDI service and databases in medicine and other biomedical, chemical and psychological databases at BMDC. The University library in Odense (OUB) was the first place in Denmark to formalize education for medical students in library use and literature searching. This was organized by Johan Wallin from OUB, who from 1978 included MEDLINE and online retrieval in the course.

Finland

In 1967, TINFO - the Finnish Council for Scientific Information– appointed a committee to study the organization of user instruction for the effective use of information sources and services. In 1969 a questionnaire on user instruction was sent out to 24 academic libraries. As a result a recommendation was made in 1970 that all students should receive training in the use of information sources and that this instruction should take place in the academic libraries under the guidance of librarians or information specialist (then called information officers). Instruction should include the use of information sources and information services. *Students, research workers and academic staff should be taught the use of computer-based information retrieval*. The Committee

recommended the provision of special funds for these purposes, but in actual practice user education in the Finnish academic libraries was largely financed by funds from their respective universities.

These recommendations acted as a stimulus for the development of user education in the Finnish academic libraries. Uutto stated in 1977 "*Instruction in the use of libraries and in information retrieval is making rapid progress in the research libraries in Finland*" (13). At the HUT (Helsinki University of Technology) Library, user studies carried out by Erkko in 1970 (14) and Törnudd in 1973 (15) clearly showed the need for user instruction. Instruction in the use of information media and information services formed regular parts of various teaching programmes at Helsinki University, and at the universities of Turku, Oulu, Jyväskylä, Kuopio and Joensuu, as well as the Tampere and Helsinki Universities of Technology. Uutto describes the courses at HUT in some detail (16). The elective subject-oriented courses for third and fourth year students contained units on both manual and computer-based information services. Video-taped programmes were produced as aids to the instruction.

In 1973 the HTKK-INIS (INIS = International Nuclear Information System) search system was introduced at the HUT (17). The first online training given was subject-oriented instruction with a one hour lecture and demonstration followed by hands-on practice. The online system was made available via SCANNET to the Nordic INIS centres: Risø Library, Denmark, the Institute of Atomic Energy, Norway and Studsvik Library, Sweden. In 1974, Lockheed and SDC demonstrations were given to Finnish users at the Training Centre for Engineering Societies.

MEDLINE was introduced in January 1973 in Helsinki with a stand at "*Lääkäripäivät*" – the main Finnish Medical Convention. Gunvor Svartz-Malmberg from MIC came to help with the online demonstrations. MEDLINE became operational in the spring of 1973 and there was a great need to inform "*the actual and potential users of the library about the new rapid access to the most recent medical literature. The system aroused such a great interest among medical practitioners, researchers and students that demonstrations were requested to be arranged one after another*" (18).

At the Central Medical Library in Helsinki, programmes on the MEDLINE computer-based information retrieval service were produced as an aid to user training. Due to the limited operational access time at the terminal and to its unreliability, and as a means of saving time for the information scientists, it was decided to produce a MEDLINE videotape with the help of the Educational TV-Unit at the Medical Faculty. This took a period of three months, but proved to be successful and time saving.

The Central Medical Library provided user education for medical and dental students from Helsinki University. The aim of the course was to teach the students how to use the medical library, the most important reference works and databases. The students had exercises using printed Index Medicus etc. and online searches were demonstrated (19, 20). User education was given to researchers and medical practitioners, as part of a course on Research skills. This included a lecture about databases, information retrieval and demonstrations of online searching. With the advent of the Finnish medical database MEDIC, courses were given on its use. Figures about the hours of user education show a rise from about 30 hours in 1975 to 90 hours, in 1980, a level that was maintained until the mid 1980s.

Norway

In Norway the computerized information searching era began with the introduction of SDI services from KTHB and BMDC in early 1970s. NTHB made in 1971 agreements to use the SDI services and databases in science and engineering at KTHB as well as the MEDLARS and other biomedical,

chemical and psychological databases at BMDC for Norwegian users. Therefore, from late 1971 onwards NTHB gave promotion and training of these database services to the university, and as the national technological library also to institutions and industries (21). From 1972 information about and practice in using these database services were incorporated in the voluntary library courses offered to the engineering students at NTH 4 times a year (each course 12 hours).

The Norwegian Centre for Informatics (Norsk Senter for Informatikk, NSI) A/S gave from early in the 1970s training in Polydoc, a system which later became available with several Nordic databases in SCANNET (22). The library of the Agricultural University of Norway (Norges Landbrukshøgskole, NLH) started in 1972 an SDI-service in the agricultural field with tapes from Bibliography of Agriculture, USA, and offered promotion and training of their service (23). The first information week, Informatica, was arranged in Oslo, Bergen and Trondheim in 1972, with lectures and presentations of computerized information systems of that time (24).

The Division of Biomedical Documentation of the Norwegian Research Council for Science and the Humanities (Norges Almenvitenskapelige Forskningsråd, NAVF, Avdeling for biomedisinsk dokumentasjon) offered training courses in biomedical documentation from 1972. From 1973 this division operated the first experimental MEDLINE search service.

The same year NTHB started with MEDLINE searching and included this online search service in their promotion and training in database searching. In 1974, Oslo University Library took over responsibility of the MEDLINE service at NAVF, and MEDLINE terminals also became operative in the other Norwegian university libraries (25). All connections from the universities went to the Swedish MEDLINE node. All university libraries gave training and promotion of the MEDLINE database to their users.

At the University of Oslo, the user education courses were given for medical and dental postgraduates. These included the use of bibliographies, manuscript writing and orientation in computer-based literature searching (26). From 1975 onwards, at the Biomedical Library, online demonstrations were given, but "*the connections to Stockholm and/or to USA were very unreliable, so we had to sometimes resort to overhead transparencies,.*" (27). Kari Halldal gave courses for librarians about MEDLINE searching, and sometimes, medical researchers brought colleagues or students to the library for a presentation, followed by demonstration – if the connections functioned. A similar course on information searching was offered for advanced students and young researchers at the University of Bergen, by the Medical Library.

NTHB had a well-developed programme of user education in the 1970s (28). Twelve-hour courses were offered regularly to the advanced students. These courses came to include computerized information retrieval. Case studies were often given as examples. Early in the 1970s, "*Information Searching Days*" were introduced every second year for industrial users, and in 1977 the first of a series of "*Online Searching Days*" was given for the same clientele (25).

The first ESA/RECON connections for Norway were through Denmark. Norway became a full ESA member in 1987, and in 1988 NTHB became the national ESA/IRS centre. Until then Norwegians got passwords and contracts from DTB in Denmark. NTHB, and also NSI, started to offer training courses in ESA/IRS to Norwegian users from 1976. Lockheed/DIALOG and SDC/Orbit training seminars were also given in Norway from 1976, and database producers and hosts gave training seminars in the country, as they did in the other Nordic countries.

Sweden

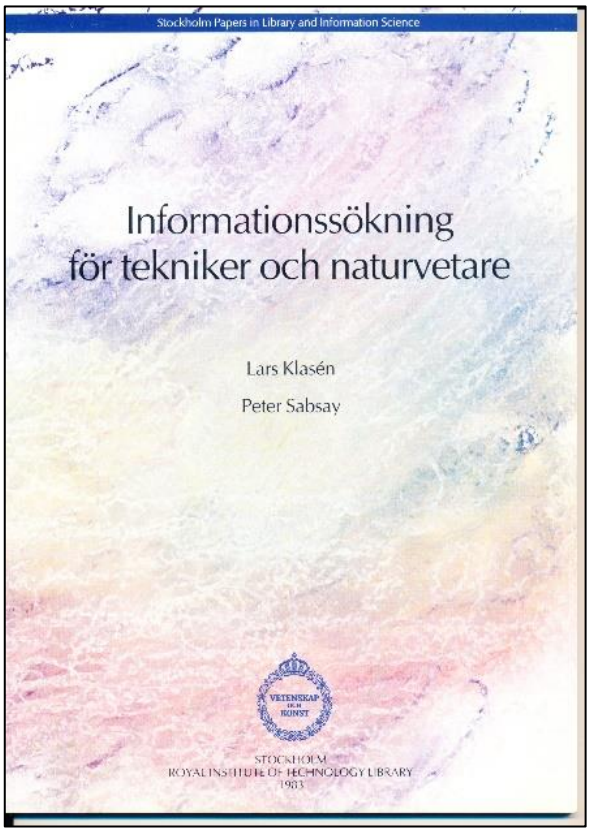
Library user education in Sweden began in the mid 1960s, and the leading libraries in this field were those serving specialized universities, such as Institutes of Technology, the University of Agriculture and the Karolinska Institute of Medicine and Surgery (29). A number of the new multi-faculty universities – at Umeå, Linköping and Stockholm – and the university colleges at Luleå, Örebro and Växjö – have also launched successful library user education programmes (29). The programmes offered can be divided into three basic levels:

- Orientation to the use of the library
- Introduction to information retrieval – for students who are working on projects or essays. This was often provided for students who were in their sixth to eighth term of study
- Advanced information retrieval – for postgraduates. These courses usually included the use of appropriate bibliographical tools, and, where appropriate, the use of computerized documentation, and sometimes the organization of a personal documentation system, and how to write a scientific paper.

This was also the model followed at Linköping University Library when user education was first introduced in 1973 (30).

At the Karolinska Institute of Medicine and Surgery, postgraduate courses were started at the beginning of the 1970s, with one course each term (31). This included computerized information retrieval, the organization of a personal documentation system, the layout of a scientific paper, presentation of diagrams and figures, printing and production of figures (32). Courses for medical students were also given at the Biomedical Library of Gothenburg University.

At KTH user education courses started during the late 1960s and were continuously developed through the 1970s (10, 33). At KTHB "*only the School of Mining and Metallurgy, the School of Aeronautics and to some extent the School of Chemistry had formal courses in library use before 1973*" (33). In 1974 a start was made to create a more comprehensive and flexible programme, see Gluchowicz, 1974. (34). It led to the development of a number of courses for the various Schools of Engineering. One example was a 17-hour course for students of Mechanical Engineering. This included both online demonstrations and the creation of individual SDI profiles. This course was carefully evaluated (35, 36).



The evaluation shows that those attending the course changed their information habits permanently by using more information sources and that by actually working with computerized information systems they got a better understanding of how to solve their information problems.

In connection with the various educational activities at KTHB, teaching material of various kinds was produced. These included the course compendium "*Informationssökning för tekniker och naturvetare*" by Lars Klasén and Peter Sabsay (37). The first edition was published in 1978, followed by new editions until 1985, when the ninth edition was published. After that revised and supplemented editions were published until 1992.

Other material included database descriptions, overhead slides and a sequence on online information for an educational television programme on Modern data-technology in 1975. Computerized information retrieval formed part of other courses at KTH and in fact most of the students as a part of these courses could set up own SDI search profiles, monitoring subjects of relevance for their projects, running for about three months.

Figure 5.13 Online searching demonstrated via TV-sets at IDC-KTHB by displaying prerecorded online sessions by using VCR (videocassette) equipment.

The most comprehensive programme of user education in Sweden was to be seen at Chalmers University of Technology in Gothenburg. This four part programme was developed during the years 1973-1977 and consisted of:

- Library orientation for approximately 900 new users per year (2 hours)
- Introductory course in information retrieval for approximately 800 undergraduates per year (14 hours)
- Advanced courses in information retrieval for postgraduates, 2-3 courses per year (35 hours)

Seminars on information retrieval for industrial engineers, given on request, 2 to 3 courses per year, half to two-days as required.

One particularly interesting feature of the Chalmers University courses was that the majority of the courses were compulsory and integrated into the projects or thesis work of the participants. During the 1970s, computerized information retrieval formed part of the Advanced postgraduate course. "*Each user carries out interactive literature searches on one or more of the following systems: LOCKHEED-DIALOG, ESA-RECON or SDC/ORBIT – three information systems containing many data*

bases in science, technology, engineering, social sciences, economics and business. These systems can be accessed interactively for either retrospective or current awareness searches." (38, 39).

A short presentation on computerized information retrieval formed part of all the undergraduate

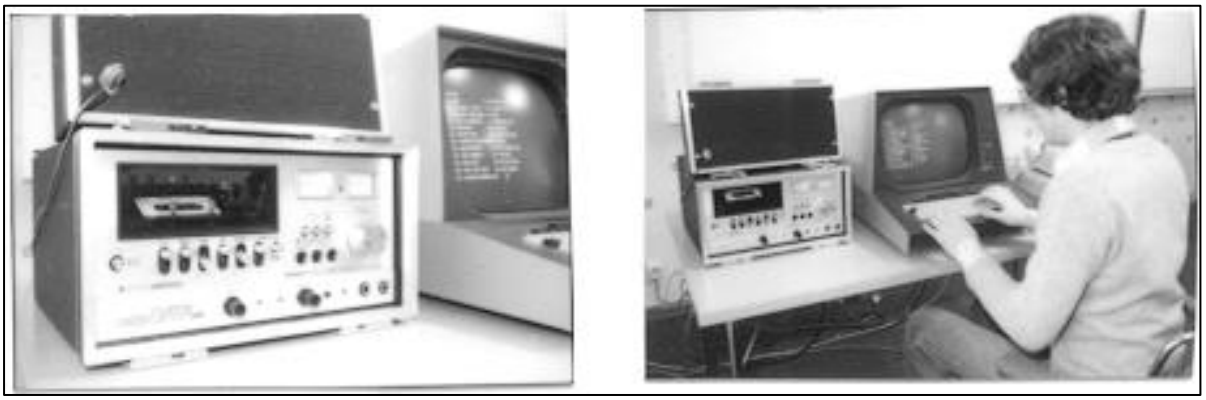


Figure 5.14 Two views of the MEDIATRON equipment.

courses from 1977 onwards. The course compendium *Datorbaserad informationssökning* by Nancy Fjällbrant was first published in 1974, and followed by subsequent editions. From 1978 onwards an introduction to online information retrieval was given in form of multi-media programmes. These were produced at Chalmers university as an inexpensive method for user-education in online information retrieval. They made use of the MEDIATRON teaching aid – a modified tape recorder designed to carry out simultaneous recording of audio commentaries, trigger pulses for photographic slides and digital signals from a computerized information retrieval system – developed at London University by Pratt and Vickery (40).

Examples of orientation programmes featured searches on: *The use of wind energy for heating, The presence of DDT in seals in the Baltic, Home-care for geriatric patients* (41). These programmes were very useful, in that they could be used when the host computer or node or telecommunications system was "down" – a not infrequent occurrence in the early days of online searching.

The University of Luleå, the newest and most northerly of Sweden's five technological universities, was opened in 1971. Library user education was integrated into project work, and a three stage programme developed. In the advanced course and later in the postgraduate course, students were introduced to computerized information retrieval (42).

A course in "*Information and documentation techniques*" was held in Lund in 1971/72 for engineers and other graduates who were out of work. The comprehensive course lasted for 22 weeks and included "*Computerized Literature Searching and SDI*" This part of the course, given at KTH, included practical training in the use of SDI systems (43).

NORDINFO and user education during the 1970s and early 1980s

NORDINFO was established in 1976, as an intergovernmental agency for co-operation in the information and library field in the Nordic countries (Denmark, Finland, Iceland, Norway and Sweden). "*The main purpose of NORDINFO is to promote Nordic cooperation within the field of scientific information and documentation, principally in connection with the research library system. NORDINFO shall also promote Nordic interests in a wider international context. NORDINFO's task is to*

be instrumental in development, aiming at better and more efficient ways of disseminating information to research workers and other users of scientific and technical information resources in the Nordic countries." NORDINFO's programme for the years 1978 to 1982 covered four main areas (44):

- Policy development and co-ordination
- Library resources and document delivery
- Databases and networks
- Education and training of users and information personnel

This programme resulted in a number of projects, which were directly relevant to the development of educational activities related to computerized information retrieval. Examples of early work are training courses in 1977/78 in the use of databases in crystallography and mass spectrometry, developed by Medicindata, Gothenburg; support during 1977 for training seminars: ESA/RECON in Finland, BIOSIS in Denmark and AGRIS in Norway (45); and the development of a mini manual for the users of the INIS database (46). Training seminars for the users of the INIS system were supported by NORDINFO funding, and held in Denmark - Roskilde, in Finland - Esbo and Åbo, and in Sweden - Stockholm (47). NORDINFO also provided support for the education of users in information retrieval from the SCANP database developed by the Nordic Schools of Economics (48, 49).

In a report on library education in the Nordic countries, Ben Rugaas, discussed the issue of user education: *"It has been pointed out that a happy development within library education is the tendency now to focus on the users. And user education in general can be strengthened by, among other things, better training in the subject at the library school and other institution*." He also mentioned the need for a Nordic clearinghouse for instructional material (50).

Ralph Strömfelt wrote a report on user education, stating that this was established to a greater or lesser extent in the academic institutions, but relatively seldom seen in industrial companies. He pointed out that there was a considerable need for the provision of training for a variety of target groups, and suggested possible actions (51). This was followed by another report on user education by Saima Wiklund (52). These reports formed the background for NORDINFO's activities in the user education sector. In June 1979, NORDINFO decided to support the formation of a Reference Group for User Education. This group met in January 1980 and recommended that an inventory of existing Nordic material for user education should be carried out and that a Seminar for Training the Trainers should be held (53). The seminar for instructors, which was held in Borås in October 1980, was attended by some 30 participants (54).

Another suggestion from the Reference Group for User Education was that there was a need to produce an instruction package about how to plan and give user training. This important need – particularly marked in a new area of education - the development of teaching material was recognized by NORDINFO at an early stage. This led to support for the writing and production of textbooks and compendia. Examples of this are the funding of a textbook about interactive searching in databases, to be written by staff at the KTHB in 1978. This resulted in the book by Ulla Karlsson and Marie Wallin "*Att söka i databaser: interaktiv informationssökning: metoder och möjligheter*" ("*Database searching: Interactive information retrieval methods and opportunities*") published as NORDINFO-publikation 8 in 1985 (55, 56, 57).

The initiative suggested by the Reference Group for User Education resulted as a NORDINFO-publication "*Brukeropplæring – idéer og utkast til brukeropplæringsprogram*" ("*User education – ideas and an outline plan for a user education programme*"), which was published in 1983 (58). This publication contained an appendix on microfiche with an inventory of user education material produced in the Nordic countries. This had been compiled by Annika Lindberg from Linköping University Library. The publication was mainly directed towards librarians and information specialists

working in small libraries and information centres in the private sector. This provided a valuable complement to the material produced by many of the universities for their user education courses.

Online education in the 1980s

The 1980s saw the development of DIANE Centres in the Nordic countries. The first to open was the Danish DIANE Centre, on April 1st 1981. The main aim of the centres was to support and promote the use of online systems in Euronet-DIANE and elsewhere and help the online users to use the databases with maximum efficiency. One of the tasks for the DIANE Centres was the responsibility for user education at all levels and for different types of users. In Denmark this was carried out both in the Danish DIANE Centre which was placed at the National Technological University in Lyngby, and in other places throughout the country (59).

Similar DIANE Centres were established in Sweden in 1982 and later in Norway (see below) and Finland. These DIANE Centres were involved in online advisory and training activities linked to the promotion of European and to a certain extent other online services, in some cases by developing there own training courses in online information retrieval.

The online training activities were to a large extent based on hands-on exercises. For that purpose most online services contributed by giving the DIANE Centres either a restricted or totally free access to their databases.

During the 1980s an increasing number of universities and colleges were offering some form of orientation, training and education in information handling. A Nordic survey carried out by Fjällbrant in 1981 showed that nearly all of the academic libraries had some form of orientation for new users, at least half had courses in user education for undergraduates, and an increasing number had courses which included online information retrieval (60).

Denmark

Throughout the 1980s, DTB provided a variety of online information retrieval courses (12).

• Beginners	open to everybody	3 hours
• Advanced courses	for users with 6 months of online use	1-2 days
• Students	from University of Technology	1-2 days
• Students	other institutions (beginner's course)	3 hours
• Demonstrations		½ - 1 hour

In addition courses by database producers were hosted for either database producers or systems operators. Sometimes these were free, sometimes fee-based.

With the founding of the DIANE Centre in 1981, a large part of this user education was taken over and extended to include a variety of groups throughout the country. The Centre centralized the registration for online courses in Denmark, most of which were arranged at the Centre's own premises, which was equipped with "*4 terminals and 4 monitors, overhead- and slide projector and a blackboard.*" In the first 18 months 18 courses were offered, most of which were training offered by hosts and database producers. These were available to everybody and were available to both information specialists and end users.

During the first five years several different host independent training courses were developed and given by the staff at the centre. These were:

- Basic training 1 day
- Brief introductions ½ day
- Equipment for searching ½ day
- Microcomputers ½ day
- Criteria for choosing equipment ½ day
- Common Command Language 1 day
- Advanced search strategy 1 day

In addition lectures about information retrieval and the work of the centre, had been given to a wide range of groups, such as students, journalists and bank employees (from the First annual report of the Dansk DIANE Center 1.4.1981 – 30-9.1982) (61). During 1984 the Centre provided 35 courses of their own with 637 attendees in total, and arranged 36 workshops and seminars with database providers and online services for 379 people, and all the services were free! In 1983 and 1984 an open seminar was held on Information and Documentation in the Humanities and Social Sciences respectively. The last one attracted 160 people and was later repeated. In co-operation with the PPT a meeting on the new packet switched network in Denmark, Datapak, was arranged in 1984. Again 160 people attended.

The Danish DIANE Centre also produced and circulated a newsletter – DISPLAY – and an irregular series "*Vink om… or Meddelelse fra Dansk Diane Center*" with advice about different aspects of online retrieval. A directory of courses was published 4 times a year with details of all online workshops and seminars in Denmark (61, 62).

In Copenhagen, at the University Library, Medical and Scientific Department (UB2), introductory courses to MEDLINE, BIOSIS and EPOS/VIRA were given on request, during the late 1970s and early 1980s. These courses consisted of a three-hour presentation on how to use the databases, the indexing used, and the services provided by UB2. The Tandlægehøjskolen (for dental education) had regular courses twice a year. In addition there was a course for biology students on information retrieval which included a brief presentation of BIOSIS (61).

In 1984 the Library started to provide formal training in MEDLINE, both to information specialists and end users. The end user training were 2-days sessions with half a day used to online exercises of own choice.

The Royal Library introduced courses in how to search for literature in psychology for advanced students and at the University Library in Odense the medical training included hands-on exercises using CD-ROMs.

In 1985, Cotta-Schønberg reported, that in a period of economic retrenchment, libraries with decreasing resources had in a number of cases made reductions in user education programmes (63). Nevertheless there had been a number of interesting developments, such as the development of project oriented courses involving the use of computerized information retrieval at Aalborg University Centre, and annual courses in Research Methodology for medical postgraduates at Aarhus University. The latter included online information retrieval, where each user prepared and carried out a search and the use of microcomputers for processing references.

Finland

Growth in computerized information retrieval was particularly marked in Finland. In 1981 "*nearly half of the university or college libraries gave some form of instruction in computerized information retrieval*". Haarala stated that, by the beginning of the 1980s, education about computerized

information retrieval, which had previously been given mainly to postgraduates, also became a regular part of subject-oriented instruction for undergraduates (64). This online education often took the form of lectures for two hours, followed by an online demonstration. For example, the Helsinki School of Economics gave a half-day course, and hands-on training was available later at the Computer Centre.

At the HUT online searching was a possibility for students. "*In many cases online education is compulsory because the new degree requirement regulations at Finnish universities include information studies as a compulsory subject in the curricula.*" The postgraduate course - Information Systems and Services - at HUT integrated online education into the curriculum, so that it was available at intervals throughout a whole year. During this course students constructed an experimental database – indexing and inputting items. The database was then used for searching. Both the Finnish Department of Library and Information Science at Tampere university and the Swedish Department of Information Studies at Åbo Akademi University included training in online information retrieval in their curriculum. Libraries and information centres experienced in online techniques, such as the Central Medical Library, Helsinki School of Economics and the HUT, gave training to library and information specialists on a consultancy basis. External users sometimes were included in these courses.

The learned and professional societies in Finland were also involved in online user education. For example, the Finnish Association of Chemistry gave a two-day seminar on chemical information with a strong online emphasis, and the Training Centre of the Engineering Societies gave a seminar for mechanical engineers, which included an afternoon session on online training The Finnish online user group published the newsletter *Online Uutisia*.

In 1985, Haarala reported that there had been a steady increase in user education throughout the 1980s. In 1984, more than 18,000 students took part in user education programmes in Finland. An important recent trend was the establishment of compulsory courses and the recognition that information retrieval methodology was a necessary tool for academic studies (65).

Training courses for intermediaries, information specialists, started in 1975 by Sauli Laitinen at VTT Information Service by inviting Lockheed and other database producers and hosts to give online training courses. At that time the online information searching knowledge was directed mainly to information specialists. The new possibilities of searching information directly online and not by reading abstract and index journals were quite a new opportunity and seemed somewhat unreal. Anyhow this development started in Finland as early as in 1975. The hosts invited in 1970s and early 1980s include Lockheed, SDC, BLAISE, BRS, Pergamon InfoLine, Télésystèmes-Questel, NIH/EPA CIS, FIZ Karlsruhe, ESA/QUEST, DIMDI, FIZ Technik and DataArkiv. The following hosts and database producers also gave training at VTT: ABI Inform, Derwent, BIOSIS, Predicasts, CAS, INSPEC, CAB, IRB, COMPENDEX, RAPRA, Beilstein. Various online courses were held at VTT as well as at HUT Library and other university libraries especially focused on intermediaries but also on end users as students.

Iceland

Iceland is by far the smallest of the Nordic countries, and as such has had to struggle with smaller resources for libraries. Indridadóttir pointed out that many institutions had appointed their first professional librarian in the last 10 years (66). User education had been started with both orientation and subject-oriented courses on computerized information retrieval, and the latter included lectures on computerized information retrieval. "*The University of Iceland Library was the only library that had appointed a full-time librarian (in 1978) to provide user education and an information service*." User education was divided into two parts: an introductory tour and advanced instruction linked to

compulsory courses in several subjects. This included the use of appropriate databases. In 1985 about 200-300 students took part in this instruction. Work was also in progress on the production of three television programmes for broadcasting via the general television network. Jón Erlendsson described plans for the introduction of education in information retrieval into the Icelandic school system (67).

Norway

NTHB played an active part in the introduction of computerized information retrieval services to library users within the university and to external clients, during the early 1980s (25). This work was extended with the establishment of the DIANE Centre in 1986 (see below). Lamvik pointed out that, in 1982, there were not very many online searchers in Norway, with 53 Norwegian passwords to SCANNET and 46 to Tymnet (Amsterdam node). This picture changed over the next five years as the number of searchers increased. NSI also provided courses for librarians and industrial users on how to use the Polydoc and Micro Polydoc databases produced by the company.

