Denmark's Electronic Research Library

Summary

Skrifter fra Statens Bibliotekstjeneste 16

Fejl! Bogmærke er ikke defineret.

Contents

Preface

This publication is the result of an investigation completed by the Danish Ministry of Culture, the Danish Ministry of Research and the Danish Ministry of Education during the period of September 1996 to February 1997.

The objective of this interministerial initiative is to establish ✌The Danish Electronic Research Library✍ (**DEF** = **D**anmarks **E**lektroniske **F**orskningsbibliotek). In the translation of the summary the term *research library* has been chosen to cover: The National Library, university libraries, other academic libraries.

The purpose is to create a coherent structure for the research libraries in Denmark which will contribute to the development of digital capacity and user interfaces of the electronic library systems for the benefit of researchers and users of research results.

The purpose of the DEF project is to offer researchers, students, business and industry, libraries and other users of information quicker, more effective and easier access to the latest research information. Furthermore the DEF project is going to offer the users of the research libraries access to collecting the research relevant information directly over the electronic networks regardless of where the information is located.

The IT-development implies radical changes in the work flow for the research sector and for the libraries serving the researchers. More and more research results are published in electronic form today, just as researchers and libraries to an increasing extent are communicating on electronic networks. The libraries' loan administration and catalogues are to a great degree automated by now and ever growing parts of their collections are accessible in electronic form.

Today we have the technological basis for establishing a proper digital library on a big scale, where the user is able to get information through network regardless of where the information is stored. In many places like USA, Japan, and Western Europe comprehensive projects concerning development of the digital library are implemented. It is important that Denmark makes an effort to join this trend.

With these considerations in mind the three Danish ministries have taken the initiative to establish the DEF project for the purpose of accelerating and coordinating the Danish development within the library sector in such a way:

Fejl! Bogmærke er ikke defineret.

- that Denmark will be among the pioneering countries
- that Denmark will achieve the qualitative and economic advantage of a joint and   coordinated

Fejl! Bogmærke er ikke defineret.

1. Denmark's electronic research library

Denmark's electronic research library will be established through a network of research libraries and information centres.

The system of research libraries forms a virtual system, which transcends the borders of regional/local libraries. In a simple, transparent way, and within the given legal and economic framework, it makes available the libraries's collective information resources (digital and traditional) to users all over the country.

The establishment of Denmark's electronic research library is based on present technical possibilities. Its aim is to realize an effective national information supply, which makes available those resources already developed in the research libraries of the country, and which makes it possible to incorporate other information centres as a natural part of the virtual information system.

It is important to stress the fact that Denmark's electronic research library will emerge as one large, coherent, virtual information system as a result of the network's linking of the research libraries' and other information centres' services, like for example national license agreements. The overall effect is gained by complying with and following standards: for communication, for search support, for (subject) registration and for document description and representation.

1.1. Possibilities

Denmark's electronic research library will offer researchers, students and other interested parties (the users) a chance to keep up with international development. For the research libraries this will mean a change of old patterns and new ways of cooperating.

The user will find it easier to search in a much larger and more complete information quantity, thereby improving the chances of getting a complete answer, and the process of obtaining the material will be much swifter. This way you keep pace with the considerable increase in the production of research information and the parallel increase of its application.

Electronic connection between libraries, users and interested parties facilitates more effective information exchange. The distribution of roles, as shown in Figure 1, may alter:

Fejl! Bogmærke er ikke defineret.

•The users can carry out searches themselves and order material across libraries and databases, nationally as well as internationally

•The libraries can rationalise their acquisitions, as only one copy is required of a digital document

•The libraries can to a greater extent act as publishers

•The publishing houses can give direct access to digital documents (like libraries)

Figure 1: Relations between the participants

Electronic access to all catalogue information and to an increasing amount of digital documents, as well as ordering traditional materials from those libraries, which are part of Denmark's electronic research library will be some of the new opportunities presented to the users. More specifically this will mean:

The possibility of swift and coordinated searching across several databases (independent of the physical position of the bases both nationally and internationally) based on a combination of many search profiles

A uniform, user-friendly retrieval system with the same user interface, whichever database one is searching in

A current, automatically updated list of literature and periodicals chosen according to individual search profiles/criteria (notification of information via search robots).

