



**Roskilde  
University**

## **E-Services in Danish Research Libraries**

Issues and Challenges at Roskilde University Library

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# Cases on Managing E-Services

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# Chapter XIV

## E–Services in Danish Research Libraries: Issues and Challenges at Roskilde University Library

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### **ABSTRACT**

*This chapter reports the findings of a case study of e-services adoption at research libraries. The case under consideration is Roskilde University Library (RUB), a research library supporting learning activities at Roskilde University. The research focuses on the main issues that RUB had to deal with in the process of adopting e-services and the future challenges that e-services provide for RUB. The chapter also presents the consequences of e-services adoption for Roskilde University library's organization, its business model and the relationships with customers, publishers (providers of knowledge), and other research libraries in Denmark. The main results can be summarized as follows: (1) adoption of e-services has forced RUB to innovate rapidly. Innovation is driven, among other factors, by ICT developments (technology push), but innovation is also user-driven and pervasive throughout the organization; (2) e-services have changed RUB's organizational structure and division of labour by moving more and more towards IT-based jobs and competences; (3) e-services have changed the relationships between users and publishers; (4) e-services have changed and continue to change the business model of the library; and (5) RUB is becoming a combination of a virtual and a physical library, moving more and more towards a virtual library with electronic resources and online communities, but still keeping the traditional function of a "knowledge space."*

## **E-SERVICES AND THEIR CHARACTERISTICS**

The networked ICT technologies (such as the Internet) are having a dramatic effect on how services and especially knowledge services are innovated, designed, produced, and distributed. In addition, ICT networks such as the Internet have created the basis for the development of new types of services. These networks may also change the way customers or users experience service functions.

E-services are defined here as services that are produced, provided, and/or consumed through the use of ICT networks such as Internet-based systems and mobile solutions. E-services can be used by both consumers and businesses, and can be accessed via a wide range of information appliances (Hoffman, 2003, p. 53). E-services also include the selling of physical goods on the Internet as for instance an airline ticket that is purchased online, but delivered by surface mail to the buyers or government services offered on the Internet or e-government. There are three main characteristics of e-services:

- The service is accessible across the Internet or other electronic networks
- The service is consumed by a person across the Internet or other electronic networks
- There might be a fee that the consumer pays the provider for using the e-service, but that might not always be the case as for example in some e-services offered by the government

Normally the production, provision, or consumption of a service requires the interaction between the service provider and the user of the service. Traditionally, this has been based on personal interactions, most often face-to-face interactions. In e-services, the production, consumption, and/or provision of services takes place through the intermediation of an ICT network such as Internet-based systems or mobile

solutions. Examples of e-services are e-banking, e-library services, e-publishing, airline tickets, e-government, information, and location services. However, e-services also include, for example, the online selling of real estate property or the purchasing of physical goods that are then delivered by other means. The advent of e-commerce and e-services has raised a number of challenges for knowledge intensive service organizations such as consulting companies, libraries, and publishers as well as for companies selling physical goods. For example, companies have to innovate, have to develop strategies and new business models for the production and provision of e-services, and acquire or develop new competences.

The purpose of this study is to investigate the challenges that e-services are posing and will pose for research or academic libraries. The research library is chosen here because it is a particular type of knowledge intensive service organization: it has the role of acquiring and providing research and learning related knowledge as well as storing and preserving such knowledge. More specifically, the study shows how the advent of e-services has revolutionized the whole concept of the library and forced the libraries to innovate at an extremely fast rate. In fact libraries have been using information and communication technologies (ICTs) for more than 20 years, but while the first wave of ICTs and technological change had resulted in automation with consequent rationalization and decreased costs, the advent of e-services is moving the library from automation to digitalization, causing a shift of paradigm in libraries. The study has focused on the issues that RUB has had to deal with as a result of e-services adoption as well as the future challenges that e-services provide for RUB. In addition, the investigation has also focused on the consequences of e-services for Roskilde University Library's organization, its business model, and relationships with customers, publishers (providers of information), and other research libraries in Denmark.

The case is based on a number of interviews with RUB management, other secondary material provided by Roskilde University Library and information provided on the Web page.