In 1985, Torild Alnæs carried out a survey of library user education in Norway. A questionnaire was sent out to over 80 libraries, and about two-thirds of these replied. 20 libraries stated that they gave an introduction to computerized information retrieval. These libraries all belonged to the category "university or large research library" such as the Norwegian Institute of Technology (NTH), Trondheim, and Oslo and Bergen universities (68). At Oslo university, the first "real course" in the use of MIC's databases was given in 1985 (27, 69). After initial training at MIC in Stockholm, Oslo university librarians held courses for other Norwegian librarians and many doctors, pharmacists, physiotherapists, and other paramedical professions. "*Many doctors referred to the courses given at the library as their first introduction to the use of IT*" (70). Courses were also available for biologists. Kvam described another interesting course, at Oslo university, in which students in the social sciences had the possibility to carry out a free online search, with a printout of up to 150 references (71). This course was evaluated in detail and Kvam concluded that manual and computer-based information retrieval should be seen as complementary strategies.

In 1986 the Norwegian DIANE Centre was established at the Documentation Centre of the Library of the Norwegian University of Technology (NTNU, former NTH) in Trondheim, as a national service centre. As well as in Denmark the main purpose of the Norwegian DIANE centre was to promote and support the use of national and international online services as well as other computerized information services. This was achieved, in part, by means of training courses and seminars for both new and experienced users, and by hosting courses for database producers and systems operators (72). The early courses were directed towards the use of individual databases and telecommunications equipment (73). The Norwegian DIANE Centre promoted the use of available databases, as did the Danish DIANE Centre, irrespective of their country of origin. The Norwegian DIANE Centre also produced the newsletter "*Norsk DIANE Nytt*", which had a wide distribution.

Sweden

In Sweden, postgraduate courses, which included computerized information retrieval were given at the following universities and colleges (74).

Karolinska Institute of Medicine and Surgery, Stockholm*)	30 hours	1 per year
Biomedical Library, Gothenburg University	14 hours	4 per year
Royal Institute of Technology, Stockholm**)	14 hours	1 per year
Chalmers University of Technology, Gothenburg	70 hours	3-4 per year

Linköping University	11 hours	3 per year
Lund UB2 Library	8-10 hours	5 per year
Swedish University of Agricultural Sciences, Ultuna	4 hours	1 per year
Skara College of Veterinary Medicine	22 hours	On demand
Umeå Forrestry College	8 hours	1 per year
Umeå University (for medical and dental postgraduates)	11 hours	2 per year
Uppsala University	2 hours	?
Luleå College of Technology (co-operated with Umeå)***)		

**) Training in the use of MEDLINE has been described by Viveka Alton Lundberg and Per Olsson in 1982 (75).*
***) An article describing experiences from training in the use of IRS/QUEST at KTH, was written by Lars Klasén in 1982. The article is, however, dealing with courses aimed at intermediates and end users in general, not students (76).*
****) See Haupt, 1987, for description of the courses developed at Luleå University (77).*

The hands-on searching for undergraduate students that was introduced in the late 1970s was continued and further developed in the early 1980s. The libraries such as KTHB and MIC-KIBIC at the Karolinska Institute included online searches at the undergraduate level already from the start, but for many other institutions, this was considered too expensive. The availability of Nordic databases, over SCANNET, provided an affordable alternative which stimulated active online training: "*In 1980 'hands-on' online training was introduced for the civil engineering undergraduates (at Chalmers). They prepared and carried out a search on BYGGDOK – a Swedish database containing some 30,000 references in the field of building and related subjects. This experiment in teaching online information retrieval proved so successful that attempts were made to introduce 'active' methods of teaching online into all of the undergraduate courses.*" (78).

An important trend that was, in part, influenced by the work of the NORDINFO Reference Group on User Education, was that many universities started to provide courses for external users. This was strongly supported by the work of the documentation centres and the DIANE centres. Courses were given by both online database producers and systems operators. These were directed towards both information specialists and practitioners particularly in the medical and engineering disciplines. Examples of universities, which provided online training for industrial companies, were KTH and the Karolinska Institute in Stockholm. Linköping University specialized in information provision for small and medium sized enterprises, SMEs (79).

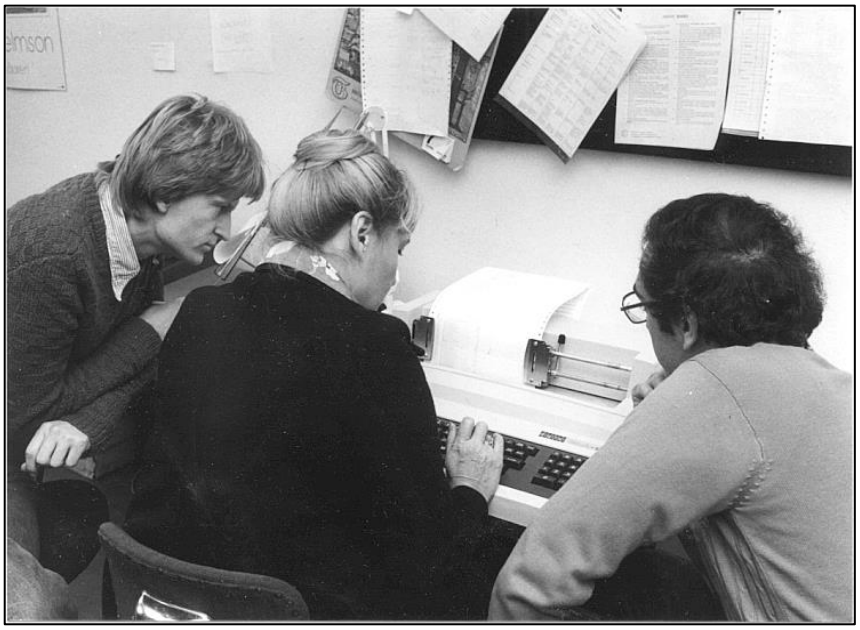


Figure 5.15 Postgraduates carrying out an online search on a Decwriter.

At Chalmers University, courses for external users were provided, for example, for nursing staff, physiotherapists,

occupational therapists and laboratory assistants. Courses for industrial engineers were organized through the auspices of TEMADOC – TEchnical and MArketing DOCumentation, the industrial service organized by Chalmers Library, in connection with the Chamber of Commerce for Western Sweden (80).

One of the problems in teaching online information retrieval with individual exercises was the cost involved. Chalmers Library had a user education programme for over 1,000 students per year. As a step in this work, a number of methods were developed. One of these was the use of emulation programs. These consisted of a search system and a local microcomputer database. These had the advantage that they were low cost and available for students at any time for training in constructing search profiles etc. The disadvantages were that the databases – Microcomputers – Toxicology etc. were quite small between 100 to 500 references, and so did not provide the "real" experience of working with a large database (81).

Another method for enabling users to get accustomed to online information retrieval is by the use of simulation programs. Chalmers produced simulation programs for ESA/IRS - "*QUESTSIM*" and for DIALOG – "*DIALSIM*." (82). These were later bought and developed by INSPEC as part of their LION training program and were available throughout Europe. The advantage of these programs was that they could provide training in command languages and search strategies. The simulation programs were purchased by colleges, schools and industrial companies as aids to online training.

Figure 5.16 Nancy Fjällbrant during a lecture, showing figures on a screen by use of an overhead projector. Source: Nytt från DFI 5(1984)3-4.

Other activities

In parallel with the work carried out by the universities, there were a number of other initiatives in online training. One example of this is NSI. This company specialized in working with the Polydoc and Micro Polydoc computer-based information systems. In the early 1980s they had 12 databases publicly available for searching – 2 factual and 10 bibliographic. They developed regular user education programs, which have been described by Pavicevic (83).

NORDINFO supported a project on the development of a computerized program for the training of individual users, independent of location. This was based on a program developed at Agder College in Kristiansand. This individual tutoring program was seen as a complement to traditional courses (84, 85). User education from a Nordic database producer's point of view has been described in relation to Byggdok, the Nordic database for the building sector, see Stern, 1982 (86). The Byggdok database was widely used in the online training of civil engineers and architects throughout the Nordic countries. In Sweden, SPRI – Hälso- och sjukvårdens utvecklingstjänst (The Development Service for

the Healthcare and Nursing sectors) was responsible for the production of databases such as SPRILINE, which opened in 1985. SPRI also gave a considerable amount of online training. The number of SPRILINE training courses varied from year to year, but was annually considerably more than 10 courses, during the first six years of operation (87).

The role of NORDINFO in promoting online activity during the 1980s

During the 1980s, NORDINFO promoted the development of online activity in a variety of ways: Through policy development and co-ordinating activities, library resources, databases and network activity, and education (88). In the field of education, NORDINFO's activities relate to both training library and information personnel and the training of information users. NORDINFO was responsible for continuing training activities for the trainers and instructors- Joint Nordic training courses in the use of new technology and networks were developed and given for library and information specialists.

NORDINFO also continued to support a considerable number of non-database specific and database specific courses. The specific databases were mostly the Nordic databases operating under SCANNET, the library and information dedicated network, which served primarily databases with a Nordic connection (89). In the field of user education NORDINFO continued to stimulate "*efforts to reach new categories of users in public administration, industrial organizations and other fields*."

Online information retrieval is based on an interaction between the user and the host computer. Therefore training packages were developed such as the software packages for microcomputers – simulation programs such as QUESTSIM and DIALSIM from Chalmers University, STN-MENTOR from the STN host in Karlsruhe and emulation programs such as Micro Polydoc from NSI, UNESCO's CDS/ISIS program (90) and the MIRABILIS program from the University of London Central Information service, see Fjällbrant, 1988 for an overview (91). NORDINFO sponsored two Nordic training courses about the use of microcomputers in libraries. This included building small databases and subsequent searching. These courses were held in February 1985 and in March 1986. A similar course was organized by the Library Association of Iceland, and held in Reykjavik.

The interaction between information searchers and host computers was complicated by the use of a variety of database structures, user-system interfaces and retrieval command languages. Most end users only used a few databases, and one or two search systems and indeed many felt that "*the difficulties were too severe to start searching at all*." Even professional searchers tended to specialize in the use of one or two host systems (92).

The mid 1980s, saw the beginning of the development of intelligent interfaces, which would aid the user in online searching. In 1985, NORDINFO took the initiative to develop an intelligent interface to Nordic information systems and databases (IANI). This was based on the fact that "*Nordic databases, often developed with support from NORDINFO, were rarely used to any significant extent by the potential users once they moved from test phase to commercial operation.*" (93).

The ambitious and costly IANI project, which was co-sponsored by the Nordic Industrial Development Foundation, started in 1986. The aim of this project was to facilitate searching in the Nordic databases, and hopefully increase the use of databases containing unique Nordic information. This was developed by the Danish data processing company CRI – Computer Resources International - assisted by BRODD – the Consultancy and Development Department of the Norwegian School for Library and Information Science.

The first stage of the project resulted in a report on language requirements for the intelligent interface facility based on the ISO/DIS 8777 standard. This part of the work was carried out by BRODD (94). CRI started work on the production of the IANI interface. The concept included the following:

- one logon/logoff procedure to all databases and hosts
- access via menu or CCL commands according to user's choice
- conversion of user statements to correct CCL expressions in the PC
- help to search formulation and database selection via meta database at the PC
- conversion of CCL commands to host language commands at the PC
- transmission of validated host language commands to the host
- transfer of search results to the PC
- sorting, merging and editing of references in the PC
- presentation on screen and print in host formats or standard IANI-format
- document ordering
- presentation of statistics on session time and costs when information is available from the host.

This was a very ambitious programme, and as could be seen, if successful, would certainly have made searching easier for end users. Indeed there were ideas that user education would become unnecessary or at least could be greatly reduced, so towards the end of the 1980s, user education had a much lower profile in NORDINFO's overall activities. The IANI prototype was tested and subsequently modified. Sales began at the end of 1989 (95, 96).

Some personal reflections about the past and future

During the 1970s and early 1980s, NORDINFO played a very important role in stimulating co-operation between the Nordic producers, distributors and managers of information through a variety of programmes, such as the production of NOSP (the Nordic Union Catalogue of Periodicas), the support for SCANNET and the production of a large number of Nordic databases. NORDINFO stimulated the use of these information products by means of education both of library and information staff and users of information. In the latter, there were numerous attempts to reach out to new user groups, such as people working in small industrial concerns, and schools.

NORDINFO also contributed to increasing international contacts with other experts from countries outside the Nordic area. This was achieved through support of international workshops, courses and by the Anglo-Nordic seminars. I have been involved in a number of these activities and enjoyed the possibility to gain a Nordic perspective.

Other organizations that strongly supported the development of user education, during this period, were NVBF, Nordiska Vetenskapliga Biblioteksföreningars Förbund (The Nordic Research Librarians Association), and IATUL, the International Association of Technological University Libraries, both of which were responsible for the organization of seminars and workshops on various aspects of this topic.

The introduction of problem-based learning (PBL) into the higher education field, has had an important effect on the development of library user education. In PBL there is a focus on the student's own ability to find relevant information about the various projects which are part of the curriculum. At Linköping university, PBL was introduced in the Faculty of Health Sciences in 1987, and Kerstin Fridén has described the role of librarian as a teacher, in this setting. She concludes that user education and information literacy "*should be given a high priority and looked upon as a natural part of the library service. Similarly, educational skills must be an integral part of librarianship.*" (97, 98).

Evaluation studies on user education had clearly demonstrated the importance of linking user education, in its various forms to project work in connection with studies (38, 39). From the 1990s onwards, PBL is being introduced into many academic disciplines, and this presents a great opportunity for library involvement.

The 1990s have seen a great many changes, with the increased availability and use of the Internet (for which Nordic academic users were well prepared through the development of SCANNET), and the development of information browsers of various types, which produced general interfaces for searching and obtaining information. Databases became available first on CD-ROM, later through the Internet with Web interfaces. This has created a popular idea that all (or at least most) of the information is available somewhere out there, and that it is FREE! This is, as information professionals know all too well, not true.

There is a growing emphasis on the need for lifelong learning in all the Nordic countries. Access to a digital library sounds like an ideal solution for people taking part in distance learning programmes. At the present time, this access is often a problem, particularly for people who live in rural areas, where they have poor network facilities. Navigational tools are improving all the time, and these will hopefully be able to respond to individual user profiles in the future. Access to networked material for learning etc. is not necessarily easy today.

More people are taking part in trans-disciplinary studies and research, often being involved with one or more universities. They may well have access to one set of licensed material from the university to which they have the "correct" IP address on their computer, but they will probably be denied access to electronic journals from another university. Material used for courses has to be copyright cleared, and assessed for quality. This involves time in the planning and preparation for distance learning courses. Some material of high quality has a high copyright clearance fee. Will people choose less expensive and readily available material instead?

There is a need for information specialists and teachers to work together in planning and developing courses, especially if these are networked (99, 100). To paraphrase the words of Sormunen and Nurminen: "*problems dealing with information access are not solved by technical developments alone. The users need human based help and support on how to find information and evaluate its quality*" (92). Those who have worked with users under this period have experienced one of the most exciting times in the development of information handling.

In March 2000, the European Commission published a document called *eEurope: An Information Society for All*, in Lisbon. eEurope is a political initiative to ensure that the European Union fully benefits for generations to come from the changes that the Information Society is bringing.

The key objectives of eEUROPE are:

- *Bringing every citizen, home and school, every business and administration, into the digital age and online.*
- *Creating a digitally literate Europe, supported by an entrepeneurial culture, ready to finance and devlop new ideas.*
- *Ensuring the whole process is socially inclusive, builds consumer trust and strengthen social cohesion (101).*

In the new millennium, librarians and information specialists have the opportunity to play an important role in lifelong learning and the development of information literacy, both for their traditional academic user groups, and also for the "information disadvantaged" such as the senior citizens. One of the most important challenges for the future is information provision to support lifelong learning. In this connection, I was very pleased to hear at the 25th Anniversary of NORDINFO,

held in Helsinki in October 2001, that a Nordic Reference Group for Information Literacy has been formed. We who worked with the development of various types of user education and training in the "old days" would like to wish them every success in the future and may they have as much fun as we had!

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6 THE NORDIC ONLINE MARKET IN AN INTERNATIONAL PERSPECTIVE 1976-2006

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6.1 Introduction

Online information and searching is crucial in the society of today. This is, however, not reflected in the revenues generated on the online market, defined by fee-based online services, which are only one or two % of what is spent on its "prerequisite", i.e. IT, information technology. As of this writing, in 2006, the revenues from online use in the Nordic region are just around SEK 6 billion per year. The online industry is also little known. But this is nothing new. This has been the case since the first commercial online services started in the early 1970s. Not even the Internet and the Web have been able to change this.

This chapter gives an account of the development of the Nordic online market related to the international over thirty years 1976-2006. I myself have been active in the online industry during this time. This is reflected here in the way I mix facts sections with glimpses from my own activities. The text is somewhat biased to Sweden, which of course is explained by me being a Swede but also due to the fact that I during the years have conducted a number of studies of the Swedish online market, thus holding an extensive body of information on this.

Data for Sweden in this chapter are largely based on these studies. As for Denmark, Finland and Norway I have for the period up to and including 1998 relied on published material. For the time after that I have utilized information gathered by myself exclusively for this study due to lack of published material. It is a well-known fact that it is hard to obtain trustworthy data on usage, number of users, revenues etc. for the players on the online market. Therefore, much of the data are my own estimates.

Some definitions

For us who were active in the information sector in the 1970s, "online" was virtually synonymous with searching in bibliographic databases within STM (Science, Technology, Medicine), accessible via fee-based online services. During the 1980s, the concept was widened, gradually including also legal and business information, information in full-text, various kinds of registers and records (such as official registers and records), credit information, financial real-time information and videotex.

After the breakthrough of the Internet and the Web in the mid-1990s, the concept "online" increasingly has come into use also for a number of other things, from search engines on the Web to

e-commerce and online gaming. This chapter just deals with fee-based online services for information searching (i.e. services with regular income from customers). Ad-funded services, such as Google, and services that are free and financed by the government, public funds, associations etc. are not included, nor services aimed at consumers.

For the period up to about 1989, the text is focused on STM, business and legal information and other kinds of text-based information, including full-text.

The Nordic region - prominent in online

In the 1970s the market for online developed faster in the Nordic countries than in other countries, except the United States. At the end of the decade, the online usage in the Nordic region, measured by search hours, accounted for about 2 % of the global online usage and a slightly smaller proportion of the global revenues. This was a high per capita share compared to other European countries but low compared to the United States. Nordic users were particularly good at utilizing international online services and databases. In fact, this latter usage accounted for two thirds or even more of the total Nordic online use.

The use was stimulated by a number of domestic, government supported, investments in systems, databases and online services, such as EPOS/VIRA, IANI, SCANNET, MEDLARS-at-MIC, Byggdok and HELECON. Some of the first advanced IR systems (nowadays called “enterprise search engines”) outside the United States were developed in the Nordic region. These include Swedish 3RIP/TRIP and IMDOC and Norwegian SIFT and Polydoc. Pioneers in the field of legal information retrieval, Finnish, Norwegian and Swedish online services, at an early stage deployed these IR systems for online retrieval of legal information.

The prominent role of the Nordic region in those years was mainly due to high technology maturity, early general computerization, excellent telecommunications and favourable economic conditions, combined with advanced research in great need of monitoring international research and development.

An interview with online veteran Carlos Cuadra, founder of SDC/Orbit (one of the first commercial online services) in Searcher, July 2003 (1), illustrates the early Nordic go-ahead spirit. He remembers the pioneering years of online and people who mattered most to spread knowledge of online:

> *"At the top of the list is a Finn named Sauli Laitinen. Sauli caught onto the promise of online and gave talks and demonstrations. He was using online even though it cost $70 an hour in communications time to get from Finland to Los Angeles. Sauli was a true believer and proselytized. The test of his effectiveness was that at one time we had 30 to 40 users (companies and organizations) in Finland and zero in Germany. Sauli and some of the other folks that didn't have colossal information resources caught on to the fact that by using online tools, they could be as good as the Library of Congress, the University of California, and all those who had tremendous resources."*

Even today, 2006, the Nordic region is very competent as regards online. However, we no longer are on top neither as regards technology nor establishing new services. This is due to the economic conditions, where the Nordic countries lag behind other highly developed countries, as well as the small size of the countries, which in this field, exactly as in many others, has made it impossible to maintain a leading position. An exception is maybe IR, where today Norway is a world leader, with the enterprise search engine FAST, and Sweden, which has a handful of technically eminent though not market leading products.

It does not mean that we are lagging behind in terms of using existing technology, i.e. to deploy existing online services, but only that we are no longer in the forefront of establishing new services. I estimate the 2004 Nordic online market at SEK 5.36 billion. This means about 1.6 % of the global online market, estimated at about SEK 300 billion. As online since the 1970s has got a global spread it means that the role of the Nordic countries relative to the United States and Europe is on about the same level as then.

However, we are no longer at the top in Europe. Our share remains because the United States share has declined. In the 1970s the United States accounted for some 90 % of the global online market, in the 1980s about two thirds and today, 2006, just under 50 %. Meanwhile, the United States temporal advantage, which in the 1980s was roughly 4-5 years, has faded. A very sharp rise of online use, over 30 % per year, occurred in the US in the early 1980s. A similar increase did not occur in the Nordic countries until the end of the decade. Today, there is no such marked temporal difference as regards growth of the different markets, at least not in general. Internet and the Web globalized and levelled out the growth in online in the same way as technological advances and utilization of new technology are now global.

The Nordic region – not one single market

The online industry in the Nordic countries has a number of characteristics and common features. It does however not imply that this region should be regarded as one unity; one single market; neither in terms of use nor supply.

The online market may, in general, be divided into two parts: one international, dominated by international players, and one national, dominated by domestic players. This is just natural and based on culture, language, political structure, economy etc. The Nordic region is no exception. A manifestation of this is that the inter-Nordic (i.e. between the Nordic countries) use of online services and databases is very small, only a few % of total use. Thus, international players marketing their services in the Nordic region have to accept that it is necessary to take on the market of each country separately. The same applies, of course, to Nordic players with the same ambitions.

In this context, it can be mentioned the attempts that have been made to establish recurrent joint Nordic fairs within online, most important of these being Databas ’88, InfoOnline ’90 and Online Information Scandinavia (OIS ’98 and OIS ’99). None such fair managed to establish themselves on the market, a fact which also is a symptom that this region cannot be regarded as one single market. However, we can now in 2006 see tendencies towards a “nordification”; a development of a pan-Nordic online market in some areas. I will return to this later in this chapter.

As regards fairs, I should mention the joint Nordic initiative in 1986 by SCANNET, at that time a project funded by NORDINFO, to invest in a Nordic exhibition stand at the 10th International Online Information Meeting (IOLIM) in London. (See figure 6.1). This stand was manned by three Swedish online services, ARAMIS (environmental information), DAFA/Rättsbanken (legal information) and CAN/DRUGAB (alcohol and drug information) and one Finnish, HELECON (economic information). I myself took part in the stand as a representative of DAFA (the computer service centre where I was employed in 1983). It was interesting as a manifestation but did not result in many new customers.

NORDINFO has no doubt been important for the development of the online use in each Nordic country as well as for maintaining the togetherness between the countries. But in terms of achieving greater inter-Nordic online use and to establish a pan-Nordic market I dare say that the practical results have been limited - for the reasons outlined above.

Figure 6.1 SCANNET's stand at the 10th International Online Information Meeting, London, December 1986. In the centre of the picture is Elisabet Mickos of NORDINFO, representing SCANNET, speaking to Teodora Oker-Blom of NORDINFO (red coat). On the right side of Elisabet Mickos is Sonja Valverius of CAN/DRUGAB. The man is Tommy Sjödin, DAFA. Photo: Lars Klasén.

On online market studies

Above was mentioned that the Nordic region cannot be regarded as one unity, one single market. In spite of this almost all published studies, market reports, compilations etc. with an international perspective deal with our region as such. In most cases, it is because our countries are small economies, with only small shares of the online market, therefore not considered worthwhile to deal with as separate entities. Historically, this is also illustrated by the fact that when international players have announced marketing efforts and investments in Europe, they have almost always set the "continental" Europe as a first priority, while "Scandinavia" has come later.

An example of a larger, comprehensive study that confirms this is OECD's *Economic and Trade Issues in the Computerised Database Market* from 1993 (2). Despite its magnitude, it deals with "Scandinavia" as one entity regarding market figures. According to this study, Scandinavia in 1990 had 7 % of the European and 2 % of the global online market.

Furthermore, in most cases these studies deal with just certain parts of the online market. An example of this is the study *European Business Information*, conducted by Information Research Network (IRN) (cited in (3)), which states that "Scandinavia" in 1998 accounted for 8 % of the European market in terms of "online business information" – which in itself is difficult to define. An early (1979) study (4) of the online use of the database BIOSIS Previews states that "Scandinavia" at

this time accounted for 8 % of the total European use. Given that Europe accounted for 31 % of the global use, Scandinavia's share of the world market thus was 2.5 %.

There are, however, two studies exhibiting exhaustive information for the Nordic region, namely MSSTUDY (Member States Study) I and II. These studies, giving details about the whole European electronic information services market, were conducted in 1995/96 and 1998/99 respectively. They are based on surveys carried out in 17 countries, including the Nordic, of the European Economic Area using a common methodology, therefore fairly well mutually comparable. The studies were financed by the European Commission under the frameworks of the IMPACT and INFO2000 programmes respectively, in combination with national funded surveys. MSSTUDY I (5) accounts for the 1994 situation and MSSTUDY II (6) for 1997.

As for studies of the online market in the individual Nordic countries, I have in addition to MSSTUDY I and II mainly taken advantage of exhaustive factual material regarding Finland and Sweden, based on national surveys and studies. For Finland these were conducted by Merja Lehti and Pirko Eskola, accounting for the Finnish online market in 1985 and 1989 respectively (7, 8). As for Sweden I have used my own material, accounting for the Swedish online market from 1979 to 2006 (including 9, 10, 11, 12, 13), supplemented with material gathered in connection with the preparation of this chapter.

On secretiveness and troubles to obtain industry data

In my study of the ESA/IRS users in 1979 (13), I reported the first comprehensive overall data on the Swedish online market size and use, distributed according to the online services as seen in Table 6.1.