Everybody will have access, either from home or from a library. It will be an Internet or Internet-like access.

1.2. Consequences

Realization of the concept will require new technology, as described in section 3. In order to get the maximum benefit the libraries will have to change the old patterns and base their cooperation on common standards and guidelines.

Fejl! Bogmærke er ikke defineret.

Denmark's electronic research library must create a profile and a level of service, which encourage the users to feel that they are "customers" in a common (virtual) unity and not in different physically separated research libraries with different conditions (borrow/download) or options. A similar profile should be presented to the suppliers. It is, therefore, necessary to develop a common set of rules to formalize this cooperation. Some areas might be:

Direct ordering from any library will change library cooperation and the economic foundation across institutions and appropriate ministeries

The acquisition of only one digital copy will require coordination of i.a. agreements on national licenses

The inclusion of the total number of research library users will necessitate that the level of service is determined according to common guidelines.

Increased cooperation between the research libraries will require overall, joint management/coordination. Cooperation across ministrial borders must be established, but the decentral participants must retain their independence in order to preserve the dynamics of the system.

A number of projects at national level - closely associated with existing national and international projects - should also be launched:

Establishment of critical mass of digital documents through digitization (scanning) of relevant collections and agreement on national licenses regarding access to digital document collections

Registration of published material and development of a standard for metadata, which facilitate consistent indexing

Compilation of results and experiences of electronic ordering, acquisition and cataloguing as the basis for a national strategy. Experiences with choice of foreign suppliers should be incorporated

Publishing and quality assurance of material.

These projects could form the basis for a decision on whether they should become national

**Fejl!
Bogm
ærke
er
ikke
define
ret.**

services with the necessary critical mass.

The individual research libraries will develop into two types of participants. One the extremely active participants in network cooperation, i.e. their collections and services have become part of the common services. The other type do not make their collections available on the network and are therefore less active, but prepared to promote the collections belonging to the active type, by offering search and ordering possibilities. This is something the user is able to do from home, but the library will often have a better connection.

Denmark's electronic research library will consist of four main components:

> The **national infrastructure** which connects the participants nationally as well as internationally

> The **library infrastructure** which is essential in making the individual library's information resources part of a whole

> **Digital resources**, including establishment of and access to these as well as negotiations with other information suppliers on access for the users of Denmark's electronic research library

> **Facilities** like for example work stations and printers, which assist the user of the individual library in effectively gaining access to and use of the electronic research library's resources.

Initial costs will depend on the level of ambition for each of the four main components. Section 4 contains an economic estimate for three scenarios, and the total costs for the five year period amount to 134 mil DKr for the basic scenario, 212 mil DKr for the extended scenario and 295 mil DKr for the advanced scenario.

Fejl! Bogmærke er ikke defineret.

2. Research libraries of the future

Over the years one of the characteristics of the research libraries has been their reference service, which has provided an overview of and access to all literature, and a major part of this literature has been available in their own collections. The advance of technology means that the nuances of these characteristics are changing.

2.1. Information volume increasing

The volume of information on a continual increase

The marked increase of the volume of information over the past 30-50 years will continue. The pace itself is expected to intensify, not least because the development of the subject for the material is no longer the single reason - the technology behind the material plays a part. Until now the increase has related to subject areas undergoing marked development, in future the increase will therefore affect the subject areas in a broader sense.

Digital documents are not only literature, but also sound, images etc.

Literature is no longer the sole information resource, although it will probably continue to dominate for some time to come. Images, film, video and sound have long been supplementary, but will gain in stature as they become available in digital form. The digital form lends itself better to dissemination, but apart from that it offers the possibility of integrated documents, as it is not possible at byte-level to decide, whether it is text, sound or image.