## **THE ROLE AND CONCEPT OF ACADEMIC LIBRARIES**

In order to understand how digitalization and e-services are changing the library and its activities, it is important to understand what a library is, and what its major roles in learning are. Libraries have historically had a central role in learning, since the first library was created 2,000 years ago in Alexandria. Libraries can be defined as “an organized set of resources, which includes human services as well as the entire spectrum of media (e.g., text, video, hypermedia). Libraries have physical components, such as space, equipment, and storage media; intellectual components such as collection policies that determine what materials will be included and organizational schemes that determine how the collection is accessed; and people, who manage the physical and intellectual components and interact with users to solve information problems” (Marchionini & Maurer, 1995, p. 68). Marchionini and Maurer (1995) distinguish three major roles that academic and research libraries serve in learning. The first role is sharing expensive resources. These resources are physical resources such as books, periodicals, media, and human resources such as the librarians that provide a number of responsive and proactive services. Responsive services include maintaining reserve materials, answering reference questions, providing bibliographic instructions, developing media packages, teaching users how to use the material. Proactive services include selectively disseminating information to the faculty and students, collaborating with instructors to plan teaching. The second role that libraries serve is a cultural role in preserving and organizing artifacts and ideas. Libraries have historically had the role

of preserving material to make it accessible to future learners in addition to ensuring access to materials through indexes, catalogues, and other aids that allow users to find what they need. The third role of the library is that of serving as a physical knowledge space, where people meet to study and read and often to exchange ideas.

## **DANISH LIBRARY LANDSCAPE**

### **The Danish Library Concept**

The Danish library system is based on the concept of the citizen’s fundamental right to knowledge and information. Basically the library service is free of charge, but libraries can demand payment for special services (Danish National Library Authority, [www.bs.dk/publikationer/english/statistics/](http://www.bs.dk/publikationer/english/statistics/)). The Danish library system is characterized by extensive and well-functioning cooperation, both within the individual library sector and between the different library types. In Denmark there is an agency that is responsible for all matters that are related to libraries: The Danish National Library Authority. The Danish National Library Authority is an agency under the Ministry of Culture. The Authority is responsible for advising the government on the organization, coordination, and strategy for the Danish Library Service and gives professional advice to ministers and public authorities, as well as local authorities, libraries, and information services. In addition, the Authority has an active role in international collaboration within the field of libraries, documentation, and information. The major duties of the Authority consist of the administration of the Act regarding library services and a number of statutory government grants for library purposes. The Authority is also responsible for collecting and providing statistical information about Danish libraries. The Authority furthermore acts as the administrative base (secretariat) for Denmark’s Electronic Research Library. This is a major initiative for the

development of e-services in Denmark and the libraries digitalization process.

There are two types of libraries in Denmark: public libraries and research libraries. The purpose of public libraries is to promote information, education, and cultural activity by placing books and other media at the disposal of the public. Libraries therefore offer books, serials, talking books, recorded music, and electronic information resources (including the Internet) to the citizens. All the public libraries are connected to the Internet. In 2004 there were 224 main public libraries, 428 branch libraries, and 44 mobile libraries.

Danish research libraries are government institutions and serve mainly higher education and research, but most of them are also open to the public at large. In Denmark there are 20 major research libraries connected to universities and other institutions of higher-level education. There are also a large number of smaller research libraries that are connected to educational institutions. The Royal Library located in Copenhagen and the State and University Library in the city of Århus have specific national library functions. The Royal Library functions both as Denmark's national library—including being a legal deposit library—and as the library of the University of Copenhagen. The State and University Library in Århus is similarly a legal deposit library. It houses the national media collection and has the overall responsibility for the Danish Central Library for Immigrant Literature and the Danish Repository Library for Public Libraries. The library acts as the national superstructure for the public libraries. Appendix 1 provides detailed data about Danish research library statistics such as number of staff, stock, expenditures, salaries, interlibrary loans, and so forth (<http://www.bs.dk/publikationer/english/statistics/2004/index.htm>).

## **The Important Role of DEFF in the Digitalization of the Danish Research Library System**

In the 1990s, the Danish government had made a policy plan focusing on the “IT society” or “IT for all.” This vision of IT for all included the digitalization of the libraries to provide all the citizens with access to electronic resources. As a result the Ministry of Culture, the Ministry of Education and the Ministry of Science established an IT working group in May 1996 with the objective of investigating how to transform a number of research libraries into electronic research libraries. This idea laid the foundation for the establishment of the “Denmark’s Electronic Research Library,” via a network of cooperating electronic research libraries (<http://www.bs.dk>). In 1997, the “DEF report” was published with a view to creating a basis for a joint effort for the research libraries’ IT development. The report described a model of reference for Denmark’s Electronic Research Library (DEF), including the essential electronic functions and services to be delivered by such libraries. Consequently, a budget was allocated by the three ministers involved, a board of directors (steering committee) was appointed, and a vision and a strategy for the project were developed. In 2003, DEF became a permanent activity with the objective of improving the use of IT in supporting research and education. This is done through six programme areas:

- E-learning
- E-publishing
- Licenses
- Portals
- System architecture
- User facilities

Today, Denmark’s Electronic Research Library (DEFF) is an organizational and technological partnership between research libraries cofinanced by the Ministry of Science, Technology

and Innovation, the Ministry of Culture and the Ministry of Education and based at The Danish National Library Authority. Its purpose is to advance the development of a network of electronic research libraries that make available their electronic and other information resources in a coherent and simple way. This is obtained partly through government funding and partly by joint purchase of licenses ([www.deff.dk](http://www.deff.dk)). According to DEFF's Web page, the strategy of DEFF is "to improve the end user's access to information through cooperation between the Danish special and research libraries. The cooperation includes joint development in cases where cooperation will result in a greater advantage than the sum of local initiatives, including a better and total utilization of the libraries' resources; further development of the joint network of information resources; collective dissemination of the research libraries' information resources to the public" ([www.deff.dk](http://www.deff.dk)).

## ORGANIZATION BACKGROUND: ROSKILDE UNIVERSITY LIBRARY

Roskilde University Library (RUB) is a research library serving the students and staff at Roskilde University. Roskilde University is a smaller university located in Roskilde, a city about 35 km from Copenhagen, the capital City of Denmark. The university counts circa 10,000 students. According to Roskilde University Statute ([www.ruc.dk/library](http://www.ruc.dk/library)), Roskilde University Library has the following purposes:

1. To give teachers and students at Roskilde University access to information and materials containing information necessary for research and teaching, as well as to ensure information on and access to the university teachers' and students' research.
2. As a public research library to make available its collection to external users, among which

are regional research and teaching institutions, business, and citizens.

3. To participate in the national and international library collaboration.
4. To conduct research and development within the library subjects and functions, but also the surrounding community and businesses as well as anybody who would like to use the library being this a public library.

Today the library counts approximately 45 employees, and the number of employees has decreased due to the digitalization process and e-services adoption. The following table summarizes some basic information about the library.

The library counts today a number of paper books, paper journals, the entire spectrum of media as for example videos, and a number of e-journals and e-books. The library still acquires 8,000–9,000 books in paper format per year. The cataloguing of these books and paper journals is still done by people employed at the library. However they expect this number to go down, while the number of e-books goes up, especially as the quality of e-books improves. In addition, RUB counts today circa 18,000 e-journals, while the number of paper journals has gone down from circa 5,000 to 2,000. The purchase of the e-journals is based on the gateway model (Scupola, 2002). This model implies that the library buys the license to the e-journals that are stored in a central repository located at the publishing house. Information and communication technologies (ICTs) have made their way into library systems over more

*Table 1. Roskilde University Library employees divided by position*

Function/Position	Number of Employees
Research Librarian	9.6
Librarian	12.9
Office Functions	14.5
IT	6.5
Other	1.5



than 20 years, and today, in Denmark, libraries are the heaviest users of ICTs among the public sector institutions. At the beginning of the library digitalization process, ICTs contributed to a transformation from a card catalogue to an electronic catalogue. The advent of the World Wide Web roughly 10 years ago has completely revolutionized the way RUB operates and has made possible a number of e-services and self-services. The adoption and implementation of e-services and self-services has resulted in a number of organizational changes, changes in the organizational structure, the competencies of the librarians and relationships between the library and the publishers and the library and the users. In addition, the business model is also changing as RUB is trying to sell the services to private businesses. RUB is moving towards a combination of a physical and virtual library, as many services are getting transformed into e-services and self-services. The advent of e-commerce has raised the question of disintermediation of some actors of the value chain (e.g., Scupola, 2002; Sarkar, Butler, & Steinfield, 1995). Accordingly some speculations have been made about the disintermediation of the research library. However RUB's management believes that the library will still exist due to the value that it adds to the electronic resources provided by the publishers, the need to collect and store the knowledge produced on campus by teachers and students, and the need for a knowledge space where students meet with friends and go to study. Therefore Internet and e-services might change many aspects of the library and its relationships with users and publishers. However, RUB might preserve its historical role of knowledge space, even though after the implementation of library's online communities, such knowledge space can also become a virtual knowledge space.