Online service (country)	Online use (search hours)	Number of passwords
ESA/IRS (Italy)	2,000	210
DIALOG (USA)	1,600	42
MEDLARS-at-MIC (Sweden)	1,500	90
SDC/Orbit (USA)	900	29
Others	< 4,000	
Total	< 10,000	

Table 6.1 Swedish online usage 1979 and number of passwords in December, 1979 to ESA/IRS, DIALOG, SDC/Orbit and MEDLARS-at-MIC (Medical Information Center, Karolinska Institute). Source: (13)

The purpose of the table was just to indicate the extent to which the target population, i.e ESA/IRS users, was representative of the online community in general. But to my surprise, it was the data itself that attracted the most attention. It even gave rise to external requests, e.g. from people outside the information community, including journalists. I realized then how sought-after and valuable this kind of factual information was. This became the starting point for my own interest and the collection of data on the online market.

My first major study of the Swedish online market was conducted in 1983 (9). I then learnt that data on the number of users, search volume, etc. was not only attractive but also extremely difficult to obtain. Secrecy was great and any information I received from the players had to be taken with many grains of salt. In the (relatively few) cases I actually received data, the figures were frequently exaggerated. This was often due to that the actual figure was embarrassingly low. In addition, there were of course definitional difficulties. Was the number of users equal to the number of distributed passwords? How many users were there per customer? What percentage was in reality so-called "sleeping passwords"? It was for me to make sensible estimates!

The consequence was that I largely relied on information which I gathered from users rather than from market participants. This was possible thanks to the relatively small size of the "online population" at the time, largely consisting of intermediaries ("intermediaries", people who search online on behalf of the customer). Many of these I knew through my membership in the Swedish Society for Technical Documentation (TLS, since 2002 the Swedish Society for Information Specialists, SFIS) and its online user groups in the Swedish Online Users Group (SOLUG) and, of course, through my employment from 1976 to 1983 at IDC-KTHB, which constituted somewhat of a centre for online in Sweden.

Secrecy in the industry has virtually remained. In 1998, it was described in this way by the online industry guru Martin White (14):

> *"One of the paradoxes of the European information industry is that information about the performance of the companies in this sector or about the size of the market (and from this, market share information) has been very difficult to obtain. Among the obvious reasons for this are concerns about giving away commercially sensitive information in the early stages of a market. For public sector organizations, there is also a concern about revealing the level of subsidies. "*

Over time it has become easier to obtain data on some of the players. This applies to those who have become so large that they are legal entities, with public annual reports and financial statements. However, it is just as hard as ever to obtain information about details such as the number of customers, users, search volumes, revenues per product etc.

This quest for business data has, in general, faded as the online industry has matured. It is also due to the above-mentioned case of a small industry, just 1-2 % of the size of the IT industry. In Sweden, the yearly revenues generated from online are about SEK 2 billion, which should be compared with the revenues from IT and telecom of nearly SEK 200 billion. The international online market revenues are around SEK 300 billion, while the IT and telecom revenues are SEK 15,000-20,000 billion.

Government subsidies – help or hindrance?

Let me take this opportunity to somewhat discuss the government's role in the development of online. Even as late as 1985, there was not a single online service in Europe that was profitable. They were operated largely by authorities, universities and other organizations in the public sector - or were funded by the government. At the same time, a number of commercial services in the USA developed into large, profitable services. Well-known online industry analyst Harry Collier (now Managing Director of Infonortics, which he founded in 1987) felt that the difference was due to the government investments and subsidies, which he said hindered rather than helped the development of information provision in general, since they hampered the prospects to start and operate commercial and profitable services due to unfair competition from the government funded.

I was at that time sceptical about his views but am now inclined to give him partly right. Interestingly enough, the same views, at long last, are now expressed in the *Directive 2003/98/EC of the European Parliament and of the Council of 17 November 2003 on the re-use of public sector information,* commonly called the *PSI-directive* (15). The directive stipulates that the authorities whenever possible are obliged to stimulate commercial re-use of information produced by the authorities, for example by providing it on low-cost to those interested in exploiting it, and by avoiding to compete with low-priced information when offered from own online services.

To what extent the directive will lead to any significant changes is still unclear as of this writing. There are strong demands from politicians, media, and others, for free access to public information.

In addition, the authorities themselves have a strong interest in publishing and managing their information on the Web. Both of these phenomena may, however, obstruct the ambition to encourage the market. Incidentally, the one hand is not knowing what the other is doing. The fact is that the European Commission's "*eEurope 2005 Action Plan*" (16) states the importance of strengthening the European information industry, which may be realized, among other things, by subsidizing various initiatives in this field. Some of these actions may in fact hamper competition.

In this matter, it can be interesting with a backward glance at the 1990s and the EU programme IMPACT. At the time there was talk about the importance of supporting information services in Europe as a means to neutralize the US dominance in the information sector and reduce the EU's dependence on US services. Thus, that were arguments that are not relevant today, in 2006, as much of the information industry is now European, including such international giants as the publishers Reed Elsevier (Netherlands) and Wolters Kluwer (Netherlands) and the leading financial service Reuters (UK). In this matter it may be mentioned that among Reed Elseviers many acquisitions is the American online service LexisNexis, acquired in 1994. Moreover, giant international publisher Thomson Corp. is Canadian, noting that in 1996 Thomson Corp. acquired the US corporation West Publishing (with the leading online service within the legal area Westlaw) and in 2000 DIALOG.

6.2 1979-1989

1979

Let me now return to 1979. As mentioned, ESA/IRS, DIALOG and SDC/Orbit were in clear dominance as regards Swedish use of foreign online services. Together they accounted for 4,500 search hours out of less than 10,000 search hours in total, including the use of Swedish online services (Table 6.1). But the "dependency" of foreign information was in fact greater than these figure indicate, namely over 60 %. This is due to the use of MEDLARS-at-MIC, most of which was use of foreign databases.

The dominance of ESA/IRS, DIALOG and SDC/Orbit was mainly due to their wide range of databases compared with other online services. Besides, we as intermediaries, as well as other users, were so familiar with the search languages of these services, in particular those very similar to that of ESA/IRS and DIALOG, that we only reluctantly took on some of the new online services, with other search languages, that from the end of the 1970s were being established at an ever accelerating pace. And it was done only if there were no appropriate database at the online services that we already were familiar with.

As stated in table 6.1, the online service most used by Swedish users was ESA/IRS. Although DIALOG had more databases and a similar search language, ESA/IRS was most often preferred. The three main reasons for this were lower communication costs, easier access and - perhaps most importantly - local presence, in the form of IDC-KTHB as a national centre. As a matter of fact, with 2,000 search hours in 1979, Sweden was the largest user of ESA/IRS, measured per capita. Second was the Netherlands with 1,900 search hours. Only Britain with 3,900 search hours and France with 2,800 were larger in absolute terms. The total use of the ESA/IRS service in 1979 was about 15,000 search hours.

ESA/IRS, DIALOG and SDC/Orbit had a major role also in the other Nordic countries. This is clear from Table 6.2, which presents data on the use of the ESA/IRS for one year 1979/1980, and the use of the two telecom networks Tymnet and Telenet in 1980 (17). Tymnet and Telenet were used for accessing DIALOG, SDC/Orbit and other North American online services. The table also reports the total use of SCANNET in the Nordic region in 1980. SCANNET was used mainly for accessing Nordic online services. Important to note in this context, however, is that those networks to some extent were used also for other activities than online searching (file transfer, messaging, etc.). Table 6.2 also reports the number of combined users of Tymnet and Telenet and the number of passwords to SCANNET in 1980. It can be noted that the number of passwords in 1979 to SCANNET was 300, which fell to 191 in 1980 after a fee was introduced.

ESA/IRS 1979/1980		**TYMNET and TELENET 1980**		**SCANNET 1980**	
	Usage (search hours)	Usage (search hours)	Number of users	Usage (search hours)	Number of passwords
Danmark	900	600	76	n/a	33
Finland	120	2,040	80	n/a	20
Norway	1,320	1,776	46	n/a	53
Sweden	2,460	7,200	200	n/a	85
Total	4,800	11,616	402	8,000	191

Table 6.2 Use of ESA/IRS in 1979/1980 (one year), combined use of Tymnet and Telenet in 1980 and use of SCANNET 1980, and number of combined users to Tymnet and Telenet in 1980 and number of passwords to SCANNET in 1980.

On the basis of (7), I estimate the number of search hours in Finland in 1979 at about 4,000 and the number of organizations that use online at about 70. The latter figure indicates that the number of users in Finland during this period may amount to a few hundred. As mentioned above, the number of search hours in Sweden in 1979 was about 10,000. The number of users was about 500 (80 % of them intermediaries) (10). On the basis of these data, the data in Table 6.2, and the reservation that the networks also were used for activities other than online searching, the number of search hours in the Nordic region in 1979 can be estimated at 20,000-25,000. The number of Nordic online users at the end of the same year can be estimated at 1,000-1,500, a vast majority of them intermediaries.

ESA/IRS, DIALOG and SDC/Orbit had a dominant role also in the rest of Europe. But globally, Mead Data Central (USA, with the online service within the legal area Lexis), DIALOG and SDC/Orbit were the largest. This reflects clearly the United States dominance on the market at that time, accounting for perhaps 90 % of the global use and revenues (18). In 1979, DIALOG alone had presumably about 6,000 users and DIALOG, SDC/Orbit and BRS (Bibliographic Retrieval Service, USA) together approximately 15,000 users. As for ESA/IRS I would guess about 2,000 users.

The global use was in the range of 700,000 search hours and the number of online users maybe 50,000. This means that the Nordic region's share was about 3 % of the search hours and 2.5 % of the online users The Nordic share of revenues is very difficult to report due to lack of data. On the basis of the average search hour cost the Nordic market for online 1979 can be roughly estimated at SEK 15-20 million. That means 1 % or slightly more out of a global market then worth SEK 1-2 billion as regards text-based online services (including DIALOG, Mead Data Central, etc., but not credit information services, financial services etc.).

Without even making an attempt at estimating the Nordic share, I would still like to indicate that the global market for all types of online services (ie, including credit information services, financial services, etc.) was in the range of SEK 10-15 billion (18).

Rapid database growth (which did not make everyone happy …)

In the years around 1980 the number of online services and databases grew very rapidly, internationally as well as in the Nordic region. Globally, the number of online services increased during 1979 to 1983 from about 60 to nearly 300 and the number of databases from around 400 to nearly 2,000. That meant in both cases an increase of 45 % per year, a growth rate which was not surpassed until after the breakthrough of the Web.

At that time I was working as intermediary at IDC-KTHB. In addition to online searching and SDI (Selective Dissemination of Information, or current awareness) for the SDI-service (i.e. current awareness service) EPOS/VIRA, operated by IDC-KTHB, I worked with education and training in information searching for students at the Royal Institute of Technology, KTH. In 1983, one of the slides that I showed the students illustrated the history of online and the emergence of online services. See figure 6.2. The picture was drawn by hand - this was long before Powerpoint! – and is included here as it mentions the most important international and Swedish online services at that time.

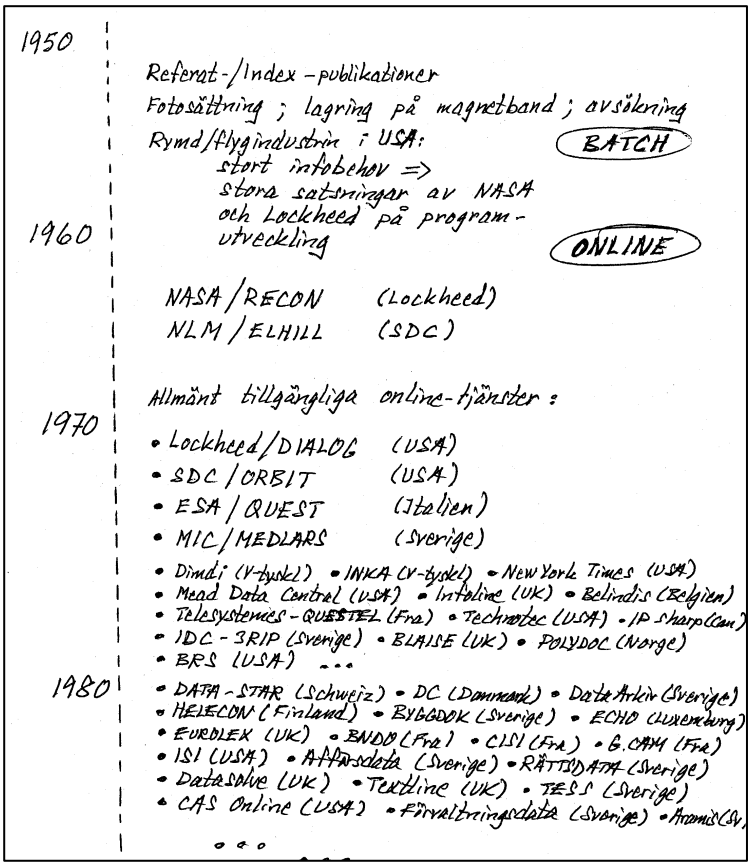

Figure 6.2 A simple drawing illustrating the emergence of online services, drawn by Lars Klasén 1983.

It goes without saying that IDC-KTHB subscribed to new online services in a steady stream, if judged relevant for the information needs of our clients. This was something that was not always so well seen among the staff of the loan department of KTHB as every new online service and database generated document orders from new sources. So when I had performed an online search for a client in such a "new" database I knew that when this client ordered original documents from the library it was only to look forward to a visit from a not-so-happy head of the loan department, who with a grim expression wondered if there really was an absolute necessity to subscribe to yet another online service: "*Why can you not be content with those you already have?*".

The fact was that many librarians, irrespective of this, in the past had a rather negative view on the phenomenon “online searching”. But around 1978, in a relatively short time, there was a 180-degree shift in attitude. There was a fascination and a notion of online as a means for satisfying every information retrieval need. I called it "*to get square eyes*" (where "square" of course alluded to the terminal screen), an early variant on the notion that "*everything is on the Web*". And we intermediaries, who could master these systems and all information contained, were seen almost as gods, like the Internet gurus that popped up after the breakthrough of the Web nearly 20 years later.

Searching for information on a database in a database

Around 1980, one of the "new" online services that IDC-KTHB started to subscribe to was NYT Infobank (New York Times Information Bank). It had been launched in the mid-1970s by the New York Times and the enterprise search engine used was a version of IMDOC.

The user dialogue with NYT Infobank was accomplished in a user interface based on TTY (a terminal based protocol which was then the de facto standard for online database access and searching) but in a new way. The novelty was a menu based interface, which guided the user through the dialogue with the system by means of questioning-answering, instead of the prevalent command-based search language. Step by step the system first invited the user to choose his/her subject field, then to type relevant words describing the issue. The system then presented an answer in the form of a list of supposedly relevant references. From this list, full-text display of selected references could be requested or, if no references were relevant, perform a new search.

Hur söker man information om en databas? Jo, i en databas . . .

Operatören ringer upp Amsterdam. Kontakt.

Nu skickas signalen via satellit till New York och knackar på dörren hos The Information Bank. Kontakt.

Vi släpps in och kan sitta i Stockholm och söka material om IRIS i New York Times stora stora elektroniska faktabas.

För var ska man leta efter information om en databas om inte i en databas. . .

"Host is online"

Bokstäverna sprutar fram över terminalskärmen på Tekniska Högskolans informations- och dokumentationscentral vid Östra Station i Stockholm.

"Värden är inkopplad. Välj termer."

Operatören knackar ner bokstäverna

Figure 6.3 Press clip featuring online searching for information about IRIS. Headline: "Where to find information about a database? Well, in a database ...". Source: (19).

The aim of the question-answer interface was obviously good, but for me as an intermediary and "online veteran" it was extremely frustrating to be locked into this predetermined dialogue instead of being able to use an admittedly complex but highly flexible search languages provided by services such as DIALOG and ESA/IRS. The fact was that the user dialogue of NYT Infobank even for many end users (users seeking information for their own use) was found not to be simple enough. May be for that reason the NYT Infobank did not succeed as expected and was shut down after a few years. Or may be it was because most online users at this time were actually intermediaries, accustomed to command-based search languages.

One of the searches I carried out in the NYT Infobank is especially interesting in historical perspective. This was in 1982 and the search was commissioned by a journalist who had heard of something called IRIS, the International Reporting Information Systems, which he wanted to know more about. IRIS, which the journalist later in an article named "*the intelligence service of the private business sector*" and "*the big companies´ eye in the Third World*", was an organization with a system in operation at a supercomputer in Washington. It invested substantial resources to develop a search system for searching a database containing information about political events, especially those relating to the Third World.

The information for IRIS was gathered by the ten owner companies that had analysts and other personnel in all corners of the world. IRIS was especially interesting as far as Sweden is concerned. Two of the owners were namely Swedish, one was the insurance giant Skandia and the other Gustaf Douglas, former CEO of Dagens Nyheter, Sweden´s largest newspaper publisher. Furthermore, the Swedish car manufacturer Volvo was also involved.

I carried out the search in the NYT Infobank in the way that was so common at this time, i.e. with the client by my side. I can not recall how satisfied the journalist was with the retrieved information. He was however so fascinated by the experience itself, i.e. to search a database online, that he wrote a separate article about the search as such. The headline was "*How to search information about a database? Well, in a database ...*" and it gives a vivid description of how a database search at that time could be perceived from a client's perspective (19). An excerpt from the article is shown in Figure 6.3.

Although I did not manage to get that much relevant information, the journalist was clearly impressed by the existence of this kind of sources available and how much information was hidden in the fully open sources, searchable by publicly available online services. Despite his profession, he had only slight knowledge about them. This is one of many examples of how unknown databases and online services were at this time. This was something that we who worked in the online industry were concerned about. This meant that there was an enormous resource that was far from utilized to the extent that it was worth. Furthermore, it meant that the revenues of the online services did not increase at the pace that was in fact possible – and, therefore, nor the industry and the online services.

What happened to IRIS and its database? Well, the story of this provides a further example of how unknown online and databases were. The fact is that the owners had started IRIS without realizing how much information was available in open sources. When it eventually dawned upon them that much of the information that their analysts and staff spent vast resources to collect, store and make searchable in IRIS was already available online from the NYT Infobank, DIALOG, LexisNexis, etc. - they decided to shut down the system!

The beginning of the 1980s

Not only online services and databases, but also the number of users grew rapidly during the years around and after 1980. In 1984, the number of online users in the Nordic region had reached about 7,000. The estimate is based on the number of users in Sweden, which was about 2,200, and in Finland, perhaps as many. The latter is based on the fact that the number of organizations in Finland using online was 550.

Thus, the Nordic region had about 4 % of the online users in the world, then amounting to 150,000-200,000. This refers only to online services in the text-based sector. Including all kinds of online services, including also financial services, videotex etc., the number of users in the world was over one million.

Of particular interest for Sweden was that in 1984 the number of end users surpassed the number of intermediaries. At the end of the year, there were about 1,300 end users and about 900 intermediaries. Probably the shift occurred at about the same time in the other Nordic countries. In the United States, where the development was ahead of the rest of the world, a similar shift occurred 4-5 years earlier. It explains that the end users globally at this point were about five times as many as the intermediaries, who were 30,000-35,000.

The large influx of users meant, of course, an equally rapid growth of online use. The total Nordic online use in 1984 I estimate at about 80,000 search hours. That meant about 2 % of the global use, which was 4-5 million search hours. The number of search hours in Finland was about 27,000 and in Sweden about 32,000.

Despite the distribution of number of intermediaries and end users, i.e. more and more end users, intermediaries yet for some time accounted for the majority of the search volume. See Figure 6.4, which shows the situation in Sweden 1979-1985 (10).

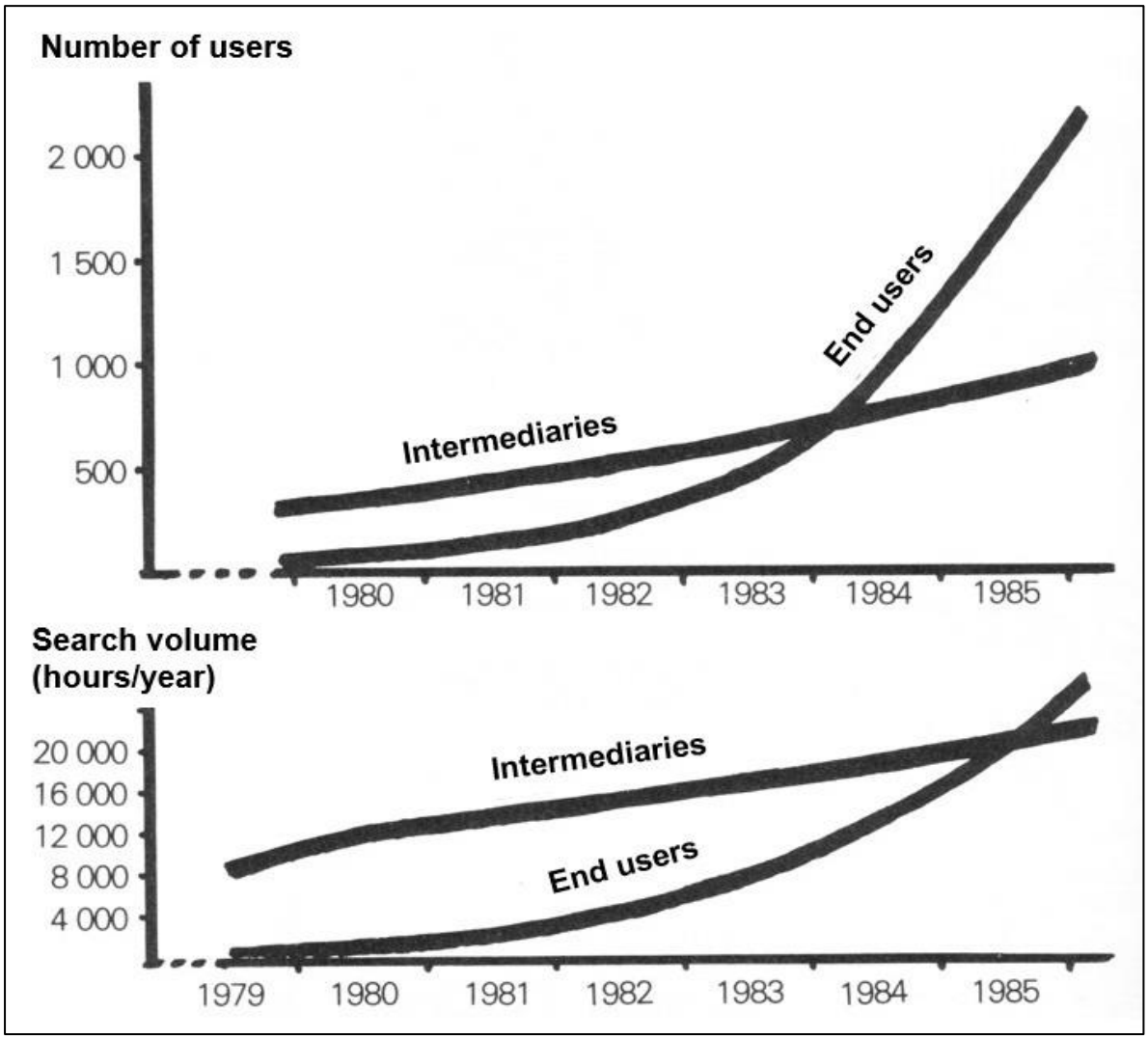

Figure 6.4 A comparison of intermediaries and end-users in Sweden as regards their number and search volume 1979-1985. Source: (10).

The share of search volume relating to domestic online services grew as the number of these increased. The same was true in most countries except perhaps the United States, due to the large foreign use of many of their online services. In connection with the above-mentioned study of the Swedish online use, conducted in 1983 (9) I illustrated the situation in the form of a flow chart, reproduced in Figure 6.5.

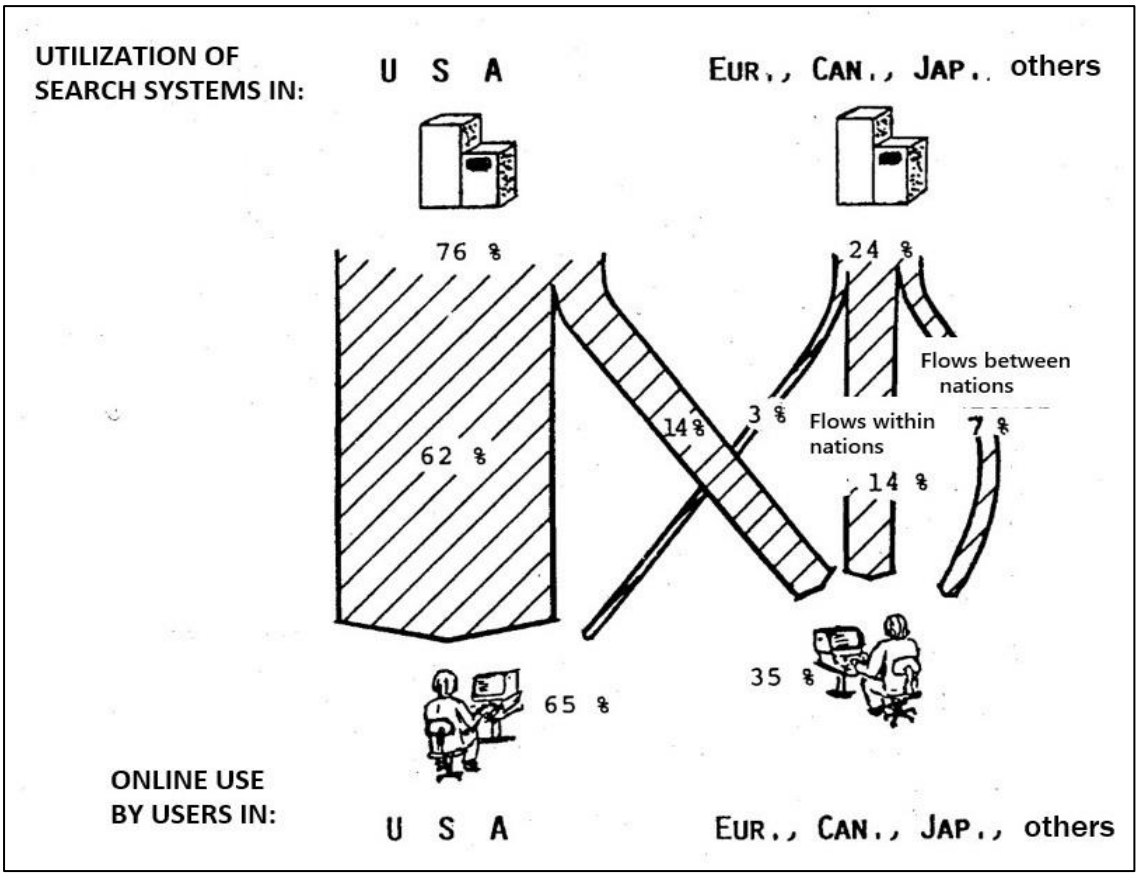

Figure 6.5 Information flows related to online in 1983. Arrows show direction of flows; their width show search volume. Percentages indicates share of global search volume in 1983. (Total search volume 1983: 2-3 million search hours, 10-12 million searches). Source: (9).