The document concept under continuous development

The extension of the literature - or rather document - concept will continue, and the first examples of documents with built-in calculation models are already available. For pure technical reasons a research library can therefore expect a further increase in the volume of material, which it has to deal with.

More and more documents are being produced	Even without new types of materials the volume is going to increase, partly because of the increased number of people (researchers) who produce, partly because publishing has become much simpler. Modern word-processing etc. has simplified the process of getting a ready for press manuscript and publication via the Internet has lowered the threshold for publishing.

2.2. Tasks

Two kinds of works: Those one must have, and those which might be practical to have	A research library's collection can be divided into those works held in common with other research libraries, and those held because of being closest to the source, and which are guaranteed to be kept for posterity, e.g. by legal deposit. In our digital world there will be a greater need for distinguishing between the two types.
Less need for those it is practical to have	A ditigal work - as opposed to a traditional work - may be used by several people simultaneously. If you have got no responsibility for the preservation, you might therefore in principle only need the catalogue reference on where to find the work, and thereafter provide a copy if a user should so want. It presupposes, however, that copyright regulations allow for such copying, and that he who has the responsibility for preservation exercises the same definition of this responsibility, as you youself feel is relevant when considering your users. Often a digital copy will be technically/economically appropriate instead of photocopying each time.

Responsibility for legal deposit copy must be evident (from the cataloguing)	At the same time having the responsibility for preservation becomes more binding, because others to a greater extent will be able to rely on getting a copy, when the need arises. The cataloguing of such works will therefore have to state more explicitly than is the case today, what the responsibility for preservation entails.
Increasing interest, in traditional services too	Many of the present tasks will remain, i.a. because the present collections will be predominant for some time to come. Experience tells you that improved retrieval facilities create greater interest also in traditional services. Technology on the other hand will make a more rational connection between these tasks possible, with the result that special departments may be reduced and routines simplified, particularly by leaving some of the tasks to the users.
New tasks will emerge: The cooperating system makes demands on IT-infrastructure, coordinated user administration etc. and national licenses	Instead of removing tasks technology will cause new tasks to emerge. First and foremost the special library community tasks. They are i.a. guidelines for user administration, coordination of acquisitions, like for example national licenses and maintaining and developing the IT-infrastructure.
IT-services developed to ensure stability and accessibility	Pure IT-tasks must be given priority. Stability and accessibility for IT-systems will become even more important, when the user group is extended beyond the library's own limits and staff. The greater the distance to a breakdown which affects you, the more important stability becomes, cf. telephone and electricity supply.

Fejl! Bogmærke er ikke defineret.

Tasks left to the users mean training becomes necessary

Leaving some tasks to the users by giving them access to intelligent IT-systems relieves you of certain jobs, but on the other hand the need will arise for training and further education not only for library staff. The task of teaching would best be placed with the individual research library.

Quality assurance etc. turns publishing into a library task

Publishing becomes easier, but even so a number of subsidiary tasks remain, which the research libraries have the necessary competence to deal with. Like for example the cataloguing competence and information quality assurance (of authenticity etc., but not an assessment of the contents). Finally the publishing competence which the research libraries automatically develop could be applied to publishing brochures, annual reports etc, which are not necessarily obvious parts of a research library's collection, for affiliated institutions.

Choice and harmonization of services will require prioritization and market research

In this project it has only been possible to give a general idea of the changes which will affect the research libraries in the future. Technological development does not only open up new possibilities for the research libraries, but changes market conditions altogether, where particularly clauses relating to licenses and copyright are constantly being adapted to the market.

The research libraries will have to adapt themselves continuously to this development. It will be necessary to do so on a more formalized basis than before, particularly because of the speed of development and the vast choice of possibilities available. And because of the IT-systems being geared to gather information on how they are used, the libraries have a sound basis for succeeding.