### **E-Services Adoption at RUB**

Over the last few years RUB has adopted a number of e-services and self-services that are changing

many aspects of the way the library operates. Many of the services provided by RUB have been transformed into e-services after the advent of the World Wide Web. The main e-services offered at RUB are as follows:

1. Access to electronic journals
2. Access to electronic books
3. Digital repository of all the students projects
4. Chat with a librarian

Examples of self-services include:

1. Rucforsk: a self-service system for the online registration of research and other activities of the teachers
2. Online reference search, online reservation of material not available in the library, and so on

The library is also working on developing a digital repository of the compendia used in the courses. These e-services and self-services are developed on the base of open source software, although the IT department at RUB modifies it to make the software fit to their needs. However they try to use the original open source software as much as possible since it is very expensive to modify it.

### **ISSUES AND CHALLENGES IN THE ADOPTION OF E-SERVICES**

This section presents the main issues that RUB has encountered in e-services' adoption, the organizational transformations RUB had to go through as a consequence, and the challenges that RUB is presently facing and expecting to face in the future.

## **Back Office**

Back office processes have been completely automated as a result of e-service adoption, and they have changed from being manual to being electronic. All library work is today done with the use of ICTs. Even when they get the paper journal, they insert it into an integrated library system. Everyone working in the library is using ICTs to do their job.

## **Innovation**

Innovation is very important at RUB. The whole e-services and self-services business model is based on it, especially IT-driven innovation. E-services related innovations at RUB are both user-driven and employee-driven. The sources of innovation are very different. A lot of projects are based on ideas coming from people employed at RUB such as librarians, management, the director, and the IT department. Also the librarians provide courses to newly enrolled students and faculty about how to use the e-services, and a lot of ideas come from these teaching sessions. In addition they have a customer-complaint box and library users may send e-mails to the library. These e-mails get screened and RUB may use such suggestions for incremental innovations. DEFF (see above) is also an important source of innovation, especially regarding the technology aspect of e-services implementation. Through DEFF, RUB can get ideas from and share experiences with other libraries. For example, each library might be in charge of testing an IT solution, then they share experiences and finally they decide to choose and adopt a system. DEFF is also important in financing new ideas or innovation projects, as RUB might lack the financial resources to start all the projects they believe are worth pursuing.

The main driving forces of e-services adoption have been the government vision and policy for an "IT society for all," the technological development of the Internet, World Wide Web and related IT

solutions mainly in a technology push fashion, the pressure from cutting costs in the public sector coming either from the government or local university authorities, an IT innovation culture that has always existed in the Danish libraries (as the director of reader services says "you want to be a little bit better than your neighbour library"), competition among the different libraries' top management and, even though to a less extent, the customer wishes.

## **Organizational Change**

The digitalization process has changed the structure of RUB's organization in several ways. First of all a new organizational level, a management level, has been introduced that can make the organization look more hierarchical than before, but it cannot really be compared with a classical hierarchical structure. In addition this management level mainly deals with library development and with political issues. Most importantly the division of labour has changed. In particular, the number of IT-related jobs has grown a lot. For example, 13 years ago, RUB had one employee dealing with IT, while today they employ six to seven people in the IT department. The IT department is expected to grow in the future in special fields. In addition almost everybody in the library has to be an IT literate and librarians have to grow together with IT as the trends change rapidly. Each employee is participating in several projects, mostly dealing with e-services and e-services development. When Roskilde University started, RUB employed circa 70 people and was servicing about one third of the number of students and faculties it has today. Nowadays, RUB employs 45 people and serves a number of students and faculties which is three times as large as the one that was servicing when the university was founded. There is a shift from the librarians to the users in the production-consumption of e-services. The use of e-services and self-services is increasing. Circa 80–85% of the users of the library are using e-services and self-

services. As a result, while earlier they needed two to three librarians at the reference desk, one is now enough. As in all the organizational changes, this is causing resistance among the employees and users of e-services. As a matter of fact, even though most of RUB users (about 80–85%) are very satisfied with the digitalization trend and the introduction of e-services, there is still a small group that is missing the old library and is unsatisfied with e-services.

### **RUB Business Model**

RUB's business model is changing as a result of e-services and self-service adoption and is going in different directions. Within Roskilde University, RUB is getting more involved with Campus IT, which is presently developed by the IT Department at Roskilde University. However, collaboration is sometimes difficult due to different priorities. RUB believes that they will play a central role in future e-learning projects at Roskilde University. In addition they are trying to collaborate with the teachers and instructors on how to best use the library for teaching and research, including a number of courses on how to use the e-services and self-services that the library offers. Outside Roskilde University, RUB is looking at the possibility of offering consulting in the field of e-services for other libraries, including business libraries. They are also trying to open their market not only to the campus' students and faculties, but also to companies, especially small and medium enterprises. Participation in the DEFF project can influence the future of RUB's business model as well. For example, they presently provide an e-service called "Chat with a Librarian", which they are running not only for RUB, but for all the other research libraries in Denmark as well.