Data from Sweden and Finland for 1984/85 and 1985 show that the use of domestic online services at that time had surpassed the use of foreign services and now was 57 % and 56 % respectively of the total. See Table 6.3, which also reports the share of use of online services in other regions.

	Finland 1985	Sweden 1984/85
Domestic online services	56 %	57 %
USA	20 %	18 %
Canada	3 %	3 %
Europe (excl. domestic, i.e. Finnish resp. Swedish, online services)	15 %	20 %
Others	6 %	2 %

Table 6.3 The Finnish and Swedish online use (measured in search hours), distributed on online services in different regions in 1985 and 1984/85 respectively.

As shown in Table 6.3, the distribution of online use in different regions was very similar in the two countries and one can assume that about the same distribution was true as regards the Nordic region in general.

In Sweden, the most used service in 1984 was MEDLARS-at-MIC, accounting for 7,500 search hours. This reflected the international situation, with the medical field as one of the largest in terms of search volume. Next came DIALOG with 4,500 search hours, ESA/IRS with 4,000 search hours, the Swedish business information online service DataArkiv with 2,500 search hours and DAFA/Rättsbanken with 2,200 search hours.

In Finland, in 1985 the most used service was 3RIP (TENTTU, Tali – references to technical journal articles in Finnish) with close to 13,000 search hours. The second most used was MINTTU (VTKK/Finlex - legal information, and some other information) with 10,500 search hours. DIALOG had 4,800 search hours and ESA/IRS about 950.

In this context it is interesting to note the high ranking of the online legal information services, i.e. in Sweden DAFA/Rättsbanken and in Finland MINTTU (VTKK/Finlex). In fact, the use of these were even higher than indicated, because the database producers' own use of their databases is not included. Legal information was also internationally a very large field in online. Only the field of medicine could match it in terms of search volume.

The most used foreign online service in Finland and Sweden 1984/85 was thus DIALOG, with ESA/IRS in second place. It is likely that the same was true in Denmark and Norway, and thus also in the Nordic region as a whole. In terms of revenues the Nordic region may have accounted for around SEK 40 million of the global market, estimated at SEK 3-4 billion, which means a share of just more than 1 %. The data refers to the use of services with text-based information. The global revenues including all types of services, including also financial, videotex etc., was SEK 30-40 billion.

NORDGUIDE in perspective

NORDINFO's 1978 inventory of databases and data banks in the Nordic region (20) partially met the ambition to increase the general knowledge of these resources. The survey, however, was quickly out of date and therefore it was decided in Sweden in 1981 to carry out a new inventory, aiming at a Swedish database guide, funded by the DFI. The work was accomplished by IDC-KTHB under the supervision of Winnie Hemborg. When publishing approached, I think it was in the summer of 1983, it was about time to name the inventory and guide. The matter was resolved at a working lunch with myself, Winnie Hemborg and another two people from IDC-KTHB. Our ”brainstorm” resulted in the acronym DOLDIS, which in Swedish is a nickname for ”unknown” (person or object), thus - with regard to the poor knowledge of databases - was an appropriate name indeed! Then it was an easy task to come up with terms explaining the letters: Directory of Online Databases In Sweden (21)!

DOLDIS would have been an appropriate name also for the Nordic successor, namely Nordic Database Guide (22), or NORDGUIDE, which was published in its first version in 1985. The history tells us that. NORDGUIDE was updated and new versions published about every second year until 2003, when it was discontinued. I expressed my reactions to this in an article published in 2003 (23), from which some excerpts are found below. My purpose was to draw attention to the change of attitude in the library sector since the 1980s, which I found remarkable. From the ambition to spread knowledge about information resources in general it now demonstrated an ambition limited to primarily include free resources. This I believe meant a subsequent poor knowledge of online services. It should be observed that NORDGUIDE contained data on information resources (for professional use) of any kind, regardless of free of fee-based.

> *"A sad fact is that […] NORDGUIDE has always been far too unknown - and therefore underutilized. It is true that the printed version of NORDGUIDE got some circulation in the library sector - but the awareness and use of the corresponding database has always been*

> *very small. That this was the case during the time when it was available at the online services InfoTorg and MIC-KIBIC in the late 1980s was not surprising in light of the low online use at the time.*
>
> *One would think that many of the Swedish Web search sites and link lists should have NORDGUIDE as a natural ingredient. This, if any of the publicly-supported search sites, provides guidance to large, reputable collections of sources of information in almost all disciplines – i.e. the main object for the search and link places in general. But not in this case! Just a few of the very many search and link sites that started in the late 1990s included NORDGUIDE. And this applied equally to publicly supported and other sites. Often it was probably due to pure lack of knowledge; their editors simply did not know about it; but often it was because they just linked to free resources. Sure, NORDGUIDE was free on the Web - but because it essentially listed fee-based services it was considered not ”clean”. The syndrome of the time was, as we know, "information wants to be free". And the situation is much the same now [2003]."*

The text mentions that NORDGUIDE was available at the online service InfoTorg. InfoTorg was then operated by the government-owned computer service centre DAFA Data AB. Representing DAFA Data AB, I was myself involved in the negotiations in 1987 preceding the set up of the guide in InfoTorg. I recall that the negotiations with NORDINFO, represented by Teodora Oker-Blom, was rather tough as regards fees. At this time, in the late 1980s, most database producers I negotiated with had an overconfidence in the value of and the market for their databases. NORDINFO was no exception, even if they were not among the most demanding. I met several producers insisting on unrealistic compensation, major influence on the database set up at the search system, or, in one case, taking part in the selection of a new enterprise search systems for InfoTorg!

Finally it can be mentioned that the national database guides in Norway (Norbase) and Denmark (Databaser.dk) were already shut down when NORDGUIDE was buried.

Searching - more than online

At IDC-KTHB, one of my duties was education and training in information searching for students at KTH. One important element in this was manual searching in printed abstract and index publications. We who managed the courses considered this important from an educational point of view. The concrete, "visual" experience to search in thick, printed ”books” simply gave a better insight into the types of sources and large amounts of information covered than the 'abstract' experience online could provide. Equally important was to show that the databases by no means covered everything. We simply wanted to compensate for the "*square eyes syndrome*", which I called the blind faith on database search that often occurred among those who saw online searching for the first time.

I myself got a practical lesson on the ”real nature” of information retrieval when I in 1982 took part in the build up and launch of one of Sweden's first information brokers, namely SVP/Interfact Internationell Faktasökning AB. I performed this together with the owners Lars Save (now 2006 CEO of Bisnode, the largest group of companies within online and databases in the Nordic region) and Sven Hamrefors (now a researcher at the Stockholm School of Economics). Customers of SVP/Interfact were mostly from major industrial and export companies. From my work at IDC-KTHB I was accustomed to that requests for information retrieval almost always were appropriate for online database searching. Now I learnt that the main source for information searching by far was: the telephone! I then regarded its "importance" for information retrieval in general to around 50 %, while online database searching accounted for just around 5 %!

Figure 6.6 The author in action during educational activities at IDC-KTHB, here teaching students manual searching in Science Citation Index. Screenshot from a TV programme from the Swedish Educational Broadcasting Company (UR) that was broadcast for the first time in October 1979.

SVP/Interfact was a node in SVP, an international network of information brokers. It was very convenient to have access to this network when searching for local information. I recall, among others, a request from a customer that meant investigating the market for dental floss in France and another request that concerned industrial robots in Japan. Instead of a tedious, doubtful and expensive database search I could just send his inquiry to the SVP nodes in Paris and Tokyo respectively. As a curiosity, worth mentioning is that this was done by telex (an international network of teleprinters)! The answer and result of the request was generally received within a day, also by telex. This method, i.e. to rely on local resources instead of performing own searches, online or manual, was indeed a very efficient means to obtain the information needed.

This reminds me of the one week auscultation I and Lars Save had at the central node of the SVP network, i.e. the SVP head office in Paris. There worked a few hundred persons who monitored the customers subject fields, which could be anything from narrow scientific fields in the research front to the film industry in France. We, who had expected a modern information centre, were disappointed. The staff sat in small, murky booths, surrounded by bookshelves loaded with newspapers, magazines, registers, books, clippings, etc. And of course a telephone. Online access? Well, there were two (!) terminals for online access somewhere in the building. And they subscribed to just two online services: DIALOG and a French online service. But their task, i.e. to satisfy their customers' information needs, both current and sporadic, was very well executed!

An interesting experience from the Swedish SVP/Interfact was that I found that many of the customers' own companies actually had own in-house libraries or information centres, with subscriptions to online services and, most importantly, skilled personnel for database searches. Why then did they engage SVP/Interfact, staffed by engineers and lawyers, instead of their own librarians and information specialists? This puzzled me - until I realized that the customers simply could not imagine that librarians could perform sophisticated database searches in their subject fields. In some cases, it was because they did not even know of their own library's existence.

It is also relevant to mention that this was about big companies, in which the employees were physically separated from the library, which was located elsewhere, maybe in another city. Another reason was that the services of SVP/Interfact were marketed to executives and other people on a high level within the corporate organizations, usually through personal visits, rather than to people in

the line, such as engineers, chemists or economists. They presented an image of high status, with online and database searching in first place - even if these in reality did not matter most.

One of the online services I subscribed to for SVP/Interfact was Affärsdata. Specializing in business and financial information, it provided articles from Swedish newspapers and magazines, including business information. This was 1982, and the service had just been launched. As one of its first customers I discovered some teething troubles and peculiarities of the system. Unlike most databases at this time the database contained articles and essays in extenso, which were full-text searchable. On the other hand, the information was not prepared in the form of structuring, descriptions etc. Thus, it was the kind of problems we now encounter when using the search engines of the Web – in fact actually worse because the online search system of Affärsdata had no relevance ranking (which, incidentally, nor had any other online search system).

Once I should search for information about the Swedish market for shoes. No matter how I searched this only resulted in articles about sports. This was because it usually was in such articles that "shoes" was mentioned ("the runner put the shoes in the starting blocks"). And there simply were no means for restricting the search, e.g. by limiting the search result to just business oriented information or to exclude articles about sports. So I contacted Affärsdata about this - which soon solved the problem simply by ceasing to include articles from the newspapers sports pages in the database!

This example demonstrates how small the world of online then was. Another example of this, also from my time at SVP/Interfact, is as follows. I was to find the components of a number of chemicals. A database named Fine Chemicals at the UK online service Pergamon InfoLine seemed ideal for this. I logged in and started to download document after document, each of which with facts about chemicals. It was slow because the speed of the communication was 1,200 bps, about 120 characters per second (which, however, was considered fast at this time).

While the output proceeded the phone rang and I answered. It was a representative from Pergamon InfoLine who wondered if I really wanted all of these documents. "*Yes, why do you ask?*" I wondered. "*Well, they are quite expensive*" she said (about SEK 200 per document, if I recall it correctly). No, I was not aware of this - I just assumed they cost about the same as regular references (i.e. about one tenth as much!). I thanked for pointing that out and immediately interrupted the output. Showing that the online service, which served the whole of Europe, apparently had so few users that its staff had one eye on basically every search performed!

Mid-1980s. Reflections on advances in technology for online

The many new databases and online services in the past few years resulted in a very fragmented online market in the mid-1980s. Later, in an article on the history of online, I stated that the market now was "*probably more fragmented than ever before or after*".

In this respect, the Nordic region was exceptional. In 1984/85 it held as many as 207 databases online, out of which nearly 200 were domestic. It meant more than 8 % of the world's over 2,000 databases. The number of online services in the Nordic region was 77, which also in this case meant more than 8 % of the global number, which was just below 1,000. This should be compared with the above statement of the Nordic region's share of revenues, just over 1 %.

In view of the fact that it, not even for international online services, was a profitable business to run online services, the position for the Nordic online services goes without saying. Sweden was in a particularly extreme situation, as it alone produced about 90 databases, which were online at 15-20

online services. I estimated that the Swedish online services (excluding financial services and videotex) during the years 1984/85 together had sales for about SEK 10 million while their operating expenditures amounted to at least SEK 40 million.

And the fragmentation, of course, also led to negative consequences for users. Later I wrote: "*one was that many users had to not only have contracts with several online services, administer the mailings from these, pay multiple invoices, etc., but also learn several search languages because almost every database host had its own*".

This of course gave birth to reflections on methods to overcome the problems. Here are some excerpts from my article in the journal Databasen 1985:1 with the appealing title "*Soon, we are going to search information on our own terms*" (24), which, in addition to a discussion of technological development paths, presented my view of the future. (*Note: Now with the answer in our hand, it might be interesting to have a closer look at my predictions. This, however, is not the place for this so I will leave it to the reader*).

> *"Through the services that he/she, or his/her organization, subscribes to, the user will have access to information – simply. Thanks to user friendly navigation on the screen, by menus, question-answer systems or otherwise, the user is guided to a relevant "subset" in which then the search takes place. The fact that this "subset" in reality might consists of multiple databases is irrelevant to the user. Equally irrelevant is where the databases or" parts "are physically located. [...]*
>
> *Some development paths, each of which can provide the user means to search a large number of databases, hosted at different online services, have been discussed in the industry in recent times. One of these is based on the fact that online searches will largely be carried out at devices with local intelligence (microcomputers, word processors, etc.). Searches thus should be carried out by means of a specially developed local software, which handles [...] selection of appropriate database(s) and online service(s), dial in, login and logout, and also provides means for the user to either use a search language by own choice or a menu-driven system. [...There] is on the market already a number of software products that offer features like these. A coordinated industry project could relatively quickly develop to a high quality product, which also could be prepared with access to a wide range of online services and databases.*
>
> *Two other development paths are based on the possibilities to communicate between computers. One of these paths is based on a cooperation between a number of online services, which agree on a "hub", a central point of access, connected to these services. The users access a hub, which automatically directs them to relevant database(s) and online service(s). There is no need for specialized devices or local software.*
>
> *Some hubs of this kind, but with a limited number of online services, have recently been established in the US. Most famous is Easynet, operated by Telebase, USA, which today provides common access to Dialog, BRS, SDC, NewsNet, Pergamon InfoLine, Questel, VU/Text, Dow Jones News/Retrieval and Wilsonline.*
>
> *The other path is also based on a hub functioning in much the same way as described above, but in this case the hub is owned and managed by an online service. By agreements with and connection to other online services the customers of the first service can access and search databases even in these. After logging in, the user can access any of the others. [...] There are many examples of this kind of collaboration. [...] One example is ESA/IRS in*

> *Italy, which gives its customers access also to Textline (UK), and DataArkiv (Sweden), which in turn gives access to DataStar, Switzerland.*
>
> *I think the "hub"-principle has advantages over a local software. Thanks to the central, powerful, computer, it can provide users with a wider range of information and more extensive search assistance than what a local solution is capable of. It can provide simultaneous searching in multiple databases at different online services, and it may eventually offer truly advanced search assistance, based on artificial intelligence. But the further development will clearly include all three paths described above (...).*
>
> *In this context, we must not forget the progress in "user-friendly" direction that we can witness on the online services. For example, there may well turn out that anyone, without any search language skills or search help, in a not so distant future can search in any database, regardless of online service. Basically, only the physical communication remains to be arranged."*

At this time there was a discussion in Sweden about the demand for a national co-ordination of databases. One manifestation of this was the symposium "*Information databases - an arena for coordination and standardization?*" organized by Humanistisk-samhällsvetenskapliga forskningsrådet, HSFR (The Swedish Council for Reseach in the Humanities and Social Sciences) and DFI in October 1986. Prior to the symposium, I described my vision on "*the ideal situation"* as follows: *"... from the users point of view, perhaps the best solution would be a single large Swedish database host with all the databases listed that now are scattered on different hosts*." (25)

I did, however, not consider this ideal feasible. As a more realistic goal, I therefore suggested a "divided co-ordination", based on the groups of "*large, growing database hosts*" that then had emerged within 6 fields. These fields were business information, legal information, medicine/biology, environment, society/culture/humanities and technology/industry/production. The co-ordination would, as I wrote, not have to be based on "one central computer operation" but could just as well be taken care of by "*local computers in conjunction with a central computer*" or by "*users with personal computers capable of local search in large amounts of information*". Based on their current roles on the market, obvious candidate for business information was DataArkiv or its competitor Affärsdata, for legal information DAFA/Rättsbanken and for medicine/biomedicine MEDLARS-at-MIC.

Around 1983 there was an effort at co-ordination in the field of engineering/industry/production. The starting point was to unite 9 databases, scattered on various online services, for a joint online service. This was, however not realized in full, partly due to egoistic reasons. The online service that eventually was materialized, Teknisk Ekonomisk Sökservice, TESS (Technical Economic Search Service), consisted of just four databases from four producers. These were Jernkontoret, Mekanförbundet, Standardiseringskommissionen and Tekniska Nomenklaturcentralen. Maybe the most important among the online services that opted out was Byggdok (Swedish Institute of Building Documentation).

TESS was discontinued after only a few years of operation because it did not pay. Yet the market for online in general had grown as anticipated. Not expected, however, was that the revenues would be distributed on ever-more online services. If also Byggdok had joined, the venture had most certainly become more successful – and perhaps even rescued Byggdok for the future. Instead, Byggdok continued to operate its own online service, though not profitable, until 2003. Then the owners decided to discontinue the service – but in the last moment InfoTorg took over. But after another three years of operation InfoTorg had to close it down definitively.

Meanwhile, some of the other database producers, originally projected for TESS with their databases, instead realized their own joint online service, ARAMIS, with databases in the field of environment. These producers were Arbetarskyddsstyrelsen/Arbetslivsinstitutet (National Board of Occupational Safety and Health/National Institute for Working Life), Arbetslivscentrum (Center for Working Life) and Statens Naturvårdsverk (Swedish Environmental Protection Agency). But even ARAMIS got such a low usage that it was not possible to justify it financially. In 1989 the service was terminated.

Late 1980s. Nordic specialities: official registers and information marketplaces

From about 1986, the rapid growth of new databases and online services began to slow down and was replaced by a period of expansion and consolidation. A handful of online services in each of the Nordic countries grew in terms of number of users, number of databases, usage, revenues, etc., while the rest remained small and of little importance for online use in general. Some online services and databases were closed down. The general structure of the market we have today 2006 was established during this period.

It was also during this period that the major, government-owned central registers in each of the Nordic countries were established as online services, available also for other than the authorities themselves, e.g. companies and organizations. Here called official registers, these registers had developed mainly during the 1970s and thereabout, with the purpose of administering information on persons, vehicles, real estate, businesses, patents, trademarks, statistics, library catalogues, legal information, and more. The Nordic countries are quite unique in the world as regards early and comprehensive nationwide investments of this kind. This phenomenon represents one example of a Nordic characteristic and common feature.

The operation of the registers was managed by the government-owned computer service centres that had been established in each country. All have later on been privatized - also a common feature for the Nordic countries. In Denmark, I/S Datacentralen af 1959 initially was in charge of the operation. This computer service centre in 1991 was transformed into a limited company which in 1996 became part of Computer Sciences Corporation, CSC. In the mid-1990s the registers was accessible via an online service called Infotorv. Now 2006 most registers are relocated primarily to authorities and Infotorv has closed.

In Finland, the corresponding service was managed by the government-owned computer service centre VTKK, which in the 1990s was privatized and sold to the major IT-consultant Tieto, later TietoEnator. Some registers have been outsourced but almost all are distributed by and can be accessed through the online service, or "information marketplace", ePortti. ePortti was started by Tieto/TietoEnator but was in 2006 sold to the publisher Kauppalehti, which is part of the media group Alma Media.

In Norway, Statens Datasentral (SDS) was in charge of the operation of the government-owned registers. SDS was privatized in 1986 and in 1995 acquired by Posten Norge. It has since reorganized and got the name ErgoEphorma AS, later ErgoGroup, and now in 2006 provides most of its registers via its online service, or “information marketplace”, Infotorg.no, though some of these no longer are operated by the company.

In Sweden, the registers were located at the government-owned computer service centre Datamaskincentralen för Administrativ Databehandling, DAFA (National Center for Adminstrative Data Processing). Some of the registers were later located to computers managed by the authorities

that produced the registers. The remaining were in most cases marketed separately. DAFA was in 1986 converted into the government-owned company DAFA Data AB.

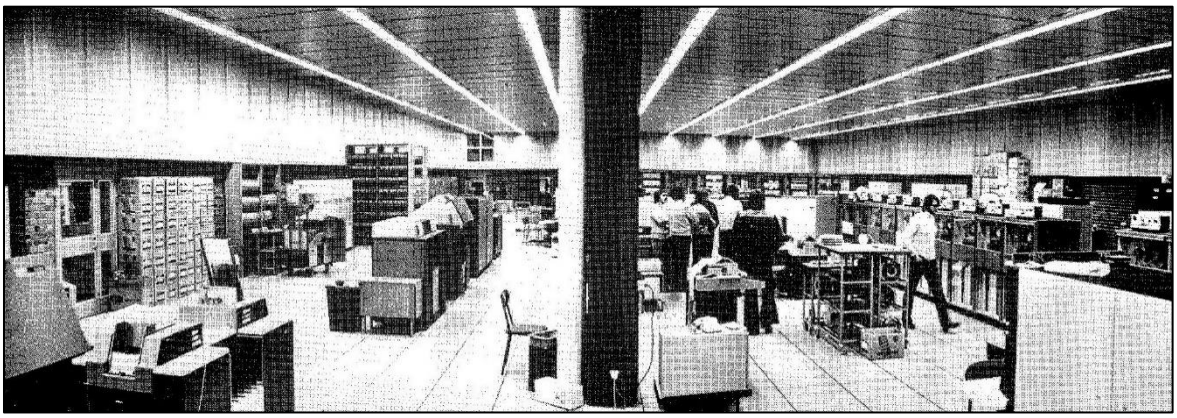

Figure 6.7 Computer hall of state computer centre DAFA in 1973, where Rättsbanken was run under IR system IMDOC. Source: DAFA-bladet (1980)10.

As an online user, I knew the benefits of being able to access and search many databases at one single online service, i.e. common access. Employed at DAFA since 1983 and active at the department managing its online services, I therefore took the initiative to and also co-ordinated activities for common access to as many databases, incl. official registers, and online services as possible, be they operated at DAFA Data AB or elsewhere. This in 1988 resulted in the launch of the “online and gateway service" (as I called it) InfoTorg, which in that way became the first "information marketplace” in the Nordic region. InfoTorg in 2006 gives common access to over 20 online services and databases, including all major Swedish official, government-owned registers, most of which are located to and operated by the producing authorities.

DAFA Data AB was in 1993 sold to the major European IT group Sema Group, which in 2001 was acquired by even bigger Schlumberger, USA. In 2003, the part of the group that was active within information management, including InfoTorg AB, formed Infodata AB. This company in 2004 became a part of the newly formed BTJ Info Data Group, which was in 2005 sold to the Bisnode group, former Bonnier Affärsinformation AB, BAF, which already owned a number of companies in the Nordic region. The part of InfoData that operated InfoTorg in 2006 became a separate company, named InfoTorg AB, within Bisnode.

I will later return to ePortti, Infotorg.no and InfoTorg, all of which belong to the leading players of the online market in their respective countries. It may be noted that these services actually manifests the "hub” principle that I described in 1985 (see above). In addition to the registers in their own operation, they provide means for accessing several others, by computer-to-computer links to the respective computer centre. And these “information marketplaces" are still there - unlike the aforementioned hubs EasyNet, ESA/IRS (with link to Textline) and DataArkiv (with link to DataStar), all of which, in their role as hubs, just got a marginal importance and no longer exist.

Legal information online: the Nordic region as a forerunner

As indicated, the Nordic region in many respects was a forerunner regarding legal information online. As early as the late 1960s, Sweden invested in a project that in the early 1970s was manifested in an

internal online service, called Rättsdata, as a work tool for employees at a number of government authorities. The service was operated by DAFA. The IR system utilized was IMDOC, developed in Sweden, thus one of the world's first advanced IR systems outside the US for free text searching in large quantities of documents in full text, such as laws and regulations, legal cases, bills, etc.

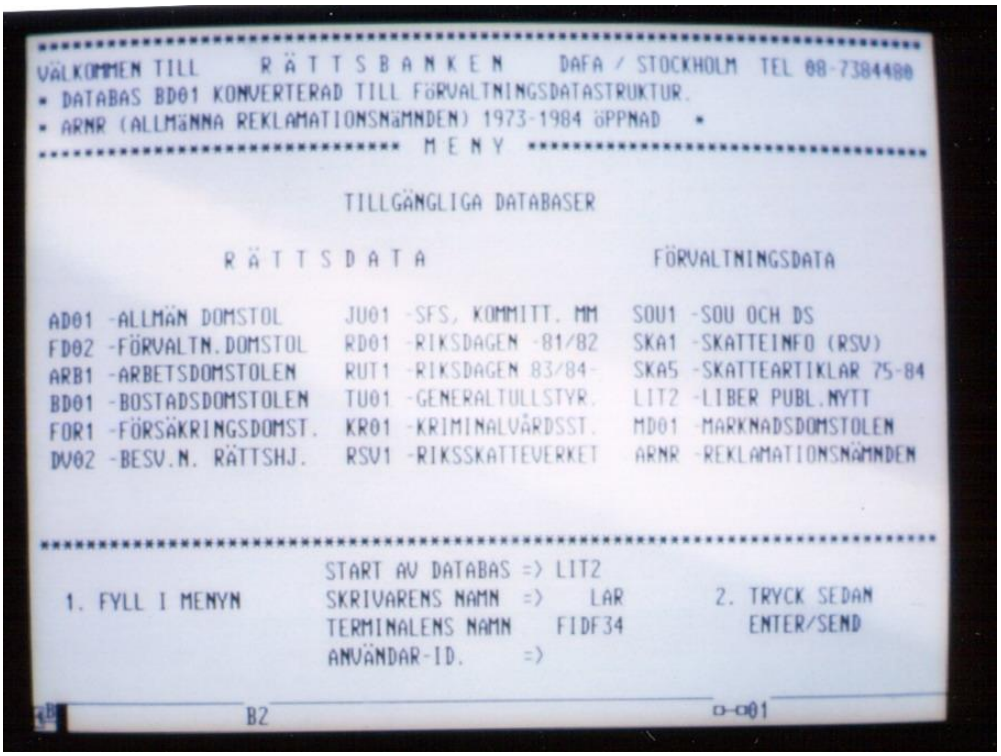

Figure 6.8 TTY terminal display of Swedish online legal information service Rättsbanken in 1984, displaying a menu of databases available online. Photo: Lars Klasén.