2.3. The library

Network cooperation has created new possibilities for the users. This also means certain changes for those libraries representing the cornerstones in the network.

New services supplement the existing ones, which will still be needed

To a great extent the changes will consist of new services. The view is both in Denmark and abroad that the need for traditional services such as the use of physical materials and the facilities of the library premises does not diminish. Quite the contrary in fact as the possibilities for discovering and ordering the traditional works improve.

Electronic access without being in physical touch with own library

The continued importance of the physical collections is one of the reasons why the user will be incorporated in the research library's physical framework. That will, however, not be necessary to gain electronic access to the entire research library system. The library just has to make sure that its online system has got sufficient capacity, stability and accesessibility for the user to gain access directly from his place of work.

Own library essential, but it must be conspicuous

It does not seem to matter then which research library /libraries a user becomes attached to. There are certain matters, though, which are more easily resolved when there is close contact to the user, and in order to create this kind of relationship the research library must remain decidedly user-oriented.

It would for example be preferable if user administration relating to the entire research library system could be handled by the individual library, which has closer knowledge or advisory capacity as regards the equipment (preferred by the users).

- e.g. through special facilities

The library has to become user oriented by offering special facilities of particular interest to the user group. It might be the above-mentioned publishing assistance with works not normally being research library material, or it might be special equipment for the reproduction of more unusual multimedia documents.

They become more alike and more diverse

The research libraries will become more uniform as far as purely library professional conditions are concerned, but more diverse in their direct contact with the users. The library professional issues will more and more be settled in standards for e.g. retrieval, cataloguing, electronic presentation and preservation.

3. Technical preconditions

In the following we are going to summarize what is needed as supplement or replacement in order to achieve Denmark's electronic research library. By replacement we mean that when the suitable time for exchange or updating of existing equipment arrives, the guidelines below should be followed, particularly as regards complying with uniform standards.

We have structured the description in accordance with the four main components, each of which consists of a number of elements, cf. section 1.2.

3.1. National infrastructure

The research net as the main IT-net

The IT-net, which is going to connect the research libraries and their partners, must have high capacity in order to produce reasonably good response time. The research libraries' demands are no greater than those of the world of research as a whole, and it would therefore be opportune to use the Danish Research Net. Right now its capacity is 34 Mbps, and it has the necessary access to the international research world, including research libraries in other countries.

- but organizational limitations must be dealt with

The Danish Research Net has the advantage that a substantial part of the users are already attached to it. There are, however, some restrictions which i.a. prevent the connection of some institutions under the Ministry of Culture, including the group described as "interested parties" e.g. the public libraries. Denmark's electronic research library cannot be fully realized until these restrictions have been dealt with and solved. This report is not going to put forward any suggestions as to a solution; the focus is on the technical conditions.

Financing must be separate from individual library's budget

It is not the individual institution's responsibility to decide on the amount needed for the realization of Denmark's electronic research library. Financing of the technical infrastructure should therefore be separate from or earmarked in the individual research libraries' budgets, including online connection to the Danish Research Net.

Common guidelines part of the infrastructure

The overall infrastructure includes working out common guidelines for in particular national licensing agreements, international standards for exchange of catalogue records and automatic production of catalogue records, common policies, e.g. for Ph.D. dissertations and coordination of user administration.

Regulations for user administration must be uniform and according to common consensus

The system as a whole must acknowledge the users, their rights and interest profiles etc. Decentral registration at the nearest library would be practical, but it must be in accordance with guidelines after common consensus and accessible in the entire electronic library. Organization of the registration and guidelines must be in accordance with the law on registers.

3.2. Library infrastructure

Fejl! Bogmærke er ikke defineret.