### **Relationships with Customers/Users**

Since the introduction of e-services and self-services, the relationships with the users of the

libraries have changed a lot. The number of users coming to the physical reference desk is decreasing quickly, while the number of inquiries at the virtual desk is increasing. The total number of inquiries is decreasing. In addition user behaviour is also changing. For example while paper books are still important for the readers, the total number of library loans is decreasing and the number of downloads of e-books is increasing. This trend is also observed for the journals. While RUB still has a substantial number of paper journals, more and more downloads of e-journal articles are taking place. They expect that the loans of physical books and journals will not be important in five years and that most of the material will be provided in electronic form. The users that have a log-in to the library can access the e-services 24 hours per day, seven days per week no matter where they are. So they will have everything they need on the computer. Some things are printed; others are not. The relationships with the users are expected to change even more in the future as a result of implementation of library blogs. In fact, RUB is looking at blogs and how to use them or integrate them with e-services such as electronic journals or e-books. Blogs would have the objective of creating online communities around specific topics, specific books, or journal articles. In addition, RUB is negotiating with Google to have all its collection retrievable through Google search engines. Therefore, e-services are leading to a digitalization of knowledge that was already codified in printed form. E-services are making it easier and quicker for users to find, store, and analyze such knowledge. In addition, e-services are making it easier for more users to get access to the same piece of knowledge or information. In fact if only one user at a time could get access to a specific journal in print form, in electronic form many users can get access to the same journal, article, or book chapter simultaneously. Furthermore, e-services are pushing customer relationships towards a virtual form. This is the case both regarding the relationship between the

user and librarian and the relationship among the library's users which, after the implementation of blogs, is expected both to become more virtualized and to increase in number due to the formation of online communities.

### **Relationships with Publishers (or Providers)**

This relationship has also changed as a result of e-services. Many of the traditional transactions such as ordering, cataloguing, and so forth, of journals have almost disappeared. The total number of transactions with the publishers has decreased. The e-journals are kept at the publishers' repository and RUB only buys the access or license to them. Initially the publishers offered a huge number of e-journals at extra cost. As a result, RUB cut the number of paper journals from approximately 5,000 to around 2,000 and instead has acquired access to circa 18,000 e-journals. However the publishers are now increasing prices on e-journals, therefore the total costs might increase as a result in the future. This kind of license agreement has contributed to the formation of a Danish library consortium whose purpose is to get better prices for electronic journals and e-books from the publishers.

### **Relationships with Other Research Libraries**

The trend towards the adoption of e-services by the Danish libraries has changed the relationship between RUB and other research libraries in Denmark by increasing collaboration and partnerships among them. While earlier they were competing on services, number, and type of journals and books offered, after the adoption of e-services there is much more collaboration among Danish research libraries. Two key examples of this collaboration and partnerships which RUB is part of are Denmark Licensing Consortium and the DEFF initiative. Denmark Licensing Consortium

is a consortium of libraries getting common licenses to publishers' e-journals and e-books. The major purpose is to put pressure on the publishers and decrease costs for the individual library. Therefore, the adoption of e-services is causing a convergence and standardization of the (e-)services offered by the different Danish libraries. Libraries were differentiating from each other much more before the adoption of e-services. Now all the research libraries members of the license consortium offer the same types of e-journals and e-books, and more or less the same type of e-services. Those few that are ahead get caught up within a six-month period.

DEFF is, as described above, a major initiative undertaken by the Danish government with the purpose of developing a network of electronic research libraries that make available their electronic and other information resources in a coherent and simple way. This is obtained partly through government funding and partly by joint license purchase ([www.deff.dk](http://www.deff.dk)). By participating in DEFF, the libraries can achieve economies of scope and scale in the development of e-services.

### **FUTURE CHALLENGES**

There are many challenges laying ahead for RUB. RUB will continue to exist and keep the role of library as an information centre, but the way the information and knowledge is provided will change. RUB will still face several organizational and technological challenges in the future.