Rättsdata became publicly accessible in 1981. DAFA then invested in a number of new databases within the legal field, and in 1985 the extended online service was named Rättsbanken (“the legal information bank”). DAFAs goal now was to become a “full-service shop” as regards Swedish legal information, including every single official document published by the government, in full text. IMDOC was partly redesigned and modernized, subsequently renamed Find-It. In 1988, Rättsbanken, at that time a part of the newly launched InfoTorg, had about 500 customers with altogether about 2,000 online users.

One of the first tasks for me as a new employee at DAFA in 1983 was to manage the development of new databases containing legal tax information. I then spent a lot of time at the National Tax Board, which of course had access to the Rättsdata system. At that time, administrative personnel in general did not have own terminals at their desks. As a matter of fact, this was true also for most people at DAFA, including those of us working with the development of databases! To use a terminal, we had to visit a special terminal room, or, at the department at the National Tax Board where I was, a small library room.

No wonder then that the search skills of the employees at the National Tax Board were quite inadequate. Once when I was there, waiting for my turn to use the terminal, the man who used it asked for my assistance to perform a search in Rättsdata. He complained that he got too many hits, regardless of keyword used. I noted that he just used one keyword in his searches, and therefore suggested that he should refine the search with additional keywords. The man looked surprised and said: "*Really! Is it possible to use **more than one** keyword in a search query*?".

This reminds me of another occasion, when a colleague of mine got a call from a user, telling him that she by mistake had used an incorrect command in the search query. Now she was worried that the transaction (i.e. search query) "*had gone away before I could stop it, hurting the computer system*", she said. "*Manage to stop it? How?*" my colleague asked. Her answer was: *"Well, I pulled the plug really fast!*".

In 1993, the Swedish Parliament's online service Rixlex was opened. This service in a way competed with Rättsbanken. In the late 1990s, the Government decided to invest in a new online system for legal information (statutes, practices etc.), named Rättsinformationssystemet ("Legal Information System").

The system, however, does still not provide much more than a Web site composed by links to a number of government authority sites with legal information.

Figure 6.9 Tax experts at the National Tax Board performing searches in online legal information service Rättsbanken at a printing 300 baud TTY terminal. Photo: Lars Klasén, 1984.

In Denmark, the government in the late 1970s opened the legal information system Retsinformation. As mentioned, it was operated by the computer service centre I/S Datacentralen af 1959. It can be mentioned that for us who in the 1980s developed Rättsbanken, Denmark stood out as an almost ideal model for how to establish a national legal information system. In Sweden, where it was up to the authoritie's free will to provide their information online, we had to persuade one after another of them to provide Rättsbanken with their information. In Denmark, it was mandatory for the authorities to provide Retsinformation with their laws and regulations, according to strict rules and a plan which ran from 1986 to 1988, decided and ruled by the Ministry of Justice.

In 1988 Retsinformation had about 1,000 customers (contracts), which meant 1,500-2,000 users (26). As of today, CSC (former Computer Sciences Corporation) operates the service.

In Norway, legal information online has always been supplied by the legal information service Lovdata. Lovdata started in 1979 and was established as a private foundation in 1981 by the Ministry of Justice and the Faculty of Law at the University of Oslo. The search system utilized was initially an enterprise search engine system developed in the UK. It was in 1986 replaced by the Norwegian enterprise search engine SIFT (Søking i Fri Tekst), developed by Statens rasjonaliseringsdirektorat (Government Institution of Organization and Management, Norway) 1980-1986. In 1988, the number of customers was about 300, with a number of users estimated at 1,500-2,000 (26). With its centralized structure, Lovdata presents an illustrative example of a service that is in striking contrast to the decentralized approach that Sweden attempted to put in practice with Rättsinformationssystemet.

For me as a Swede, in a country with one of the world's first legal information systems, it was a little bitter to read the kind of statement that could be read in the Norwegian publication for legal informatics Lov & Data, March 2004: "*Whoever will have an idea of what we could have gotten just has to try to search for legal information online in Sweden or Denmark*". It was expressed in an article discussing how well the Lovdata fulfils its role as the national legal information service. On the other

hand, Sweden today, 2006, is proud of three well developed commercial legal information services, all of which are as good as Lovdata.

In Finland, starting in 1973 the government set up its legal information online in databases at VTKK in a service that from 1980 was provided under the name Finlex. The enterprise search engine utilized was MINTTU, a version of IMDOC. In 1988, the number of customers was about 400, representing approximately 1,500 users (26). After a government procurement the operation of Finlex in 1997 was transferred to the publisher Edita Oy, owned by the Finnish State.

Legal information became one of the biggest areas for productions on CD-ROM. So let me take this opportunity to briefly touch on this medium, which was seen as a competitor to online and actually became quite big in the mid/late 1990s. In 1997, the Nordic market for CD-ROM as regards productions for professional use and so-called "edutainment", which among other things included encyclopedias and dictionaries, was about SEK 650 million (12, 27, 28). That meant about 13 % of the size of the online market. As a matter of fact, the Lovdata revenues from CD-ROM publishing was during 1996-2000 greater than their online revenues!

Even in Sweden the market for legal information on CD-ROM was for a time in the late 1990s greater than the market for legal information online. The publishers of CD-ROM were mostly traditional legal information publishers. These productions and their users have since gradually migrated to the online and Web services that these publishers eventually started. It may be added that even if the market for legal information on CD-ROM was large, business and company information on CD-ROM was larger, though not achieving more than 5 % of the corresponding online market. After a peak around the year 2000, the market for CD-ROM gradually declined and today has only little importance.

IANI – an elegant approach

As indicated, from the mid 1980s more and more of the online use was performed through the major online services. Still, the lack of co-ordination was just as obvious and frustrating as before. To the reasons mentioned above, such as difficulties for users and unnecessarily resource-intensive database production, could now be added that the smaller databases and online services were increasingly overshadowed by the larger ones. Above, I gave an account for some of the ”development paths” considered to overcome the problems, including points of common access, hubs, and its internationally most famous manifestation, EasyNet.

It is in the light of this that we should consider the NORDINFO investment in the project IANI, Intelligent Access to Nordic Information Systems (29). IANI, carried out 1986-1993, aimed to provide common access, via one interface and one search language, to online services and databases in the Nordic region. I myself took part in the project as a consultant for the National Library of Sweden, on behalf of DAFA Data AB. LIBRIS, Sweden’s national library catalogue, was then in operation at DAFA Data and searchable under IMDOC. My task concerned the implementation of LIBRIS in IANI.

From the work with IANI, I especially recall an IANI project meeting in Copenhagen in the summer of 1987. It was only then that I got fully aware of the advanced approach of the project. The software would be kept up to date with the search languages of the connected online services by files containing formalized descriptions of these languages, which whenever necessary were downloaded automatically from the online services (file transfer). These descriptions were then transferred (translated and compiled) into a common search language, namely CCL. I was impressed but at the same time quite doubtful about the chances to achieve this ambitious goal. As a consultant, however, it was not my thing to bother about this. Anyway, LIBRIS benefited by a relatively simple

search language and became the first Swedish service that was implemented in IANI, thus searchable with CCL.

At the conference Nord IoD 1992 in Helsingborg I gave a lecture entitled "*Advances in technology and its role for common access to databases*" (30). Obviously, IANI was discussed. Here are some excerpts:

> *"In the case of IANI, where the updating procedure - in principle – was solved very elegantly by letting the software "automatically" get the basic data for updates from the online services (by file transfer), other obstacles arose. They consisted mainly of (too) extensive programming needs and insufficient capacity of the computers for which the software was designed.*
>
> *Consequently, the automatic file transfer of the IANI concept has not come to use in practice. Instead, the updates of the software have to be performed in the "traditional" way [i.e. through mailing of new disks]. This meant, however, not only disadvantages, at least not for the IANI developers as they now did not have to pay regard to the online service's ability and willingness to implement the necessary file transfer functions. Thus, they can provide the product with access to virtually any service - which in practice meant that even non-Nordic online services could be included, such as Dialog, STN, etc. [...]*
>
> *But the fact is that the IANI project even without the "software"-obstacles had had difficulties to succeed. It had then encountered the same obstacles that it was intended to overcome: namely the barriers of coordination and standardization! The IANI concept presupposes that the automatic file transfer functionality at the online services has a "standardized" design - the personal computer must always regard it as one and the same. To this can be added that IANI was (too) late in view of the rapid development of gateways on the market, with its alternative solutions to many parts of the IANI concept.*
>
> *The question one can ask is, of course: Wouldn't it have been better to (try) to convince the online services to comply with the ISO standard for search languages? Admittedly, with little hope of any major impact - but still! Each step forward in this regard will last; and each new implementation means that yet another service becomes more within easy reach (as regards searching) for any user, with any form of communication and equipment, unlike IANI, which requires TTY. Incidentally, I believe that such an implementation for most online services would be cheaper than an IANI file transfer function.*
>
> *Please do not understand this as I am belittling the IANI concept as such! On the contrary! It is, in principle, brilliant! In fact, the developers very early adopted a concept that now is nowadays more and more discussed, namely use file transfer for automatic updating of software in personal computers (for example in a corporate network)."*

This was written a few years before the breakthrough of the Web. As we all know, the concept is now commonplace. IANI thus represents an example of an almost general lesson regarding online: you have to adopt an idea or a concept at the right time - not too late, but certainly not too early! Another conclusion is of course: centralize instead of complicate! - a lesson which is confirmed by today's major search engines on the Web!

6.3 1990 and beyond

The time around 1990

Let me now proceed with presenting data on the Nordic online market. For 1989, there are data published for Finland and Sweden. In Finland the number of search hours then reached 73,000 and in Sweden about 100,000 (8, 10, 13). Table 6.4 shows how the use in 1989 and 1988/89 was distributed on use of domestic and foreign online services.

	Finland 1989	Sweden 1988/89
Domestic online services	78 %	77 %
Foreign online services	22 %	23 %

Table 6.4 The Finnish and Swedish online use (text-based services, measured in search hours), distributed on use of domestic and foreign online services in 1989 and 1988/89 respectively.

The share relating to the use of domestic services thus had increased considerably compared with 1985, when it was only 56 % (Finland) and 57 % (Sweden) (Table 6.3). Again, it is interesting to note how similar the countries were in this respect. Chances are that about the same proportion between the use of domestic and foreign services was true also for Denmark and Norway.

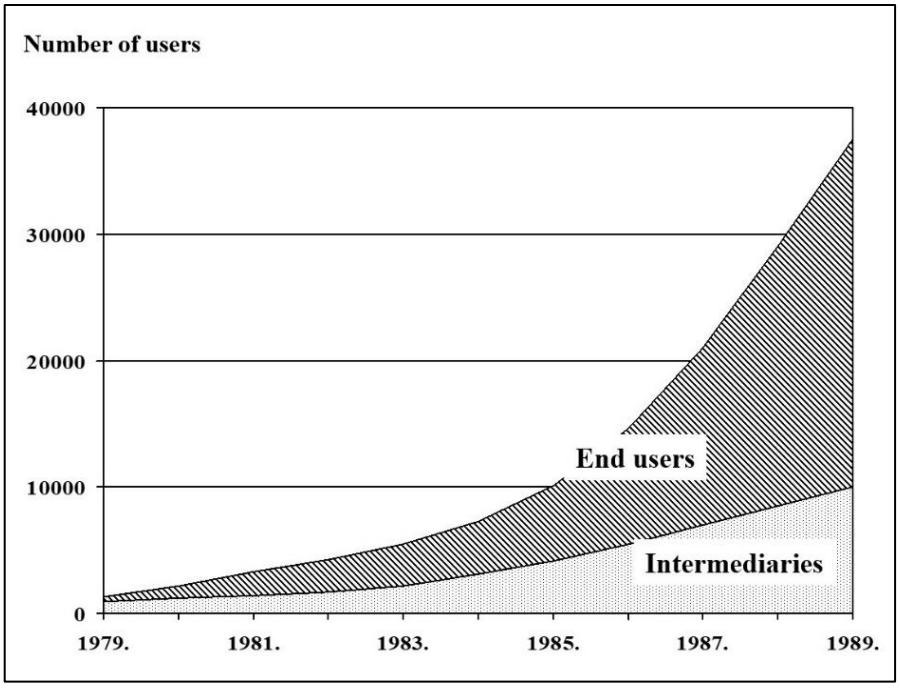

Figure 6.10 Number of online users in the Nordic region 1979-1989 in the text-based sector, distributed on intermediaries and end users.

The above indicates that the total online use in the Nordic countries in 1989 was 250,000-300,000 search hours. This means 4-5 % of the global number of search hours, which was around 6 million. The revenues are estimated at about SEK 200 million, which represents approximately 3 % of the world market for text-based information, amounting to about SEK 6 billion. These are my own estimates, based on a number of various sources (including (2)), all of which present a wide variety of figures. The number of users in 1989 in Finland was about 7,000 and in Sweden about 12,000. Thus, the number of users in Nordic region as a whole can be estimated at 35,000-40,000,

out of which about 10,000 intermediaries. This means about 3 % of the world's 1-1.5 million users, out of which maybe 100,000 intermediaries.

Figure 6.10 shows the number of online users in the Nordic countries 1979-1989, distributed on intermediaries and end users. Please note that this only relates to text-based online services.

Let me go on by presenting some figures accounting for the market growth in terms of revenues. Figure 6.11 shows the growth of the text-based sector 1979-1989.

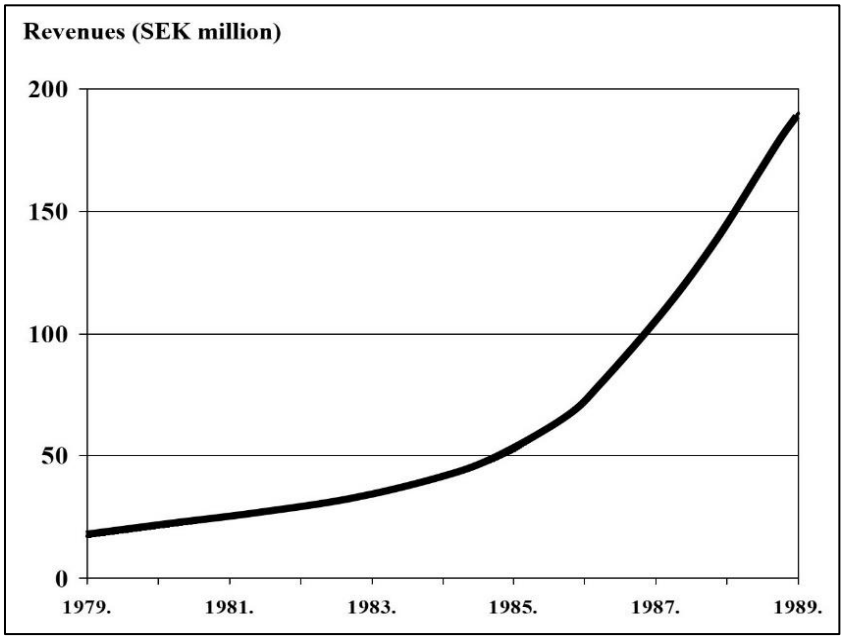

Figure 6.11 The development of the Nordic text-based online market 1979-1989. Revenues in SEK million.

Please note that the information in figure 6.11 relates to the text-based sector. From now on, I will also present facts and figures about other types, or sectors, of online, namely real-time financial information, credit information, videotex and information from official registers. During the 1990s, these sectors were increasingly integrated as especially the leading services began to provide information from more than one sector. One example is the before-mentioned "market place" InfoTorg of DAFA Data AB, from the start in 1988 providing textual databases as well as official registers, and in the course of the 1990s also credit and financial information.

Let me now give an insight into the magnitude of the ***other areas within online*** regarding the Nordic region. It can be given by estimates for Sweden 1990. This year, the total online market in Sweden was SEK 700-750 million. Of this, real-time financial information accounted for about SEK 400 million, credit information for SEK 150-200 million, videotex for SEK 40 million and information from official registers/text databases for SEK 110-120 million.

Based partly of this, the ***total Nordic online market*** in 1990 can be estimated at over SEK 2 billion. This represented about 3 % of the global market for information, all categories, which was in the order of SEK 60-70 billion. (This is my own estimation, partly based on (2)).

In the early 1990s, as a result of the market concentration many of the major online services had started to become profitable. This was true even in the "text-based" sector. In Sweden, this included MEDLARS-at-MIC, which in 1991 had about 3,500 users and 18,000 search hours (out of which 2,500 search hours from abroad, most of which emanated from the other Nordic countries) and estimated revenues of SEK 7 million, as well as Affärsdata, with 4,000 users, 14,000 search hours and estimated revenues of SEK 7 million, and Rättsbanken, with about 3,300 users, 10,000 search hours and estimated revenues of SEK 3 million.

Yet, still in 1991 the total income to the Swedish players in the text-based sector was about SEK 45 million, which was much lower than their expenditures, amounting to approximately SEK 70 million. In this context, it may be mentioned that foreign online services this year had sales of about SEK 25 million in Sweden. Most used was DIALOG with about 6,500 search hours, performed by its approximately 900 Swedish users. Next came DataStar with 800 users and 4.500 search hours, STN with 400 users and 3,500 search hours and ESA/IRS with 500 users and 3,000 search hours. Most likely, these services were also the most used in the Nordic region as a whole.

Mid-1990s; MSSTUDY

Initially, I mentioned MSSTUDY, the European Commission's major pan-European studies with a comprehensive collection of data from 17 countries in Europe, including the Nordic. The first study was related to 1994 (5) and the second to 1997/98 (6). Thanks to the same definitions used in both studies they are reasonably reliable and the data comparable with each other.

According to MSSTUDY, the market for online, all categories (including financial services, videotex, etc.) in the Nordic region was nearly SEK 3.9 billion in 1994 and slightly more than SEK 4.8 billion in 1997. The online market in Europe was SEK 35 billion in 1994 and SEK 50 billion in 1997, calculated on the basis of information in MSSTUDY. Thus, the Nordic region's share was 11 % in 1994 and 9.6 % in 1997.

Also according to MSSTUDY, the global online market was SEK 80 billion in 1994 and 115 billion in 1997. Thus, the Nordic region's share was 4.8 % in 1994 and 4.2 % in 1997. These shares are surprisingly large, which I think is because MSSTUDYs estimate of the global market is too low. According to estimations I have done in the past, the global market in 1994 was nearly SEK 100 billion, which would mean that the Nordic region's share was 3.9 %. As regards 1997, I think SEK 140 billion is a better estimation than that of MSSTUDY, which would mean that the Nordic region's share that year was 3.5 %.

The revenues in the Nordic region distributed on the countries in 1994 and 1997 respectively is shown in Table 6.5.

	1994		1997	
	Revenues	**Import share**	**Revenues**	**Import share**
Denmark	SEK 1,193 million	31 %	SEK 1,268 million	49 %
Finland	SEK 604 million	35 %	SEK 1,306 million	34 %
Iceland	SEK 72 million	93 %	SEK 89 million	95 %
Norway	SEK 1,044 million	28 %	SEK 892 million	56 %
Sweden	SEK 945 million	45 %	SEK 1,287 million	43 %
Nordic region	SEK 3,858 million	35 % *) 32 % **)	SEK 4,842 million	45 % *) 41 % **)

*) Not adjusted for internordic use
**) Adjusted for internordic use

Table 6.5 The Nordic online market 1994 and 1997 and the share of use of foreign services ("imports"). Data for Sweden is drawn from basic data of the Swedish part of MSSTUDY. Everything else is calculated from MSSTUDY by extracting data on online from the total market for electronic information, which includes CD-ROM and more.

As regards 1994 I think the data in MSSTUDY for Denmark and Norway, as accounted for in Table 6.5, is somewhat too high. The same applies to 1997 as regards Denmark and Finland. But I also think the data for Finland 1994 is too low, as it is not likely that the revenues in Finland had more than doubled in just three years. I also feel somewhat dubious about the diminished revenues in Norway. I regard all this is due to different interpretations of the definitions in the two studies and/or in the national studies of respective countries. In any case, I regard the total growth of revenues 1994-1997 per year, 8 %, reasonable.

Table 6.5 also accounts for share of imports, i.e. use of foreign online services. The figures are based on interpretations of data in MSSTUDY. They show that the proportion of the use of foreign services in the Nordic region, seen as a whole, was about one third in 1994 and just over 40 % in 1997. The increase, 13 percentage points, is due to a very strong increase of dependence on foreign services in Denmark and Norway, as reported in MSSTUDY for 1997. This is contrary to the previous trend with a faster growth of use of domestic services. The reason may be that the use of real-time financial services increased very much during this period - but it could also be due to different interpretations of the definitions. Consequently, the data must be taken with several pinches of salt.

Despite the size of MSSTUDY it lacks information about what can be regarded as the most interesting in terms of the online market, namely information on the market players, i.e. the services, database producers, etc. This is because the collection of data in most countries was done through surveys, including questionnaires to players, with the promise of confidentiality. Sweden belonged to the exceptions, and it was I, on behalf of the Swedish Agency for Administrative Development, who conducted the investigation for the Swedish parts of MSSTUDY (11, 12) as regards online. Therefore I have access to such data for Sweden, but as a matter of fact, due to my role as a project partner, data also for other countries. Table 6.6 reports previously never before published details for the five leading players as regards revenues in Europe and the Nordic region in 1997, namely Reuters, Bloomberg and Dow Jones/Bridge, both within the financial real-time information area, the credit information giant Dun & Bradstreet and the leading online service within STM DIALOG.

	Reuters	*Bloomberg*	*DJ/Bridge*	*Dun &Bradstreet*	*DIALOG*
Denmark	SEK 450 mill.	SEK 150 mill.	SEK 80 mill.	SEK 75 mill.	SEK 20 mill.
Finland	SEK 180 mill.	SEK 70 mill.	SEK 45 mill.	SEK 25 mill.	SEK 15 mill.
Iceland	SEK 5 mill.	SEK 4 mill.	SEK 2 mill.	SEK 15 mill.	SEK 1 mill.
Norway	SEK 270 mill.	SEK 60 mill.	SEK 30 mill.	SEK 75 mill.	SEK 15 mill.
Sweden	SEK 400 mill.	SEK 80 mill.	SEK 60 mill.	SEK 160 mill.	SEK 20 mill.
Nordic region	***SEK 1,305 mill.***	***SEK 364 mill.***	***SEK 217 mill.***	***SEK 350 mill.***	***SEK 70 mill.***
Europe	SEK 17,000 mill.	SEK 1,700 mill.	SEK 1,500 mill.	SEK 1,900 mill.	SEK 900 mill.
World	SEK 35,500 mill.	SEK 9,300 mill.	SEK 9,600 mill.	SEK 10,900 mill.	SEK 2,200 mill.

Table 6.6 Revenues for the five largest players, all categories, on the Nordic, European and global online information markets in 1997.

As regards the Nordic region as a whole, financial services in 1997 accounted for about half the market. Credit and company information accounted for about one fourth. Revenues from text databases (information within STM, business and legal information etc), official registers and other types of information accounted for the rest of the market, i.e. one fourth.

MSSTUDY concluded that the export from the Nordic countries, i.e. foreign use of information from national services in the Nordic countries, was small, just about 5 %. Most of this of course originated from export to other Nordic countries, thus non-Nordic use of Nordic information was very small, maybe 2 % of the total.

As previously mentioned, the Nordic countries exhibit several distinctive and common features. This was the conclusion also in MSSTUDY, which prompted the co-ordinating team to call our countries "*the phalanx of Scandinavian countries*" (5) and "*The Nordic Bloc*" (6). They also drew attention to the prominent role of the Nordic region in online. One example is the online use related to the number of inhabitants, which positions the Nordic countries well above the average. See table 6.7.

	1994	1997
Denmark	SEK 229/capita	SEK 244/capita
Finland	SEK 118/capita	SEK 256/capita
Iceland	SEK 240/capita	SEK 297/capita
Norway	SEK 243/capita	SEK 207/capita
Sweden	SEK 110/capita	SEK 148/capita
Europe total	SEK 94/capita	SEK 125/capita

Table 6.7 The Nordic and European online market in 1994 and 1997, by SEK per capita.

In a comparison between MSSTUDY I and MSSTUDY II one is struck by how little the online industry changed from 1994 to 1997, despite the major changes that followed the breakthrough of the Web. In 1994, no online service was on the Web. In 1997 almost all were there. On the Web, they met competition from a number of new players and - of course - lots of free information. The number of potential customers and users suddenly was very much larger than before. Yet, the majority of the established players and services remained, and the rate of growth stayed at around 8 % per year, i.e. almost as in the previous years in the 1990s.

Search volumes and number of online users

MSSTUDY does not report the number of search hours. Therefore I supplement with some data on this. Within the text-based sector in Sweden, I in 1994 recorded around 150,000 search hours, of which 113,000 search hours were use of Swedish online services and 37,000 search hours use of foreign online services. Already by this time the number of search hours started to become an irrelevant measure, partly because of the charging principles based on other measurements. This was accentuated with the Web adaptations carried out from 1995 by the online services when they gone to the Web, introducing partly different pricing principles. After 1997, it was no longer relevant to talk about number of search hours.

Neither the number of online users is reported in MSSTUDY. According to my own previous estimates for 1994, the number of online users in Denmark was 50,000, in Norway 64,000 and in Sweden 100,000 (10 ,31). This includes users of all categories of online services, even financial services etc. Of the Swedish users. approximately 20,000 were users of text-based services. It can be added that end users at that time were in strong majority. Of the Swedish users, approximately 4,000 were intermediaries. In Denmark intermediaries accounted for 10 % of the revenues. Based on these data, the number of Nordic users in 1994 is estimated at about 300,000, of which 60,000-80,000 were users of text-based services. The number of Nordic intermediaries was 12,000-15,000.

As regards the number of online users in 1997, I make use of the estimates reported for Sweden. They show 150,000-200,000 users, including 40,000-70,000 users of text-based services (32). In

particular the latter figure, however, is highly uncertain due to the frequent occurrence of corporate licenses, fixed-price contracts for universities etc., which makes it impossible to do more than reasonable estimates of how many people actually utilized the services.

An estimate for the Nordic region in 1997, including all types of online services, thus can be 500,000-700,000 users, of which the text-based sector accounted for 150,000-300,000. The number of intermediaries can be estimated at the order of 15,000-20000. It is important to point out that this data relates to users of fee-based services and not the number of users of free services on the Web; a number which, of course, is substantially higher.