The systems must be modular and comply with common standards	Every research library must have an information system to support all the most important functions, i.e. user administration, gateways to systems elsewhere, management of purchase/acquisition, management of loan/delivery, digital catalogue and management of digital works, including storage. The system should be modular, built like client/server systems and comply with common standards. It will then be possible to build the system with modules from different suppliers, although it would be advisable to limit the number of suppliers for practical reasons.
The systems must have Web-interface, support Z39.50, danMARC2, HTML-format and EDIFACT	Ideally the systems should have a Web-interface and retrieval etc. should follow the Z39.50-standard. Exchange of catalogue records should be according to the specifications for danMARC2 and like digital documents be stored in HTML-format or possibly PDF. Communication with external (IT-systems), e.g. about purchases should be based on EDI and follow the EDIFACT-standard.
RC-lib must be replaced, others upgraded	In some of the major research libraries these guidelines will require replacements (RC-lib) or upgrading of existing systems.
Local network with structured cabling and possibility of 100 Mbips or more	Local network is established or replaced with structured cabling with distributor boxes for switching and routing. For the normal work station a capacity of 10 Mbps may be used, but there should exist the possibility of enlarging to 100 Mbps for the avanced multimedia work stations. In the backbone and for the servers 100 Mbps or more should be used as soon as possible.

Mirrored system to gain stability	Vital parts of the network should be mirrored, or alternative routes established to gain maximum stability.
TCP/IP should be the only net-protocol during the five year period	During the five year period TCP/IP should be used as net-protocol as well as intranet facilities as a whole. We recommend that other protocols be gradually phased out. In local networks with more than about 20 work stations and a number of external ports automatic network surveillance should be established.
Surveillance and possibly outsourcing developed to gain stability and accessibility	The importance of stability and accessibility increases with the distance, and becomes more important than at present, because the distance for the user in Denmark's electronic research library can be described as infinite, when it is transparent which document server one is in contact with. Surveillance of the IT-systems must therefore be extended, and outsourcing of IT-tasks considered.
Many and different courses part of the plans	Training of library staff should be currently adapted to the changing needs of the libraries. The introduction of Denmark's electronic research library will affect many categories of staff, and several different courses, internal as well as external, will become necessary.
Training must include courses in pedagogics	The training of librarians and research librarians should emphasize pedagogical training, as library staff is going to be required to teach and advise on library use.

Administrative and library oriented systems must be on the same technical level	The research libraries must also have administrative IT-systems, which are on a par with the library oriented systems. They must both be modular client/server systems, complying with general standards, which will enable them to "work" with the information systems.

3.3. Digital resources

Catalogue records will be digital, and the whole catalogue will soon be completely digital	It is to be expected that catalogue records will be received in digital form or composed electronically, which will make it possible to bring the digital catalogue up to date without digitization (scanning). Over the five year period the most important records from the existing - non-digital -catalogues will be retrospectively converted, resulting in a fully digitized catalogue for Denmark's electronic research library.

Special parts of the physical collections may be digitized	The basic collection will at any rate consist of physical as well as digital works, and there is therefore apparently no immediate need for digitization. There might however be some particular areas which might lend themselves to conversion into digital form. It might be electronic, but analogous documents like sound; it might be fragile parts of the collection which through digitization could be made accessible to more users; it might be areas with only a small proportion not in digital form; it might be materials in great demand, which could be made more accessible; and it might be practical, e.g. when disseminating information digitally instead of photocopying or faxing.

Fejl! Bogmærke er ikke defineret.

Reach critical mass, i.a. through projects	Some digitization projects should be set in motion, i.a. to assess the size of and reach the critical mass of digital documents. One might also experiment with automatic cataloguing.
Document servers should be established	Document servers should be established with the necessary storage capacity (Terabyte), in the first instance for text-oriented documents in HTML or PDF format and later for a larger amount of scanned documents and multimedia documents.