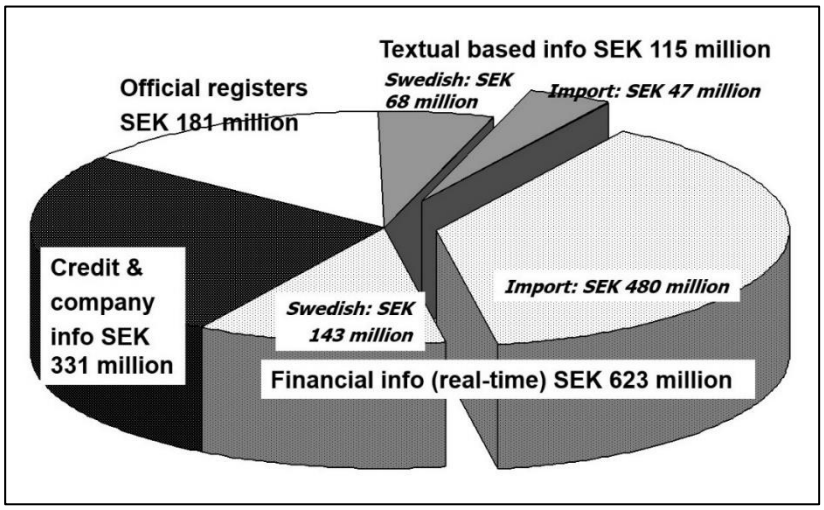

Figure 6.12 The Swedish online market 1997, distributed by sectors. Total: SEK 1,250 million.

To conclude this section, I here present a figure (Figure 6.12) showing the revenues of each sector of the online market in Sweden. This, however, also illustrates the situation as regards the relative size of the sectors in the Nordic region as a whole. It is drawn from the Swedish part of the study (12) and shows how the total revenue, SEK 1,250 million, is distributed. (*Note: MSSTUDY reports SEK 1.287 million. This is, however, due to some differences in definitions*). Note especially the dominance of the financial sector. The same was true also for most other countries. As regards the Nordic region, the part for official registers is of particular interest. It is not reported separately in the main MSSTUDY report because it is of a significant magnitude only in the Nordic countries.

From TTY to the Web

The online services were more or less taken by surprise by the breakthrough of the Web around 1994 and it was not until autumn 1995 that the first online service was available there. It was the German service DIMDI. To the best of my knowledge, the first Nordic online service that appeared on the Web was the Swedish service Byggdok. It was later that year. Now, if not before, it became quite clear to the established online services that it was to "*migrate or die!*". Without their Web presence, the many new players who made information available there (most often for free) should get free reign when it came to attract the many new users that went online. Consequently, in 1996 most other online services also became available on the Web, and by 1997 virtually all of them.

At the same time, the user interfaces and protocols (TTY, videotex, IBM 3270, Windows …) that until now had been used were put down and buried or reduced to a minor role. It is interesting to note the rapid transition from TTY and other terminal based protocols to Web interfaces. In 1998, this prompted me to write the following (32):

> *"Almost all online services – some thousands - are now available on the Web. From Swedish Bonnier Affärsdata and InfoTorg of Sema Group InfoData to the US giant in legal and business information Lexis-Nexis. Yes, it is odd to think that as late as the summer of 1995 no one was there! Now it is a matter of course. (I must, however, admit that I still have*

> *some difficulty accepting the fact that many of today's online users have never searched online other than via the Web. I was fully aware of that last fall during a conversation with some younger BHS (Swedish School of Library and Information Science) students who, despite great experience of Dialog and other online services, only had vague notions about phenomena such as asynchronous communication and TTY, which - to the extent that they had even heard about these - seemed as old-fashioned exotic as the flared pant legs of the 1960s).”*

Talking about rapid transition, I cannot resist to cite myself from a report published in the beginning of 1995 (10):

> *“In this context it may be mentioned that the means for using higher communication speeds, so far up to 9,600 bps for dial-up access, of course also influences the situation. However, it is a fact that still just a small part of the use, probably not more than a fifth, is performed by higher speeds than 2,400 bps. Access to public, commercial, online services via the Internet (*Note: this does not refer to the Web) *is not very widespread yet. Generally, I estimate it in the order of 5 % of the total use. The proportion is however increasing rapidly. As regards some services, e.g. MEDLARS-at-MIC, the proportion today maybe 10 %.”*

Today, it is hard to imagine that 9,600 bps, i.e. only one hundredth of the normal speed of today, was regarded as high speed. However, worth noting is that only plain text, requiring about 10 bits per character, was transferred, i.e. not images and other voluminous information.

Speaking of speed, I cannot help but smile a little when I recall that we at IDC-KTHB until the early 1980s called the terminal connected to the ESA/IRS computer service centre in Frascati, Italy, via a leased line, for HST, High Speed Terminal. It communicated in 2,400 bps, that is twice as fast as the 1,200 bps which was then the maximum communication speed on dial-up connections. By the way, the terminal was located in a special room and it was a little solemn to perform searches here, especially with a customer/requester present. To search online here was somewhat glorious because for years it was the only place in Sweden that could offer this "high" speed access to ESA/IRS.

In fact, searches with the speed of 1,200 bps felt most optimal at this time. This was because it was the maximum speed that allowed reading, or at least browsing, references at the same pace they were displayed at the computer screen, or printed on paper. Speaking of the latter, the standard equipment used for online until the beginning of the 1980s were printing terminals, i.e. terminals that instead of displaying the output on a screen printed it on paper. It can be mentioned that even in cases where the search was conducted via a screen, everything displayed was also printed in parallel on a printer. As the terminals were not equipped with memory, there was no other way to save the information, purchased for good money. Well, there was one method for this, namely so-called offline printing, which was then very common.

Offline printing meant that the searcher via a command could order printing at a centrally located printer, in the case of ESA/IRS in Italy, later also in Germany. The requested output was then sent by post to the addressee. Since the online search fees, usually connect time based, were very high, a method sometimes used by us intermediaries was to avoid expensive online time trying to refine a search but instead order offline printing of large amounts of references, for later review on paper in peace and quiet. My biggest offline print order consisted of approximately 4,000 references, about 1,000 pages of paper. But it was not the IDC-KTHB record. The record was held by my colleague, the online veteran in chemistry Lilianna Kanafarski, as she once had printed 6,000 references! An impressive stack of paper ... Bad for the requester; i.e. the customer, one might think. But the search was cheaper. And it resulted in a high recall …

From the beginning of the 1980s, word processors became increasingly common in the offices. They were typically equipped with the ability to communicate via modem and, therefore, possible to use for online searching. This provided a huge advantage over searching via terminal because they allowed machine readable storing of search results. It meant that these could be examined in peace and quiet afterwards and also edited before final printing of specially selected, relevant, information.

During a recent lecture for a group of university students I showed a photo (Figure 6.13) from 1985 on such equipment, consisting of a word processor (by type, IBM Series/80) with attached floppy disk (magnetic storage media) drive and external modem. Then one of them asked "*why is there a toaster right next to the word processor?*". "*Toaster?*" First I didn't understand what she meant. But then it struck me: she was referring to the large floppy disk drive with its two vertical compartments for 8 inch floppy disks –undeniably a certain similarity! After this, no one was surprised to learn that the large electronic box on top of it was a modem capable of ”high speed communication” at 1,200 bps!

TTY was the de facto standard for online searching until the breakthrough of the Web. This is well known by all online users of that time. Less known is the major role of full-screen terminals and protocols. Among these terminals, IBM 3270 should be mentioned in particular. Such terminals were used for online services specialized in specific areas, such as real-time financial information, videotex, official registers and legal information. For example, full-screen dialog was standard for most legal information services, both in the Nordic countries, such as Danish Retsinformation, Swedish Rättsbanken and Finnish Finlex, as in other countries, such as Lexis-Nexis in the United States. However, it should be mentioned that most online services with text-based information eventually also were made available via TTY; during the first half of the 1990s some also via a Windows interface.

Figure 6.13 IBM word processor IBM Series/80 including a floppy disk drive for two 8 inch floppy disks. On top of the disk drive is a modem capable of communicating at 1,200 bps. Here operated by Ulla Bakker of DAFA, it was mainly used for producing legal texts and uploading these texts to the mainframe computer of DAFA, in order to update the databases of the online legal service Rättsbanken. It could also be used for accessing online services, including searching as well as downloading and storing of search results (which were very advanced options for that time). Photo: Lars Klasén, 1986.

The full-screen terminals were permanently wired to a computer service centre via leased lines and could only be used for the services they were connected to. This in contrast to TTY terminals, which together with a modem, could be used for any online service accessible via dial-up. But full-screen terminals gave a number of advantages over the TTY. For example, the interfaces could be designed more user-friendly, with features such as function keys and use of colors. Often they were also faster

Hypertext is highlighted as one of the Web's biggest achievements. But the fact is that it already in the 1980s became possible to use hypertext features in the IBM 3270. This possibility was also utilized in the Rättsbanken interface for IBM 3270 in the late 1980s. Incidentally, the notion that hypertext came first with the Web prompted Norwegian legal information veteran Jon Bing to,

somewhat acidly, in the journal Lov & Data april 1998, point out that ”*Hypertext is actually nothing new*” - although he primarily meant the method by which judgments were referred to that was introduced by Frank Shepard in the United States back in the 1800s ...

Online services and the Web – an international view

The Web brought a number of good things. At last, here was a medium that bridged the biggest barrier to a wider use of online services, namely availability. It was also a medium that was spread far around, open to access for everyone with a personal computer, Internet connection and a standard browser. Web technology also meant that online services could be provided with easy-to-use interfaces, eliminating the need for search languages. Thus, the quest for a standardized search language for database searching was no longer relevant. Moreover, the Web and its search engines got users accustomed to information retrieval.

We, who for many years had worked with online had hoped that the breakthrough for the Web should result also in a breakthrough for database searching. But we were disappointed. The never-ceasing flow of new sites and the amounts of free information that was made available instead meant that existing online services and databases disappeared into the crowd. They simply remained as unknown as ever.

The situation was accentuated by a widespread myth from the earliest years of the Web. This myth told that in the Internet age there is no need for middlemen. On the Internet, it was said, buyers and sellers/producers would all by themselves be able to find each other and establish direct contacts. Thus, no online services, i.e. middlemen, should be required because the database producers themselves should provide their databases on the Web. By the way, neither should databases be required as the information itself, i.e. the "raw material", should be available on the Web, provided by the primary information producers!

Moreover, the never-ceasing flow of free information that was made available on the Internet gave the ordinary users a notion that information should be free; or as it was expressed: "*Information wants to be free*". The so-called dotcom boom further fuelled this notion due to the gigantic investments in new IT companies, with the Web as arena. Information became a lure; a means to attract users to one’s own Web sites. The trend was accentuated towards the end of the 1990s, when it was even talked about the Internet as something bringing a new world economic order, ”*The New Economy*”, or the information economy, where information is free.

Despite all this, the structure of the national online industry in most countries, including the Nordic, was not too much influenced. The disappearance of the middlemen turned out to be just a myth. In area after area - from e-commerce to media – it was middlemen, already established or new, that took command. In short: the laws of the market were in charge also on the Web! As for online, it proved that there was (and still is) a need for someone able to provide a co-ordinated supply of information from many different sources, ensure update and quality, handle copyright issues and refund authors and other originators, take care of invoicing, provide customer support, etc.

Within this scope, the development on the international arena still proved to be upheaval. The most turbulent period began in autumn 1997. Then the relatively small, UK-based, online player M.A.I.D (with online service Profound) acquired the much larger Knight-Ridder Information, with the online services DIALOG and DataStar, and formed The Dialog Corporation. Market analysts now talked about "*the end of online as we know it*", arguing that this event marked the end of an era (33). One of them described it in this way: *"... the question is no longer whether there are cracks in our shell. Rather the question is: What will emerge as the pieces crumble away? Will we see the start of a vital new industry or will we smell the rotten odor of decline?*" (34).

Till then in the 1990s, the ongoing market concentration had seen some major publishers and media players become increasingly dominant. Key features of this were Reed Elsevier's aforementioned acquisition of LexisNexis in 1994 and Thomson Corp.'s acquisition of West Publishing and Westlaw in 1996. The formation of The Dialog Corp. represented a break of this development; M.A.I. D was neither publisher or media player, not even big! The wave of acquisitions, with Elsevier and Thomson as the most active, continued in the late 1990s. In addition, a third major player, the publisher Wolters Kluwer, got into the game, including the acquisition of the online service Ovid in autumn 1998.

This tumultuous process, affecting the whole online industry, was brought to an end when Thomson late spring 2000 acquired (or as some said, saved) The Dialog Corp. This occurred during the same time as the air began to go out of the dotcom bubble; a process that got the market for Web advertising to more than halve within a short period. This in turn meant that competition from players who financed their operations with ads was alleviated.

Now a more quiet period for the online industry began; a period of recovery; internationally as well as nationally. And the answer to the above question "*Will we see the start of a vital new industry or will we smell the rotten odor of decline?*" was: neither … nor!

Today in 2006, we can conclude that the online industry, in principle, is where it was before the breakthrough of the Web around 1994, of course apart from the existence of search engines and other free search services on the Web. It is just bigger but above all yet more concentrated. The players who remain are largely those previously established while the majority of the "new" players are either defunct or acquired and integrated into established services. Just a few of the others have reached substantial size.

As long as the poor climate for advertising lasted, until about 2004, the acceptance of "there are no free lunches", i.e. good services costs, gradually increased. But the initial ”wave of acceptance” got stuck. Some of the services that started to charge, or planned to do so, now have backed about this when facing the risk of losing visitors. The tendency is reinforced by a renewed and steadily increasing, not to say almost explosing, interest in advertising on the Web. This in particular is true as regards keyword advertising on major search engines, such as Google and Yahoo!. It reinforces the old notion that information and information retrieval shall be free – which means even more revenues for these search engines, thus financial resources to develop services able to compete with the established online services and database producers. One example is Google Scholar for academic/scientific information.

In the Nordic region, it is primarily the many services that offer news and common business information for free on the Web that have presented, and still present, the greatest competition for the established players on the online market. On the other hand, competition from public information on the Web, provided free or for a fee, by the authorities themselves, has lately slowed down a little. The transposition into national law of the above-mentioned EU Directive on the re-use of public sector information (PSI) may have played a role in this.

6.4 The Nordic online market in 2004

The introduction of this chapter states that it “*gives an account of the development of the Nordic online market related to the international 1976-2006*”. I must, however, admit that it was not an easy task to accomplish this as regards hard data from the last period of this interval. This I learnt when I

was to finalize the research. The latest study with aggregated data about the Nordic region turned out to be MSSTUDY II, containing 1997 data! I found no national studies conducted since then. Thus, I saw no other way to realize my objective than to gather the necessary data on my own.

Concerning Sweden it was easy because I already had gathered relevant information, due to the fact that it was a part of my job in my company (i.e. business intelligence). My position as the editor 1999-2006 for a Swedish newsletter on Online helped, of course, to keep me up to date (35). As for the other countries it was more difficult. Anyhow, I think I have managed quite well as concerns Denmark and Norway. Concerning Finland, I did just manage to gather enough data for a rudimentary view of the situation. I did not investigate Iceland. The result, covering the year 2004, is presented below. Please note that all data are my own estimates and that smaller or larger deviations from the real situation may occur.

Denmark

I estimate the Danish online market in 2004 at nearly SEK 1.2 billion. The largest sector was financial real-time information, estimated at SEK 440 million, out of which SEK 340 million imports (Reuters, Bloomberg and others). The second largest sector was credit and company information, with revenues estimated at about SEK 350 million. It was dominated by Købmandsstandens Oplysnings Bureau and RKI Kredit Information, both owned by Experian, and Kraks forlag. Among the rest can be mentioned D&B, Greens and Kompass, all owned by Bonnier Affärsinformation AB, BAF (now in 2006 they are owned by Bisnode).

The Danish market for official registers is not nearly as developed as in the other Nordic countries. The reason for this is that the data is not to the same extent re-used and distributed online by commercial services. The government authority structure in Denmark means that the government takes a more active part in IT, including co-ordinating the IT activities of the authorities. This includes operating own online services, which also provide the information for external use, for free or low fees, thus limiting the market for commercial services. I was not able to study the area in more detail, but in order to perform the compilations later in this chapter - and solely for this purpose - I set the market for official registers to the order of SEK 100 million. The registers include the Centrale Personregister (persons), Centralregisteret for motorkøretøjer (motor vehicles), Ejendomsregisteret (real estate), Bygnings- og Boligregisteret (houses, apartments) and Publi-com.

The active role of the Danish government also means that the market for legal information is small. I estimate it at SEK 40 million in 2004, and as far as I can see it grows very slowly. Among commercial players are the publishers Schultz, Magnus and Thomson Karnov. The domestic market for information within media and business intelligence, with revenues of about SEK 120 million, was heavily dominated by InfoMedia. Other players in this area were Infopaq, Infostill, Visator, IDG News, Pressbox, Observer and A'Jour Klip. The area is growing quite rapidly. As regards the rest of the market for text-based information I estimate use of domestic information at SEK 30 million and use of international online services such as DIALOG, Factiva (mainly business information) etc. at SEK 70 million.

Finland

The largest area in Finland in 2004 was, as I can see it, financial real-time information, with Reuters as the largest player. The largest player within credit and company information was Soumen Asiakastieto Oy. Other players in this area were Balance Consulting (a part of Kauppalehti, owned by

the leading media group Alma Media), Credita (owned by the goverment-owned publisher Edita Oy), Talentum and D&B Finland (then owned by BAF, now by Bisnode).

Regarding official registers, a major part of the computer operation and supply online is managed by the online service ePortti. ePortti was started and previously managed by Tieto/TietoEnator but since 2006 it is markeded by Kauppalehti. In addition, ePortti provides access to a number of other online services, among them Suomen Asiakastieto, D&B Finland and Edilex. In my view, ePortti has an even larger role in Finland than InfoTorg in Sweden as regards provision of national official registers. This is due to fact that it is also in charge of the operation of almost all of these.

The market for legal information online is small compared to Sweden. This is because the government owned Finlex provides free access to the majority of the legal information produced by the authorities. Finlex is provided by Edita, which is in charge also of its own online service Edilex. Another player with legal information online is Talentum, which publishes Suomen Laki (Finnish law book).

Players in the sector for information within media and business intelligence, including monitoring services, were in 2004 among others Turun Sanomat Online, Startel (part of SanomatWSOY group), Esmerk (now 2006 part of SanomatWSOY), Observer, Talentum, News Engine and Agentum Technology. Among international online services I have found that DIALOG (in Finland represented by Merilkon) is the largest.

Norway

I estimate the Norwegian online market at about SEK 1.1 billion. The largest area was financial real-time information, with revenues of about SEK 410 million. Of this, SEK 270 million was imports (Reuters, Bloomberg etc.). Norwegian services were Olso Børs, Hugin Online and SIX Norge. The market for credit and company information was about SEK 260 million. This sector was largely dominated by Creditinform (owned by Experian) and among the others were Lindorff, D&B Norge (then owned by BAF, now by Bisnode) and BizKit/Findexa.

This means that most of the use is via distributors. One difference in 2004, though, was that in Sweden there was one dominating player, InfoTorg, while there in Norway were two big competitors, namely ErgoEphorma AS (later ErgoGroup), operating the service Infotorg.no, and EDB Business Partner AS, operating EDB Infobank. Other players worth mentioning were Brønnøysundsregisterne, Tavninfo/Mediahuset, and Infoland Eiendomsregisteret. I estimate the total revenues from online use of official registers in Norway 2004 at about SEK 300 million.

I estimate the market for legal information online 2004 at less than SEK 30 million. Its small size was due to the online service of the private foundation Lovdata, offering low prices as well as very comprehensive coverage of the information in the field. Lovdata co-operates with the government. Another player was the publisher Gyldendal. The sector for information within media and business information, including other types of text-based databases, had revenues of about SEK 75 million. It was by large dominated by online services owned by Schibsted, among them Retriever, Mediearkivet.no and Atekst. Other services were Opoint (owned by Orkla), Infopaq, Cyberwatcher, Observer & Waymaker, Magenta News and InterMedium. I estimate Norwegian use of international online services providing information within business, news, STM, etc., at about SEK 50 million.

Sweden

I estimate the online market in Sweden 2004 at SEK 1.8 billion. The largest sector was of course financial real-time information, with SEK 660 million in revenues. Of this, foreign-owned services generated revenues of about SEK 420 million, of which the largest, Reuters, accounted for SEK 360 million. Bloomberg had much less revenues. Swedish services in this sector, with revenues of about SEK 240 million, was dominated by SIX (then owned by Addnode/BAF and in 2006 acquired by and merged with Ecovision) with revenues of about SEK 120 million, and Ecovision, about SEK 70 million. Compared to the previous year, both leading services, i.e. Reuters and SIX, had experienced lower revenues.

The market for credit and company information in 2004 was about SEK 490 million. The sector was by large dominated by two players, namely Upplysningscentralen UC (bank-owned) and BAF (now Bisnode) with its companies and services of D&B Sverige and AAA Soliditet. Other players were Svensk Upplysningstjänst, CreditSafe and BusinessCheck (jointly owned by BAF). I estimate the online services revenues of UC at about SEK 200 million and about the same for D&B and Soliditet combined. The services mentioned represents the ”traditional” credit information sector; a sector that has been exposed to fierce competition since the late 1990s, which has resulted in falling prices. In spite of an ever increasing demand of this kind of information, the revenues have not increased at the same rate. Yet, combined with players providing nothing but company information, the area is highly profitable and has a good growth rate.

Official registers have an important role on the Swedish online market. In 2004, they altogether had revenues of about SEK 360 million. With the exception of the Swedish population register SPAR, the authorities themselves provide online access to their registers. The by far largest of these is the official real estate register. Two-thirds of the revenues, however, were due to resale, i.e. distribution, by commercial players. Of this, InfoTorg accounted for nearly SEK 200 million. InfoTorg provides access to all large national registers in Sweden, among them SPAR, the official vehicle register, the official real estate register and the official company register.

The market for legal information online has another characteristic in Sweden than in the other Nordic countries. It is due to the vast number of players and to its large size, with revenues in 2004 which I estimate at about SEK 60 million. The three largest players, i.e. the two publishers Thomson Fakta and Norstedts Juridik on one hand and on the other Rättsbanken of InfoTorg, accounted for about three quarters of this.

As regards national online services, the rest of the text-based sector had revenues of about SEK 130 million. Here, players providing information within media and business intelligence, including monitoring services, were in dominance. These include ”veterans” within business information, such as Affärsdata and Presstext (both in 2004 owned by BAF, now in 2006 by Bisnode) and Mediearkivet (now part of Retriever, owned by Schibsted group) and the media monitoring services Retriever (Schibsted) and Agent25 (Spray). Generally, media monitoring via the Web is a ”hot” area with many other players, among them newcomers such as Magenta News, FindAgent, Newsmachine and Aitellu. But in addition, also veterans such as Observer have launched this kind of services. The telephone directory company Eniro also invests in this area, however with free, advertised based services, mainly aimed at individuals.

Finally, I estimate the revenues from Swedish use of international online services in the text-based sector at about SEK 80 million. Largest of these services was DIALOG and secondly probably STN, Ovid and Factiva.

To conclude, I in figure 6.14 illustrate the development of the Swedish online market 1991-2005 by the different sectors. Also included is the development of net advertising. This phenomenon, just one decade of age, is of interest to compare with the online market as income from advertising allows for free services, attracting users from fee based services. The figure also illustrates the relations between the different sectors in Denmark, Finland and Norway as they show similar patterns.

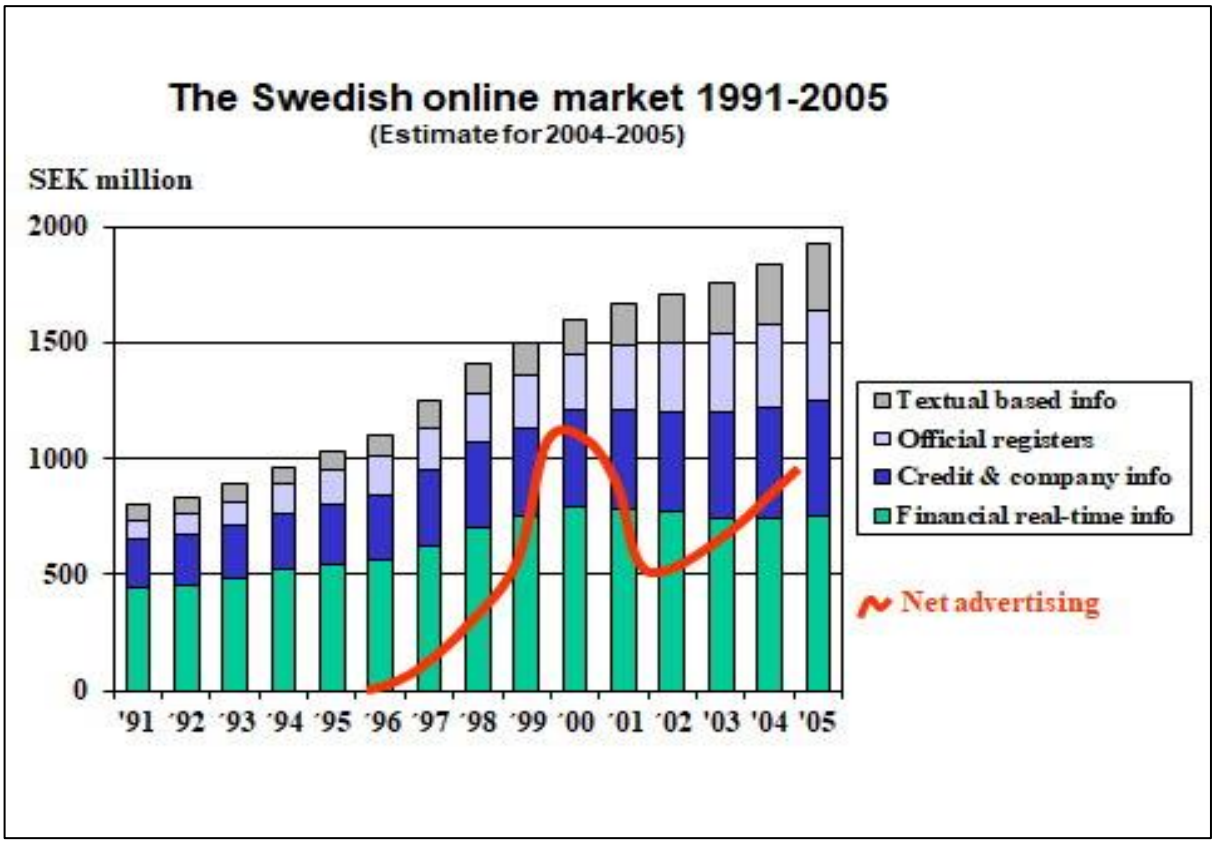

Figure 6.14 The development of the Swedish online market by sectors 1991-2005. A similar development as regards the relations between the different sectors could be seen also in Denmark, Finland and Norway.

The Nordic region as a whole

Above, I have presented numerical data for Denmark, Norway and Sweden. In order to produce a compilation for 2004 for the entire region, I have to make an assumption for the online market in Finland. For this purpose, I set it to SEK 1.2 billion. This amount is based upon data in MSSTUDY, the size of the country and my own market studies. Nevertheless, it has to be regarded as fictive.

In addition, I assume that 30 % of the Finnish use is use of non-Finnish services (i.e. imports), which is the average for the other Nordic countries.

Finally, I distribute the revenues from Finnish online use on the various sectors in line with the average for the other countries. Also for Iceland I make an fictious assumption for the revenues, namely SEK 100 million, which I distribute in the same way.

Based on this information, the online market in the Nordic region in 2004 can be estimated at about SEK 5.360 million. Table 6.8 accounts for the distribution of the revenues of the countries and the share of imports.

	Revenues	Import share
Denmark	SEK 1,150 million	34 %
Finland	SEK 1,200 million *)	30 % **)
Norway	SEK 1,130 million	29 %
Sweden	SEK 1,780 million	28 %
Iceland	SEK 100 million *)	30 % **)
Nordic region	SEK 5.360 million	30 %

*) Fictious amount
**) Fictious amount, based on the average for the other countries

Table 6.8 The online markets in the Nordic region and its countries in 2004 and the share of use of foreign services ("imports"). Data for Denmark, Norway and Sweden are based on my own research. Data for Finland and Iceland are fictious.

Figure 6.15 shows how the revenues in the Nordic region 2004 are distributed on the different information sectors.

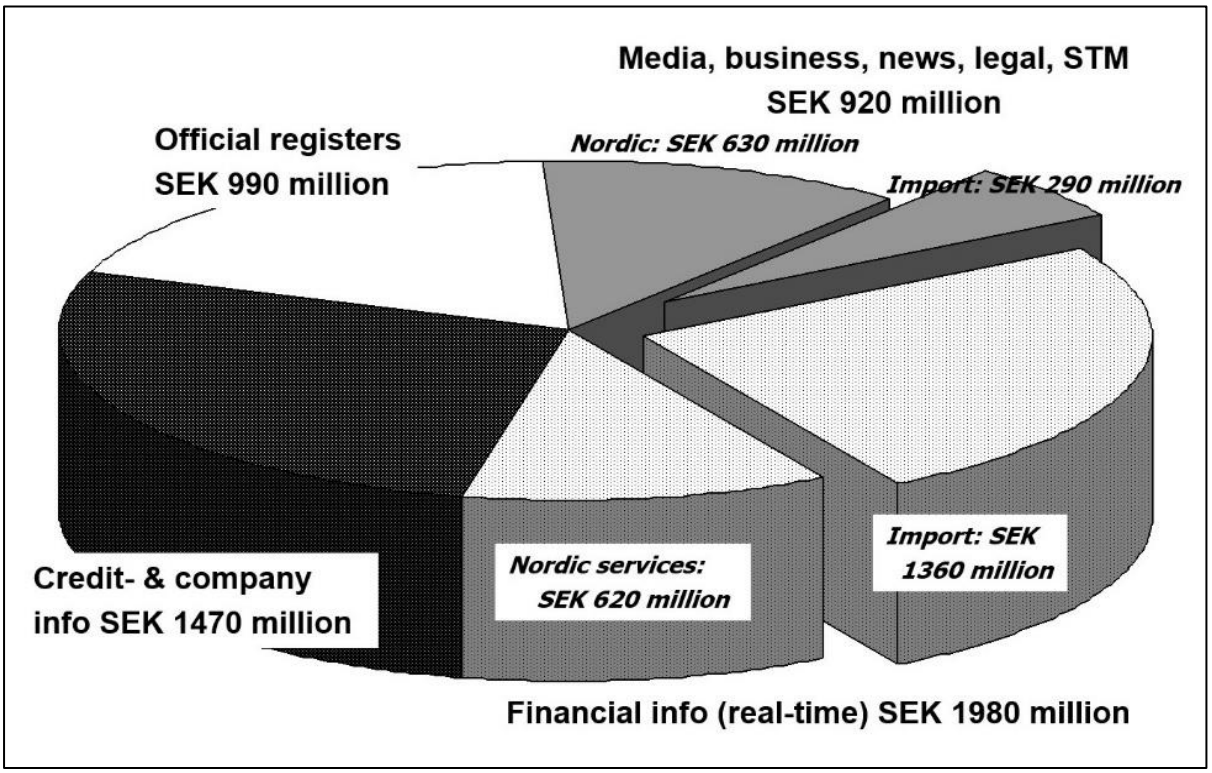

Figure 6.15 The Nordic online market 2004 by sectors. Total: SEK 5,360 million.

Thus, the largest sector was financial information, accounting for revenues of SEK 1,980 million, out of which 1,360 million imports. The largest online player was, of course, Reuters. The second largest sector was credit and company information, accounting for SEK 1,470 million. The lagest players in this sector was Experian and BAF (now Bisnode), both with a number of services.
Revenues from use of official registers was SEK 990 million. The largest online services was InfoTorg (then owned by Infodata, now by Bisnode), ePortti (then owned by TietoEnator, now owned by Kauppalehti), Infotorg.no (ErgoEphorma/ErgoGroup) and Infobank (EDB). National players in the text-based sector (comprised of information within media and business intelligence, business information, news, legal information etc.) accounted for about SEK 630 million. International online services within STM, business and legal information and other subject areas in the sector had revenues of about SEK 290 million. Among the most used were firstly Thomson Dialog and other online services owned by Thomson, secondly online services within the Reed Elsevier group and thirdly Factiva, Ovid, CSA and ProQuest (now owned by CSA).

6.5 Conclusions and trends 1997-2004

There are a number of conclusions to draw from the above, in general as well as compared to the situation in 1997. In my opinion, most notable is the low average growth 1997-2004, only about 2 % per year, which means a growth at a significantly lower level than the yearly growth in 1994-1997, which was 8 % - not to mention the earlier decades even higher growth rates!

Admittedly, differences in definitions or else means that the figures are not exact, but I still believe that it shows the situation. It is important to point out that the compilation is based on my own methodology and my own definitions, i.e. those I always have used for Sweden. The data for Sweden is of course the most reliable because the same methodology and definitions have been utilized consistently.

Another immediate conclusion is that the proportion of the use of non-national online services (imports) has decreased significantly since 1997, from 41 % to 30 %. It should be mentioned that this use has also decreased in real terms, from about SEK 2 billion to about SEK 1.6 billion! It is mainly due to the decline for the financial sector, which of course was hit hard by the financial crisis that followed the dotcom crash in 2000. In particular, Reuters has had major financial difficulties and, as a result, declined internationally as well as in the Nordic region.

As regards the distribution of the revenues by sectors, I mentioned in the section on MSSTUDY that in 1997 financial information accounted for about half the market, credit and company information for about a quarter and other areas (text databases within STM, business, news, legal information, official registers, etc.) for the remaining quarter. In 2004, financial information accounted for 37 %, credit and company information for 27 % and other information for 36 %. This clearly reflects what is indicated above, namely the decline of the financial sector and the growth of the market for official registers online.

In addition to the above, my studies of the Nordic countries exhibit four important differences between 2004 and 1997. The first is that the market for national databases of the traditional type, excluding business and legal information, has almost vanished. These are databases that are (or were) produced by universities, research institutions, libraries, government agencies and others. The main reason is that this type of databases nowadays almost without exception are available for free on the Web.

Secondly, in my view, the market for international online services in STM has stagnated in recent years under the pressure of free services of various types that to an ever increasing extent meet the

demand for online information searching and retrieval. Among free services are major search engines and services (such as Google, Yahoo! and Amazon A9.com), specialized (such as Elsevier's Scirus) and search services provided by the big publishers, media players and "aggregators" (such as Elsevier, Thomson, Springer, Infotrieve, Ingenta ...) - just to name a few. In addition, the so-called Open Access movement has affected the development by reviving the "information wants to be free" syndrome, which by expressing a negative view of fee-based services has been a contributory cause for the stagnation of the online market.

To this can be added that the online market of course also has been affected by the availability of national free search engines in each country, in general financed by advertising. We can find examples such as Google's local initiatives as well as Eniro's Web based news search engines. Here should also be mentioned ”lure” services, with some free information as a means to attract users to their fee-based services. Examples are Eniro's services Emfas and DN.se/ekonomi, both of which offer free company information searching, resulting in basic (but not in-depth) information on companies derived from D&B and UC. These types of services satisfy part of the search demands even for professional users of online, thus reducing some of the space for fee-based services.

Thirdly, except for Denmark, the market for official registers online has grown significantly, in absolute terms as well as proportionally. A very large part of the use of these is via the ”information marketplaces” that originate from the 1970s and 1980s government computer centres.

Fourth, a new group of players has appeared on the online market. It consists of the so-called media-monitoring, business intelligence or news current awareness services, which base their business on continuous watching and gathering (harvesting) information from sources on the Web. Examples of this type of players and services are Retriever, Agent25 and Infopaq. Characteristic of the recent trends in this type of services are that they are active in more than one Nordic country and that they often seek co-operation with traditional media archives. A main example of the latter is Schibsted-owned Retrievers merger with Mediearkivet, the Swedish veteran in the field of media archives. This trend has in recent times forced also the established services, such as Swedish Affärsdata and Danish Infomedia, to broaden their services to provide search also in materials gathered from free sources on the Web, monitoring these in the same way as that of the new players.

In conclusion, I have found much greater differences between 1997 and 2004 than between 1994 and 1997. Admittedly in a larger time span than the latter, I will anyhow suggest that the market structure did not change much even between 1990 and 1997, i.e. a period of the same length as 1997-2004.

Let me conclude this section with an international comparison. Before I do this I would however point out a few difficulties in connection with this.

Firstly, there is a variety of disparate data on the size of the market and its different parts. This stems partly from different definitions of what those parts are and what is actually included and partly from which players should be included. The fact that many of the players, especially the larger ones, are active in several areas - many of which may not even belong to the online market in general - obviously means problems as regards distributing the revenues by market sectors.

Secondly, it is extremely difficult to limit the area dealt with here to other areas. A current issue is e-publications (e-journals, etc.), which are increasingly becoming part of the activities of many online services, in particular the major international, but where the revenues for supply of journal articles in original format can not be regarded as part of the online market according to the definition I employ here.

That being said, I specify the global online market size in 2004 in the region of SEK 300 billion, distributed on the financial sector SEK 100 billion (i.e. 33 %), credit and company information SEK 70 billion (23 %) and others (text-based databases in STM, business, news and legal information, official records, etc.) SEK 130 billion (44 %). This means that the Nordic online market, which in 2004 had

sales of SEK 5.36 billion, accounts for 1.8 % of the global. Table 6.9 below shows a comparison between the Nordic region and the world in terms of revenues distributed on the sectors.

	Nordic region		World	
	SEK billion	*Share*	*SEK billion*	*Share*
Financial info	1.98	37 %	100	33 %
Credit and company info	1.47	27 %	70	23 %
Others	1.91	36 %	130	44 %
Total	5.36	100 %	300	100 %

Table 6.9 Size of the online markets in the Nordic region and in the world in 2004, distributed on market sectors.

Finally, I will present a comparison between the Nordic and global online market revenues throughout the period 1989-2004, including all sectors. See Figure 6.16 and Figure 6.17.

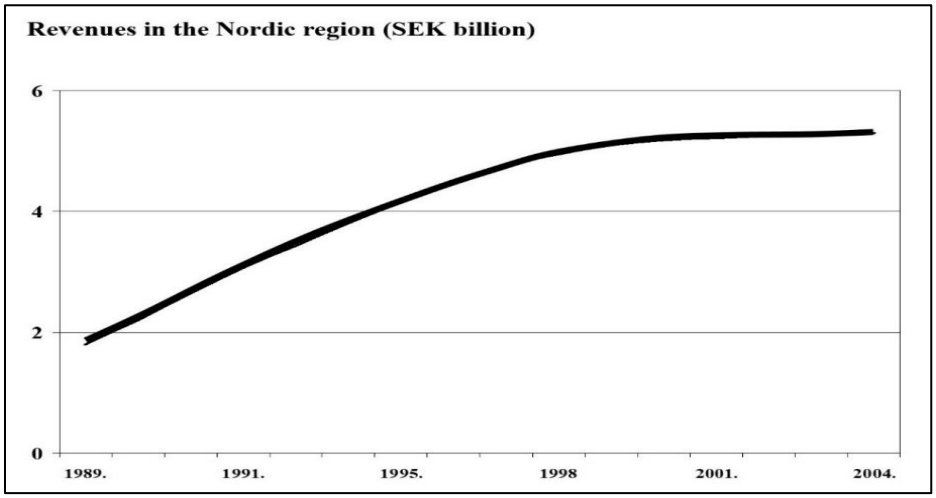

Figure 6.16 The development of the Nordic online market 1989-2004. All sectors included. Revenues in SEK billion.

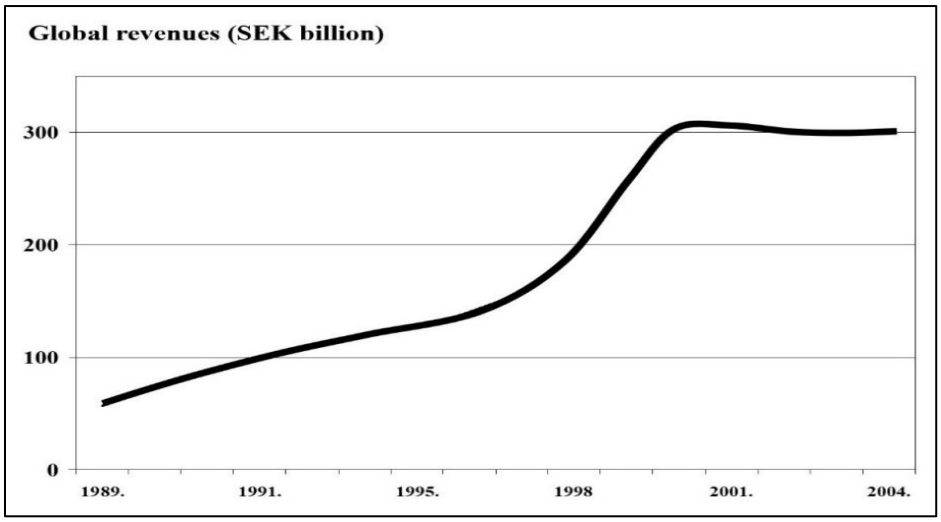

Figure 6.17 The development of the global online market 1989-2004. All sectors included. Revenues in SEK billion. (Note: The figure is based on data from a number of sources from different times, utilizing different definitions. Due to this, it just serves as indicator of the market development).

Towards a (pan-)Nordic online market?

The trends outlined above are based on hard facts. But there are also other than the quantitative trends that are related to and of interest from a Nordic perspective. In an introductory section, I wrote that the online industry in the Nordic countries should not be regarded as one unity; one single market; neither in terms of use nor supply - but concluded that we now in 2006 can see tendencies towards a "nordification", a development of a pan-Nordic market in some areas. These overall trends mostly concern the supply side and only to a small extent the demand side.

Most important is the "nordification" in progress on the media market in general. As the major media companies in the countries are growing they eventually find the market in their own countries too limited, thus expanding by establishing their activities also in the neighboring countries. As concerns the online industry, typical exponents of this are media and information groups such as Alma Media, Bisnode, Eniro, SanomatWSOY, Schibsted and Talentum. But also others who operate on more niched markets are forced to act in the same way. Examples are Experian and Observer.

Another major general trend is the rapid expansion of the media monitoring business, represented by companies that base their business on monitoring and retrieving information from media on the Web. I have already touched on this and mentioned players such as Retriever, Agent25, Magenta News and others. The technology used can easily and at a low marginal cost expand to monitor and retrieve information from virtually any number of media sites (and media). Therefore, it is natural for these companies to broaden their coverage as much as possible, and when the domestic media sites and media of relevance are covered, they can take an easy and commercially safe path to expansion just by extending the monitoring to media Web sites also in other Nordic countries. And that is exactly what is in progress right now - and the development is rapid due to the economies of scale, for example in terms of number of media covered. The number of customers and revenues is increasing rapidly. The trend is reinforced by the fact that many of the companies and services are owned by Nordic media and information groups such as those mentioned above.

On the demand side, trends towards ”nordification” are more infrequent. However, one such trend is the growing demand for access to official vehicle and real estate registers across the Nordic borders. But the increasing demand in general for credit and company information, EU legal information, and more, which is mainly met by existing services, national and international, can not be regarded as steps towards a pan-Nordic market but rather towards a further extension of the EU-wide and global market.

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7 INTERVIEWS – Pioneers' reminiscences of the start of the online information era

Introduction

Marie Wallin

Manuscript received 2007

Inspired by the interviews published in the Proceedings of the 1998 Conference on the History and Heritage of Science Information Systems (*Bowden et al: ASIS and the Chemical Heritage Foundation. ASIS 1999. 291 p.*), we decided to add to the contributions graciously written by the authors in the book, interviews with recognized personalities in these online information pioneering times in the different Nordic countries. Unfortunately the editors group did not manage to contact all the personalities thought of when this book was first being edited in 2007. In several cases it was already at that time too late for that. Many of these pioneers are, however, mentioned and honoured in this book and some have as authors given their interesting views on special aspects of online development.

We are pleased to present three prominent personalities in the field in this chapter. We intended to ask a number of questions as is illustrated in Sauli Laitinens interview but Björn Tell provided us instead with a spontaneous description of his role in the very early development in Sweden and internationally related to our subject, which is reproduced herein. The interview with Lilianna Kanafarski was more of a free triggered by the same questions.

7.1 Preamble to KTHB online – Björn Tell

Björn Tell

Manuscript received 2001

Being lazy by nature I have always tried to avoid repetitious work when mechanical means as well can do it, or do it better. To use multiple forms and carbon paper, plate embossing addressing machines, or stencils to avoid duplication of loan transaction forms or catalogue cards became a whim when I started my library career. That transpired into an inquisitive mind about the possibilities to use a computer when such an opportunity was offered in the Swedish nuclear establishment AB Atomenergi in the late 1950s. The big Ferranty Mercury computer that belonged to the company was originally intended for solving intricate mathematical problems in connection with reactor construction work, and I wanted to use it for bibliographic references by a string handling technique, and then benefit from its sorting, selection and presentation power.

A few references in the literature had shown some attempts in the USA to make use of computers in the library field, and I saw an opportunity to try similar things in the establishment. Thus, was born Sweden's first computerized periodicals list. A study tour to various American centres, especially to the Case Western Reserve University where I happened to meet Allen Kent, Jessica Melton, and Robert Fairthorne enhanced my thoughts about the use of computers in the library field. Later the participation in two Gordon Research Conferences on Scientific Information gave me many American friends to contact and exchange experiences with. Thus, meeting Peter Luhn and discussing KWIC-indexing was enlightening. Classification issues were profoundly discussed with Pauline Atherton-Cochrane, citation indexing with Eugene Garfield, natural text searching with Paul Howerton, and superimposed coding with Calvin Mooers noted for his coining of the term "*information retrieval*".

That resulted in a decade of batch processing activities on what was called the second-generation computer at the company and also at KTHB (Royal Institute of Technology Library) as we joined forces in the field of computer programming and processing. The processing was cumbersome and required that you almost had to be a programmer to interact with the computer. I myself used FORTRAN and IBM assembly language.

The ABACUS system, originally designed for bibliographic listings was used while we waited to finalize a retrieval system that just was in our pipelines. I remember how we clipped out the pertinent references from the ordered listings and pasted them to the answering forms, before that was automated. It should be mentioned that the versatility of ABACUS (AB Atomenergi Computerized User-oriented System) was so great that the SAFAD, the Swedish Agency for Administrative Development (Statskontoret), used it for producing a KWOC index to all the tax laws.

Figure 7.1 The paper tape era. Björn Tell, Zofia Gluchowicz and Kerstin Wessgren, KTHB.

Tape services were coming on the market such as NASA/STAR, INSPEC, ISI, CAS, COMPENDEX and others for SDI, a current awareness service based on individual interest profiles that were run against the incoming tapes. By a paper tape input we also built a database for the Swedish industry, MechEn. The field was still new and exiting.

Our success to acquire outside funding depended upon our own programming abilities using exotic things such as hash coding and tree-structures, and. I was quite happy to find that our program for processing CAS-tapes proved to be 30 % faster than that of the Canadian CAN/SDI. The system ABACUS ultimately resulted in the program package called EPOS/VIRA and eventually its online version 3RIP. The quality of the programs was demonstrated, namely that centres in France and Belgium were eager to acquire them from us.

As an early bird in the field I was very proud to be selected by the Director General of ESRO (European Space Research Organization), Pierre Auger to join its Documentation Consultative Committee. ESRO had started discussions with the Americans who were interested to start up a European service with the NASA tapes in order to get feed-back from Europe of technical reports. By processing the tapes from NASA/STAR on a computer in its establishment ESDAC in Darmstadt, Germany, 1966 it was the first time when there was talked about reactive typewriters online with a computer.

I saw the opportunities to complement our batch processing SDI activities for current awareness with in depth searches from the cumulated database in Darmstadt. Lookheed had for NASA developed NASA/RECON (Remote Console Information Retrieval Service) which permitted the searcher to enter several descriptors at once and get an immediate response, which was more than many of the present search engines can do. RECON was introduced in ESRO which thus got online access to an IBM360, a third generation machine which now entered the field with random access disk memories and display screen terminals operating through telecommunications networks.

ESRO had just performed a successful online telecommunications test from Paris to Palo Alto, USA, and was now looking for a development in Europe. The creation of a network begun by two terminals in Paris, one at St. Mary Cray in U.K., KTHB in Sweden and in Rome, Italy. The first meeting about a Swedish RECON terminal took place at TUAB (Teknologiparkernas Utvecklings AB), Stockholm, in June 1970 whereby Lockheed was represented by Roger Summit and ESRO by Noël Isotta. The speed of transmission could be 600 or 1,200 baud (about 60-120 characters per second), but Lockheed confirmed that for dial-up purpose it was safer with only 600 baud. Difficulties arouse with dial-up transmission on a two wire line, and four wires was recommended.

The Swedish research council SINFDOK would never sponsor the rent of a leased telephone line from Stockholm to Darmstadt. Many discussions followed then with ESRO, and it was decided that trials should be made with dial-up techniques. KTHB got an ESRO terminal, one of these heavy and bulky gadgets with a small screen of that time. The Swedish telecom became also interested in the experiment and put up a modem box that they had to adjust to the signals. During that time the documentation activities had moved from Darmstadt to the ESRIN centre in Frascati, Italy. The trials were successful as an example of the feasibility to use dial-up technique for information retrieval over national borders, so we received funding for this new online activity.

The NASA/STAR database was based on a thesaurus. A system is not any better than its weakest components, and in this case you had to deal with the human input. I discovered that a keyword such as "information retrieval" was spelled in more than ten different ways, such as "formation storage and revival", "sturrage and retrieval", "information astorage and retrieval" etc. That put me on the alert, as that must be the case also with other keyword input. My skepticism over manually assigned keywords from thesauri seemed confirmed; a reason why I always have liked to combine that meta-device with free text searching from the original words by the author himself. That was especially true when we processed the ERIC tapes, where we could show to their representative on visit how lousy their thesaurus was, compared with free text searches. I remember that they then revised the thesaurus.

My know-how acquired during these early years came to good use in international forums.

The Swedish government and other government bodies nominated me as delegate to a number of international organizations such as Council of Europe, ENEA, ESRO/ESA, IAEA, ISO, OECD, UNESCO and WHO. All of them wanted to spread the knowledge about the new technology among their member states. In some cases I was instrumental for the formulation of policies, standardization activities and data base building. However, in my own country the National Library of Sweden (KB)

that could have taken the lead for the development of automation in libraries as it was funded directly by the ministry, was slow to react in spite of the push I tried to make by arranging a conference at Studsvik for NVBF, Nordiska Vetenskapliga Biblioteksföreningars Förbund (The Nordic Research Librarians Association) in 1961, where I invited Sune Lindqvist of KB and showed the processing of bibliographic lists.

Instead it let SAFAD take the initiative to claim all development funds available. That proved to be detrimental for all research libraries which were deprived of development. In fact they were prohibited to try any experiments in the field. Over the years SAFAD showed its incompetence and it took a long time before the online cataloging service of LIBRIS came into action.

In the Nordic countries we had good contacts during those Nord IoD conferences which were held each third year. Of course there were also differences of opinions. Norway wanted to market its Polydoc system in Sweden where other actors fiddled around. Denmark would have liked us to abstain from using CAS and instead rely on the Technical Library in Lyngby, as it was supposed that the underlying Danish market was too small to motivate their acquisition costs for CAS. Finland through Elin Törnudd used what she called the parasite attitude, namely to profit from our endeavors in Sweden, and wait for the establishment of a packet switched Nordic university network, very much thanks to the support by NORDINFO.

It should also be mentioned that the ISO 2709 Format for bibliographic information interchange on magnetic tapes was in a sense a Nordic achievement together with Henriette Avram, Library of Congress. That format is still the exchange format for UNESCO's WINISIS program.

In 1973 I moved to the Lund University where I had to face the disastrous work of SAFAD to get the LIBRIS going online on leased lines. The online access to MEDLINE was implemented, and I remember how I during a trip to ESRO in Frascati had to bring back the cumbersome RECON terminal and place it on an empty seat in the plane back to Copenhagen to the curiosity of the fellow travellers. Thus even the Lund University could from that on benefit from the online service to the number of databases that ESRO provided for through dial-up.

My career has been a mix of operational daily work in a couple of libraries and the role of an advisor to my government and to international bodies, especially OECD and UNESCO. Since the late 1950s UNESCO has sent me on many missions to developing countries, a role eventually taken over by SIDA, the Swedish International Development Authority, for missions to Central America. Both OECD and UNESCO feared a fragmentation of information activities in the world, and a widening of the North-South's knowledge gap between those who have and those who have not information. The establishment of a world-wide communications network such as Internet has prevented that by creating a ubiquitous awareness of what online services can offer. If there is an information gap in the developing countries now it depends on their national policy, the language barrier and the unawareness of the information sources. A hurdle is the pricing policies of the actors operating the market, because information is by far not a free commodity in the online world and structurized information sources will always have a price.