A continuous development of this capacity will be necessary as more and more works are received in digital form. It is also to be expected that conversion (migration) will have to be carried out from time to time, as new types of servers and new or updated storage formats emerge. |

3.4. User equipment/facilities

Terminals will have to be replaced by powerful standard PCs	When changing to client/server the present terminals must be replaced by PCs. You should choose relatively powerful standard PCs, e.g. Pentium 133 Mhz and 1Gb hard disk. Yet more powerful machines will be needed for showing advanced multimedia documents. The machines should have a Web-browser and the elementary parts of an office package.
NCs will reduce running costs	NCs (netcomputers) with the appropriate software are expected to become widely used. This should reduce initial expenditure as well as running costs.

4. Economics

**Fejl!
Bogm
ærke
er
ikke
define
ret.**

At present the total expenses for the research libraries in Denmark amount to about 700 mil DKr per year. Depending on the level of ambition it would cost 4-8% of this figure annually to establish Denmark's electronic research library. Figure 2 shows the investment sequence for each of the three economic scenarios, described in detail below.

Figure 2: Investment sequence

Total costs for the five year period is 134,212 and 295 mil. DKr. respectively. If distributed on the four main components, the result is as shown in figure 3 and 4.

Figure 3: Relative distribution on main components

Figure 4: Absolute distribution on main components

These are the initial costs, not running expenses. Initial costs cover the investment needed to bring the research libraries from the present level (1st generation application of IT) further onto Denmark's electronic research library (2nd generation). In a project of this kind the financial estimate is primarily a model, illustrated by a concrete calculation of costs.

4.1. The road to Denmark's electronic research library

Denmark's electronic research library may be established at various levels of ambition. The number of facilities may vary, and so may the speed with which you reach the goal. The main report reflects this in three scenarios, and in figure 5 we have shown the expenses divided upon the four main components[1].

Figure 5: Total investments per scenario

---

[1] All three scenarios show an amount set aside for projects, rising from 33 mil. Dkr. in the basic scenario to 45 mil. Dkr. in the advanced scenario. The projects are centered around the national infrastructure and digital resources, but the total cost is placed under the digital resources.

**Fejl!
Bogm
ærke
er
ikke
define
ret.**

In the **basic scenario** network cooperation is established between the 13 major libraries[2]. The users, particularly the researchers, are having their basic demands fulfilled: They gain transparent access - from their individual place of work - to localize material, assess possibilites for loan and order electronically. The collection of digital documents consists of material originally produced in digital form.

figur

In the **developed scenario** access is extended to material in electronic form and shared facilities are established somewhat earlier in the period. All catalogue records will become accessible, the most important ones in the early stages of the period. The main difference is the emphasis of digitization of documents to reach the critical mass, and establishment of suitable user facilities, i.e. access for students too. Furthermore there will be an increased number of users and electronic usage of the libraries.

figur

In the **advanced scenario** the circle of libraries is supplemented by a dozen libraries with special collections. The emphasis will be on an increase of multimedia oriented documents, i.a. through digitization. The main emphasis will be on establishing user facilities.

figur

The distribution of costs on the four main components in the three scenarios reflects the priorities at the different levels of ambition. The national infrastructure plays a relatively larger part in the basic scenario, because it is essential to establish a suitable platform to even contemplate Denmark's electronic research library. On the other hand user facilities play a

---

[2]Aalborg University Library, The Library of the Danish Patent Office, The Danish National Library of Science and Medicine, The National Library of Education, The Danish Veterinary and Agricultural Library, Technical Knowledge Center & Library of Denmark, The Royal Library, Copenhagen Business School Library, The Library of the Århus Business School, Odense University Library, Risø Library, Roskilde University Library, The State and University Library.

Fejl! Bogmærke er ikke defineret.

minor role in the basic scenario, which means that the new options will primarily be available to researchers, who have got their own facilities.

The costs involved in the establishment of Denmark's electronic research library depend on the level of ambition and on the starting point. We have estimated the initial costs on the basis of starting from scratch, because in this project we are not looking at individual libraries. The individual library must therefore begin by looking into the possibilities inherent in the present systems. The key figures above may be used as the basis for a more concrete estimate.