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7.2 Interview – Sauli Laitinen

Elisabet Mickos

Interview performed 2007

When and why did your interest start in the online/database market? What motivated your career?

I was working as a chemist in a research laboratory of a chemical company in Northern Finland in mid 1960s. In addition to laboratory research I had to do market surveys related to potential new products. I gathered information about the properties of the products, processes how they are made, companies involved, pricing etc. I had to dig that information from a number of sources such as specialized encyclopaedia, trade journals, newsletters and also research literature. I wished all this information to be computer readable and readily accessible for retrieval.

I regarded the development in the information service field to be interesting and challenging. So, when I saw an advertisement of the Finnish Society for Information Services calling for internship at Chemical Abstracts Service, I became interested, applied for the job and was chosen. Since then I have been working with information services.

How did the development in your field start?

As the beginning of the online/database development in my field I see the automation process in the production of Chemical Abstracts. Chemical Abstracts is the most important, comprehensive source of research information in chemistry. Already in the 1960s they abstracted more than a hundred thousand research papers and the number grew rapidly every year. So, they realized that computerization of the production process is a necessity. Several development projects were carried out both as to registration of all known chemical compounds as well as to producing printed abstract and index journals by phototypesetting from computer files. On the basis of these projects Chemical Abstracts Service had a number of experimental pilot products in the form of databases on magnetic tapes.

The databases on magnetic tape were distributed to information centres in the US and abroad to offer services to end users. The service was SDI, Selective Dissemination of Information, which was based on running the bi-weekly or monthly tapes against search profiles compiled on the base of the interest of the end users.

Later on, in the 1970s computers with direct access memory devices, timesharing and telecommunications services made online retrieval possible. Information centres specializing in online services acquired databases from secondary publishers and made them available to users. This was the beginning of the online era.

Which possibilities did you see?

I foresaw the great possibilities related to instant availability of research and other information by introduction of computers in handling of textual information.

During the internship year at Chemical Abstracts Service in 1969 - 1970 I attended courses at the Department of Computer and Information Science at the Ohio State University and also participated in their research programme.

Since that time my professional career has been related to databases, online services and information management. So, I have made a transition from a chemist to an information specialist. I have been working in this field more than thirty years now.

Which were the conditions at that time?

The point of time when I became aware of databases and computer-based information services was the era of SDI services. The search profiles were punched on cards and the computer runs were made as batch operations.

When access to American online services became possible in early 1970s, there were no telecommunications nodes for the trans-Atlantic traffic in Finland or elsewhere in the Nordic countries The nearest nodes were in central Europe, the Netherlands, France, Switzerland and the UK. Dial-up telephone services to these countries did not exist either, at that time in Finland. The only possibility was to order a special data call to the nodes in these countries. At the end of a session we had to call the operator again in order to be cut from the line. This was cumbersome. Telecommunications charges were high. The dial-up connection to the nearest node cost USD 50 per hour, much more than the trans-Atlantic connection via packet switched network, USD 15 per hour. The share of the telecommunications cost was in many cases higher than that of using the online service, for which the charge was USD 20 - 80 per hour depending on the database. The speed of the data flow was only 300 baud (about 30 characters per second) in the early stage.

Later on, dial-up became possible and in the 1980s packet switched services by the telecommunications authorities were introduced. In the early days the quality of telecommunications services was low, however, and a major concern among online users.

What has restricted the development?

I don't see big restrictions in the development so far. Maybe the lack of understanding of the need of packet switched networks by the national telecommunications authorities was a major hindrance in the early phase. This relates both to non-existence of the networks in the beginning and the low quality of the service at a later stage as well as to the tariffs.

Otherwise, I don't see that the elementary conditions in the early days were a major hindrance in adaptation of the service into use in the light of pioneer spirit, which all the people involved seemed to have.

The most important events that influenced the development

Clearly the most important phase of development is the introduction and proliferation of the Internet from the beginning of the 1990s. Especially the Web has had a great impact not only in information services but in the whole society.

Information retrieval, which was a function of information specialists, has become an everyday matter to anyone. Hundreds of millions of people all over the world are doing information retrieval every day. Newspapers, general interest magazines and other media give advice on use of online information retrieval. The importance of the Internet in the society has brought development of information retrieval from the back office of the library to mainstream computing.

As to scholarly publishing and bibliographic databases, a major improvement has been linking literature references in bibliographic databases to full text articles. The only obstacle still is that the primary publishers in many cases require subscription to the journal in question.

Memorable moments in your career

I always remember the very beginning of using international online systems. In 1974 I was working at the Information Service unit of Kone Corporation in Finland. I happened to visit HUT Library and I noticed in a professional journal an advertisement of Lockheed Information Services titled "*Lockheed offers a simple low-cost way to search major bibliographic data bases Online*". The ad claimed that "*a typical search costs USD 5 to USD 10*". I became interested, wrote to Lockheed and in the return mail I got a contract form and later on manuals and a password to start searching. Some time later there was also an advertisement of SDC Search Service, which we also took in use at Kone. We had a GE Terminet terminal, which had been used for financial calculations in the company using a service offered by the MARK III network. We did searches and showed the services to colleagues in other industrial information units and university libraries. They were impressed, but said that they will never use such an expensive service.... My Nordic colleagues were astonished, too, and did not believe when I was telling that I could search Chemical Abstracts online.

I moved to work at VTT in 1975. The new main building of VTT in Otaniemi, where the information service was relocated, was inaugurated by President Kekkonen, who took an online connection to SDC Search Service in California.

The role of Nordic countries in online development

Nordic technical university libraries as well as medical libraries were among the first information centres in the world starting to offer SDI services based on databases on magnetic tape. Nordic countries have also been very active in using international online systems as proven by user statistics.

NORDFORSK started the SCANNET project in the early 1970s in order to create a packet switched telecommunications network for information retrieval. This was a major initiative in Europe corresponding to that of the Commission of the European Communities for Euronet. The network was made operational quickly and with limited resources.

It is also relevant to mention another important NORDFORSK initiative, SCANDOC. Online services brought to the attention of users a lot of literature references and it was in many cases hard to get hold of the original literature. To fulfil the need special services, document brokers, were founded in the US from early 1970s. Such a service, however, already existed for the Nordic countries, Scandinavian Documentation Center in Washington, DC founded in 1968 with a task of acquiring hard-to get literature from the US to Nordic users.

NORDINFO's role in the online development

NORDINFO took over the activities of SCANNET promoting Nordic databases. An important product and service has been NORDGUIDE, the Nordic directory of databases, which has been available in printed form and is now online on the Internet.

I see an important role for NORDINFO particularly in raising awareness about the Nordic services. Well known international online systems contain information about research results in big sciences. However, they do not hold small local databases which may, however, have information that is important for users in the Nordic countries and occasionally also to others. Giving information about Nordic databases to the Nordic and international user community is an important activity for NORDINFO.

NORDINFO also contributed to a number of projects, where different technical solutions were sought and tested in document delivery. These techniques include teletex, telefax, transmission by satellites as well as the Internet.

As direct access to original documents is part of online services nowadays, NORDINFO's initiative on establishing the centres for excellence NordEP, Nordic Net Centre and Nordic Digital Library Centre in mid-1990s is also an important contribution to the field.

What could have been done better?

I see that the development in general has been smooth and easy to adapt by information specialists but not necessarily by end users owing to the complexity of the problem.

One of the limiting factors has been the state of technology in the early days, and another factor conservatism of the scholarly publishing system slowing down the progress.

In addition, retrieval systems were rapidly developed for the Internet without knowing and taking into account what already had been found to be good practice by the information specialists. So, in some cases the wheel was re-invented and the result was not always good.

Speculations about the future

When making predictions about the future as to when a given development phase will happen, two factors can be taken into account: Is it technologically feasible and is it economically feasible. At a certain point of time a product or a service can be both technologically and economically feasible, still it will not be taken into use at that particular point of time but probably later. This is due to a countless other factors affecting human behaviour. In addition, there are always "early adopters" who are eager in trying new things, and it may take many years before the product or a service is generally adopted. Furthermore one may ask, if the development is desirable.

It is hard to predict what actually will happen to the scholarly publishing system, what will be the future role, if any, of the various actors, primary publisher, secondary publisher, online operator and library.

Internet will offer totally new avenues for scholarly publishing. Multimedia gives enhanced possibilities for visualization of research results. For the moment its potential has not been much exploited. It is likely that when user friendly authoring tools are available and when scholarly publishing is moving from paper based to network based, multimedia will have a great role.

The principles of information retrieval in the online services date back to 1960s. Best results are still obtained using Boolean combination of index terms selected by experienced human indexers. Development of language technology eventually will change this situation.
The time of a journal may be over in a few decades. Publishing of research results in journals started in the late 1600s. Before that scientists had been communicating research results to their colleagues by correspondence. Correspondence is back by virtue of the electronic mail, which "invisible colleges" are using all the time. One possibility would be to skip the concept of a journal and to create a pool of articles, well described and analysed to offer maximum relevance and recall in a search. A mechanism of authentication is needed, however, including arrangements for peer review. At present time this is offered by the primary publishers. New forms of scholarly publishing are discussed and experimented e.g. in the framework of the Open Archives Initiative. Time will show what new ways the scholarly publishing will take at large.

7.3 Interview – Lilianna Kanafarski

Marie Wallin

Account of an interview performed 2003-02-27

Lilianna Kanafarski is a well-known personality for all who worked with online information in the early days in Sweden, her adopted country.

From Poland to Sweden but always information

Lilianna is a diplome-engineer in chemistry from the University of Wroclaw in Poland. She arrived in Sweden in 1970 and soon got an employment at the Royal Institute of Technology Library (KTHB) where the first national programme for computer-based information retrieval – the SDI-service – was under development. In Poland Lilianna, after some time in research and development, had already begun working with information. She was providing alert notices on scientific developments in chemistry for a regular news bulletin distributed to decision makers in industry by the National Institute for Information. Thus she had a good background for starting to work in Sweden with the awareness service then being developed at KTHB, this time using computer based technology.

Beginning a career in the new country

There was no formal librarian or information specialist education in Sweden at the time, but Lilianna could sign up for the course in information handling and retrieval that SINFDOK organized several years in a row for people in industry working with information and documentation, the so-called literature engineers. Like these people, she had to attend evening and weekend classes while working regular hours at the library as well. But this was worth the effort, she recognizes, as it gave her a firm grounding in the language of the trade and a good introduction to the structure of scientific information provision in Sweden.

At the same time she was making friends with many people active in the field. Many of them would later become her pupils in computerized information retrieval or co-members at the council for education of the Swedish Society for Technical Documentation – TLS. In fact, as one of the founding members of SOLUG she was very active within that organization from 1988 until it ended in 1996, in particular with organizing courses or representing SOLUG in international organizations, for example EUROLOG.

Early times at IDC-KTHB

It was by working in the development team at KTHB and its department IDC, Information and Documentation Centre, that Lilianna herself learned about computerized information technology, and she remembers how she was at once pushed into the heat of the action. She had to introduce the SDI service to engineers in chemical and related companies, a job where you had better not be too shy. Lilianna was also the first person with Åke Nord to work with the first online terminal in Sweden connected to the ESA/RECON information retrieval system. This terminal was connected to the ESA computer centre in Darmstadt. A Texas Silent 700 with a qwerty keyboard instead of the azerty one she had been using when learning to type in Poland was also new.

The new technology was exciting but could be treacherous. As she was one of the persons using the equipment most she would experience most of the failures. So much so that the well-known

demonstration effect was baptized the "Lilianna effect". During one of her demonstrations she pointed at the screen and it went black. Laughter. Good thing, she thought pedagogically, this will revive the auditorium … but when this repeated itself each time she pointed her finger it was not as funny anymore … that is how she found out the effects of static electricity on computer equipment. This and many other types of disturbances on electronic equipment would always manifest themselves at demonstrations in exhibition halls or rooms. And there was usually no technical specialist available who knew about these new communication contrivances. Therefore also the subject specialists, in this case a chemical engineer, had to develop a practical knowledge of how to treat machines, cables and printers.

Lilianna liked to teach and got known for it

Very soon Lilianna was teaching online searching to generations of new users in courses organized by IDC-KTHB or TLS. They were being trained on the systems represented in Sweden by IDC-KTHB, like ESA/IRS, CAS Online or STN or on using databases in chemistry and related subjects on any online system.

Within KTH, the department of chemistry was the first to take advantage of the new services and online searching, and Lilianna collaborated with teachers and researchers to introduce these new information retrieval tools in the regular curriculum. Lilianna liked teaching and was good at it and she proudly remembers the applause of a full auditorium of students at the end of one of her lectures. Most of the online users belonging to the first twenty years of online in Sweden have been taught by Lilianna, and most of the visitors to IDC-KTHB remember her as well. Everyone having attended a course by Lilianna knows how demanding she was, on herself, as well as on the systems and the attendees, and she succeeded in transferring her knowledge to many.

Meeting people in the industry

Human communication is her interest and keeping in contact with people she had met at conferences or meetings was her hobby. In the middle of the 1980s she could boast of knowing most of the people participating in the annual International Online Information Meeting (IOLIM) in London. But, sadly, she observes, it was not the case at my last visit there in December 1995. The industry's commercialisation has expanded at a fast pace with many youngsters mainly interested in selling new products and services.

Figure 7.2 Lilianna teaches online, here by showing instructions by means of an overhead projector. Photo: Lars Klasén, 1978.

Why was the beginning of online so exciting and how did she develop her skills? Learning by doing was the method. Something new was happening every day and you had to learn and check by yourself in order to teach. Also contacts with the representatives of the systems or databases producers were many, more personal and always rewarding. She as an intermediary felt that she was participating in the development of the industry as the vendors were very willing to listen to suggestions and even criticisms. At IDC-KTHB the vendors found a sizable group of intermediaries using different systems and making comparisons all the time, while at the same time having a good understanding of database structures and contents as they were themselves involved in running a batch retrieval system using most of the important databases. For Lilianna, unveiling the new possibilities of online technology to customers and new users was a pleasure as most were information professionals themselves, eager to learn more.

A genuine missionary for online abroad …

Lilianna´s subject knowledge and position led rather naturally to her being chosen as member of the CAS European Advisory Council were she served from 1983 to 1986 and of the European Materials Advisory Group from its start until 1995. When in 1987 the STN European node established its representation in Sweden (in the beginning serving also Finland) it was located at IDC-KTHB. Wearing this time the hat of the STN-representative, Lilianna endeavoured to market this service and she remembers a stimulating time in co-operation with Ylva Rosell introducing users to yet another information system.

Figure 7.3 Members of the "Road Show for online" in Portugal 1979. From left to right Theresa Amaro, Gabriela Lopez da Silva and Sérgio Carvalho, Portuguese National Institute for Scientific Research, and Lilianna Kanafarski and Lars Klasén, IDC-KTHB. Photo: Lars Klasén.

Lilianna enjoys travelling and during her long trip to the USA in 1980 she visited most of the places where computerized information services were being offered or developed. This happened again during her next trip in 1990. She was often the person who initiated meetings of special groups like CAS-specialists for the ESA/IRS system or the European DIANE centres in the 1980s. She remembers with great pleasure what can be called one of the first Road Shows for online services in 1979. Lilianna and Lars Klasén from IDC-KTHB travelled all over Portugal with the organizer Gabriela Lopez da Silva and her colleagues from the Portuguese National Institute for Scientific Research, Sérgio Carvalho and Teresa Amaro, demonstrating the possibilities of online retrieval at six universities spread along 1000 km of sinuous roads. The dial-up terminal at that time was not very portable and the acoustic coupler not so reliable, but people at the seminars were converted all the same.

… at home …

Lilianna accepted, with great pleasure, the responsibility of leading the Swedish DIANE centre that was supported by DFI from 1982 to 1986 and housed at IDC-KTHB. Marketing to end users and demonstrating the benefits of online information services to enterprises were now being stressed. At the inauguration event of the new Swedish packet switched communication service Telepak, it was

Lilianna who demonstrated online services. This was happening in a crowded auditorium in the presence of the minister for industry. Mainly European systems should be demonstrated and among others the News database on Data-Star. The appearance on the huge screen of the name of the minister sitting himself in the assembly and after that the name of the champion tennis player who happened to be a Swede was a clever ploy to put the attendees in a good mood and to give confidence in the timeliness of the database.

After Euronet-DIANE she was responsible for the REFLINE service at KTHB until her retirement in 1995. In this capacity she continued to invite vendors and database producers in the fields of science and technology to hold their training and user meetings at the course facilities maintained by the library.

… and internationally

Lilianna was like a missionary promoting the use of online services and databases for materials and technology whenever she could. So she arranged for travelling to her old home country on two occasions and gave lectures and demonstrations at many places, among others at her Alma mater. She even was at CERN, in Geneva, the birthplace of the Web, introducing the whole spectrum of databases and systems to a large auditorium of researchers, and subsequently leading several sessions of hands-on exercises for the employees of the library.

Her extensive practical experience resulted in her being chosen as delegate from Sweden to the first seminar ever on Quality of Information Products and Services arranged by the European Commission in Luxembourg in the early 1990s as well as to the CODATA Conference on Databases for Discovery in 1990. In 1995 she won the EUSIDIC Personality-Award. The stated motivation summarizes it all: "*to someone who has perfected the art of being an online searcher of great proficiency. She is also a leading advocate of the information profession and a tireless worker for the improvement of products and services*".

What about the future?

When asked about her thoughts on the newer technologies she comments that she retired just at the beginning of the Web era when quality information available on the network was still scarce. She still thinks that qualified information retrieval is depending on the searcher´s subject knowledge and that specialized intermediaries are needed now as before.

Contributors

Note: Descriptions relate to the date of "Manuscript received" of each chapter/section.

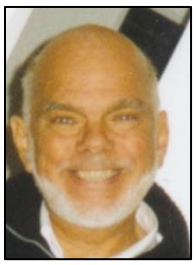
Inge Berg Hansen (Denmark) is Chief Advisor at the Danish Research Agency to the Ministry of Science, Technology and Development of Denmark, which employed her from 1991 on. She holds a M.Sc. in Chemical Engineering and a Ph.D. in Biochemistry from the Danish University of Technology. She worked as an Information Specialist 1969-1978 and as Acting Director 1990-1991 at the National Technological Library of Denmark. She was Library Director at the Danish Veterinary and Agricultural Library 1978-1986. She has participated in the work of NORDFORSK and in NORDINFO as board member, IANI-evaluator, etc. from 1983 to 1997. She has been an evaluator/reviewer of EU-research and innovation programmes like IMPACT I Libraries and Innovation, INFO2000 and IST since 1988.
(Inge Berg Hansen, 2001)

Malin Edström (Sweden) is information analyst at InfoData AB, Stockholm. She graduated with a BSc (Mathematics, Physics, Chemistry) at Stockholm University in 1968 and in addition attended a postgraduate course in Information Sciences. Between 1978 and 1981 she was head of IDC-KTHB (Information and Documentation Centre at the Royal Institute of Technology Library). 1983-1985, employed by NORDINFO, she was the co-ordinator of SCANNET . After that she joined QZ (Stockholm University Computing Centre) where she served universities in Sweden with electronic information retrieval utilities. When QZ was privatized in 1988 and acquired by DAFA Data AB, Stockholm, which subsequently became InfoData AB, Malin joined this new organization and worked there until her retirement in 2007. All those years Malin worked with information systems and databases within Sweden as well as in European co-operation, compiling the EUSIDIC Database Guide, standardizing command languages and exchange formats as well as giving courses in how to prepare and build databases.
(Malin Edström, 2007)

Inga Elding (Sweden) is Information Scientist at AstraZeneca in Lund. She took a Ph.D. in Physical Chemistry at Lund University in 1977. Before moving to industry she worked as Information Specialist at UB2 the division of Science, Technology and Medicine of Lund University Library 1978-1999 and there introduced the use of online information systems. She was a member of CAS European User Council 1992-1994. Inga is a very active member of TLS/SFIS (Swedish Association for Information Specialists) especially within the educational committee.
(Inga Elding, 2005)

Carl-Eric Elwin (Sweden) is retired Head of the Clinical Pharmacology Unit at the Danderyd Hospital, Karolinska Institutet, Stockholm. He graduated as M.D. from Karolinska Institutet in 1958 and received his Ph.D. after experimental research in gastric secretion on drugs. He was the Director of the BMDC (Biomedical Documentation Center of the Karolinska Institute) 1969-1973. As a visiting scientist at NLM (National Library of Medicine) at NIH (National Institutes of Health), USA, 1965-1967 Carl-Eric helped to improve pharmacology terminology in MEDLARS (Drug Literature Program - DLP) and continued this work for three years under a grant. He is one of two founders of the Drug Information Center, which was established at the Huddinge University Hospital, Sweden in 1974.
(Carl-Eric Elwin, 2007)

Nancy Fjällbrant (Sweden) is retired Head of the Department for Education in Information Retrieval at the library of the Chalmers University of Technology, Gothenburg. She has a B.Sc. from Edinburgh University. She gained her Ph.D. in Educational Technology from the University of Surrey and has published widely in the fields of user education in libraries, document supply and delivery and aspects of information technology and its application in libraries. She was Project Manager for two EU projects in the 1990s: EDUCATE and DEDICATE. Recent publications include Digital libraries in the Nordic countries 2002, and 2002-2003.
(Nancy Fjällbrant, 2002)



Björn Grönlund (Sweden) is engaged at the Swedish PTT with Quality Management, which led to a ISO 9000 quality certificate. He graduated as M.Sc. in Chemical Engineering from Åbo Akademi University, Finland. This was supplemented with studies in Business Economics at Yrkeshögskolan (Higher Vocational Education) in Sweden and at the PTT Management School. Björn joined NORDFORSK as Research Secretary in 1972 where the Committee for Information and Documentation became his responsibility. The US ARPANET inspired the creation of SCANNET that became one of NORDFORSK´s biggest efforts under his management.
(Björn Grönlund, 2003)

Even Hartmann Flood (Norway) is Senior Academic Librarian at the Norwegian University of Science and Technology- NTNU. He has a degree in Chemistry from the University of Oslo (1971). Even was employed as reference librarian 1987-2003 by the Norwegian National Office for Research Documentation, Academic and Special Libraries - RBT, working at Infosøk (Department for Information Retrieval at the NTNU Library in Trondheim) as leader of the Norwegian DIANE Centre, a co-operation between RBT and the NTNU Library.
(Even Hartmann Flood, 2003)

Roland Hjerppe (Sweden) is retired Director of Libraries at Mid-Sweden University. He is M.Sc. in Technical Physics from KTH and has been Visiting Distinguished Scholar at the Office of Research, OCLC, USA, for one year. He worked as Information Officer/Systems Analyst at IDC-KTHB (Information and Documentation Centre at the Royal Institute of Technology Library) since its creation and was Acting Head of the centre 1975-1978. After two years as consultant at Tanzania National Scientific Research Council in Dar es Salaam he became the Head of the Section for Research and Development at DFI (Swedish Delegation for Scientific and Technical Information). Roland has also directed LIBLAB (Library and Information Science Laboratory) at IDA (Department of Computer and Information Science) at Linköping University. He has published some 40 papers on Library and Information Science. He is a co-founder of Paralog, Stockholm.
(Roland Hjerppe, 2006)

Liv Aasa Holm (Norway) is Associate Professor at Oslo University College where she teaches database theory and network communication in the master programme for Library and Information Studies. She worked many years with research and development in library and information science at the Norwegian BRODD Institute, mainly with projects in the fields of knowledge organization, system analysis and network communication between information systems. Liv took active part in the development of standards for libraries such as ISO 8777 (CCL) and ISO 23950 (Z39.50). She has also been project manager for several Nordic and European co-operation projects, for instance the projects Nordic SR-Net (1991-1994) and ONE.
(Liv Aasa Holm, 2002)

Lars Klasén (Sweden) holds a M.Sc. from the Faculty of Engineering, Lund University. He began his career as Information Specialist within online and IR at IDC-KTHB (Information and Documentation Centre at the Royal Institute of Technology Library) 1976-1983. In 1982 he was involved in the launch of Interfact/SVP, one of the first information brokers in Sweden. In 1983 he joined the major computer centre DAFA in Stockholm. Initially Lars worked with the development of its online legal information service as responsible for database structuring and IR. In 1987 he initiated and co-ordinated the development of InfoTorg, Sweden's largest Online Service, launched by DAFA in 1988, the origin of InfoTorg AB, now part of Bisnode, a leading provider of business intelligence. He has since worked with its further development as Project Leader and Business Developer. Lars has published a number of reports, articles and newsletters on the Swedish online market. He was the Writing Editor for the newsletter of TLS/SFIS (Swedish Association for Information Specialists) 1999-2006.
(Lars Klasén, 2007)

Sauli Laitinen (Finland) was the director of the VTT (Technical Research Centre of Finland) Information Service until his retirement in 2002. He has a M.Sc. in Chemistry from the University of Oulu. He participated in the Chemical Abstracts Service internship programme 1969-1970 and at his return founded and managed information service units in several industrial companies and at VTT. Sauli has been involved in Nordic co-operation within several projects supported by NORDFORSK and NORDINFO as well as in European co-operation within projects supported by the European Commission.
(Sauli Laitinen, 2007)

Aud Lamvik (Norway) is Head of Infosøk, the Department for Information Retrieval of the Library of NTNU in Trondheim. She has a M.Sc. in Chemistry from the same university and worked as Research Assistant at the universities of Bergen, Oslo and Trondheim before becoming Academic and Research Librarian at the NTNU library in 1972. Aud took a postgraduate course (1971-1972) in Library Science at the NTNU Library. She also has a degree in Library and Information Science from the University of Minnesota, USA where she studied 1975-1976. As lecturer in the library's Information Training courses she published numerous training manuals and conference papers on electronic information retrieval. Aud served as member of NORDINFO´s board 1980-1988 and participated in numerous projects in EU-research and innovation programmes like INFO 2000, MIDAS-NET etc.
(Aud Lamvik, 2003)

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(Merja Lehti, 2002)

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(Elisabet Mickos, 2007)

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(Teodora Oker-Blom, 2007)

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(Ulla Retlev, 2003)

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(Lennart Scharff, 2003)

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(Maria Schröder, 2002)

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(Elin Törnudd, 2002)

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(Marie Wallin, 2007)