4.2. Running costs

It is not possible to offer a concrete estimate of the running costs without a detailed analysis, which is not part of this project. Such an analysis has to look specifically into the individual research library, as there might be various possibilities for cooperation with the library's mother institution.

The investments mentioned include about 10% for service agreements etc. The figure does not include internal resources. Neither does it include those parts of the total costs, which include all direct and indirect expenses, like wages for the staff involved in the IT-process) and the time which they spend on tasks other than the organization's primary ones.

The fall in prices of technical equipment tends to bring about a constant need for new purchases and a constant albeit small increase in the total IT-expenses, unless emphatic management results in new services replacing some of the old ones.

5. The framework for the consultant investigation

The task has been carried out by UNI*C and Ernst & Young Management Consulting for the Ministry of Culture, the Ministry of Research and the Ministry of Education. It is described in further detail in contract of 1. October 1996 and project decription of 30. September 1996.

The project was carried out during the last three months of 1996 and January 1997.

The course of the project is described in a main report and four subreports.

5.1. Aims

The project description of 30. September 1996 outlined the aims and extent of the investigation, and was based on the mandate of 4. July 1996 for an interministerial investigation of the research libraries' need for information technological investments.

The project aimed to create the basis for decisions on the development of Danish research libraries. This development should furnish Danish research with possibilities for publishing and access to information on a par with technical developments and conditions in countries, with which we want to compare ourselves.

The prerequisite for the project was that the main trend in this development should be the establishment of Denmark's electronic research library. Our investigations have proved the relevance of this provision.

The more specific aim of the project has therefore been to work out an overall framework for an IT-based network cooperation of research libraries - the virtual library.

5.2. Background

The Danish library system, including the research libraries, started to show an interest in IT-development in the late 1960s, and during the 70s and 80s extensive parts of the collections were registered in digital catalogues and library systems were established based on this catalogue information. With certain particular projects or in special subject areas a further step forward has been taken with the establishment of digital collections or electronic access to such collections elsewhere.

Fejl! Bogmærke er ikke defineret.

This step is now being taken for the research libraries as a whole. Some of the major research libraries have been planning this for some time, and it is considered one of the most important aspects for the realization of the government's IT-action plan.

5.3. The organisation of the consultant investigation

The figure below shows the construction of the project organisation.

figur

The inter-ministerial IT-working group has had six meetings, mainly concentrated on the discussion of the reports from the investigation. The group consisted of representatives for the three ministeries, the project manager from the National Library Authority, the Ministry of Culture's advisory officer, representatives for the major research libraries, and the consultant agency's project management.

The project group has held a number of meetings, and close contact has been maintained between the project management of the consultant agency, the project manager from the National Library Authority and the Ministry of Culture's advisory officer.

5.4. Framework

The investigation has been focusing on information technological aspects and deals only briefly with the development of the processes and organisatorial consequences. It singles out factors which are going to change processes and organisation, but it does not present any suggestions or advice as to how the changes should be implemented.

There are several hundred research libraries in Denmark of very varying sizes. The investigation has focused on the larger ones (the group of 13), which will form the backbone of Denmark's electronic research library, when they are connected technically and organisationally in a network cooperation.

During the investigation a number of points have been touched upon, which are not specific for research libraries or which are not judged to be relevant within the five year scope of the investigation. Such areas were not dealt with in further detail in the investigation, and we would refer to the main report regarding this.

Fejl! Bogmærke er ikke defineret.

Economic calculations

The following economic templates represent the basic calculation for the three economic scenarios. Every scenario is described in two templates, listing the total investments covering a 5 year period as well as the economic consequences.

It should be emphasized that the calculations are only general and do not apply to specific libraries.

The templates for the economic consequences start with three columns:

1 - 1997 price level

2 - Operational costs in % of the investment

3 - Expected fall in price level per year

SKEMAER

Fejl! Bogmærke er ikke defineret.