From a technology point of view, the ICTs platforms used in delivering e-services become obsolete quite periodically and new e-services solutions have to be found. For example with the development of Web 2.0, they will have to make new types of systems. Integration of RUB e-services into one simple system is also an important technical future challenge. Presently

the e-services located on the Web page are connected to six or seven different systems, and a future challenge is to integrate all these different systems. Standardization is another technological challenge. Customers want a rapid response and RUB is working on this by looking at standardization issues and they have to keep doing so in the future. Standards are very important for library's e-services. Finally, ensuring getting the best and same results for the same search is also a future technical challenge.

Copyrights and licenses are another important obstacle and challenge for the development of RUB's e-services. For example, they are running a project to convert the library's videos into files to be kept on the local servers. The problem is though that whenever a student wants to see a video, instead of seeing the file on the computer screen, they have to save the file on the tape, since the material that they loan out has to be in analogue form due to copyrights restrictions. So copyrights of what can be digitized are a big barrier to further e-services development and especially use by the customers. Licenses on the other hand limit the use of the e-services for remote users not connected to the university and therefore do not have a log in to the library system. This implies that these users still have to walk into the library to be able to use the e-services, thus limiting to some extent their functionality.

Another future challenge comes from the library users. The users are becoming much more advanced and sophisticated in their online searches; young people have a lot of ideas about how to do things better. Here the challenge is to understand their needs and implement user-driven innovations in e-services. Budget problems are another challenge for RUB. In the last few years the budgets allocated to research libraries have been decreasing. This trend has been worsened by decentralizing the budgets concerning the research libraries from the government to the university the libraries are connected to. This creates the possibility for management at Roskilde

University to cut the library's budget in favour of other activities.

Organizational challenges are also lying ahead. As the number of physical loans will decrease and the number of electronic downloads keeps increasing, there is going to be less need for the reference desk and the number of positions in the library might decrease. The way of working in the library is changing, therefore the type of competences needed might change moving more towards IT specialists and going away from the classical librarians skills. Disagreement on e-services' future development between the different groups in the library is also a major organizational and human resource challenge, even though most RUB's employees like e-services. This requires RUB to explore new functions and new directions to change their business model.

## **CONCLUSION**

This chapter has contributed to understand e-services development by investigating a particular type of e-services: research library e-services. Specifically the study has investigated the implication of the advent of Internet and e-services for Roskilde University library as well as the future challenges that e-services provide for RUB. The study has also investigated the consequences of e-services for Roskilde University library organization, its business model, and relationships with customers, publishers (providers of information), and other research libraries. The picture that emerges is one of rapid innovation, big transformations, and change at organizational and business model level, as well as in the relationships with customers, publishers, and other research libraries. In addition there are a number of challenges that RUB has to face in the future in response to e-services. Some are IT-related; others have to deal with copyrights, licenses, standardization, and user-driven innovation. The general trend is that RUB is becoming a combina-

tion of a virtual and physical library, moving more and more towards a virtual library by providing resources and knowledge mainly in digital form and by offering blogs and possibilities of online communities to discuss books and articles. On the other hand RUB is still keeping the traditional library function of a physical knowledge space. What will RUB look like in 10 years? The only certain answer according to RUB management is that it will still exist.

## REFERENCES

- Hoffman, K.D. (2003). Marketing+MIS=E-Service. *Communications of the ACM*, 46(6), 53–55.
- Marchionini, G., & Maurer, H. (1995). The roles of digital libraries in teaching and learning. *Communications of the ACM*, 38(4), 67–75.

Sarkar, M.B., Butler, B., & Steinfield, C. (1995). Intermediaries and cybermediaries: A continuing role for mediating players in the electronic marketplace. *Journal of Computer Mediated Communication*, 1(3).

Scupola, A. (2002). The impact of electronic commerce on industry structure: The case of scientific, technical and medical publishing. *Journal of Information Science*, 28(3).

## ENDNOTE

- <sup>1</sup> Including the metropolitan municipalities of Copenhagen and Frederiksberg

## APPENDIX 1: THE DANISH RESEARCH LIBRARY STATISTICS 2004<sup>1</sup>

Table 1. General figures about Denmark

Area	43,094 km <sup>2</sup>
Local authorities	271
<b>Counties<sup>1</sup></b>	<b>16</b>

Table 2. Denmark's population per 1.1. 2005

Adults	4,459,978
Children (0-13)	951,329
<b>Total</b>	<b>5,411,307</b>

Table 3. Number of research libraries in 2004

National library	2
Libraries of institutions of higher education	100
Special libraries	78
<b>Total</b>	<b>180</b>

Table 4. Staff in 2004

National library	563
Libraries of institutions of higher education	788
Special libraries	219
<b>Total</b>	<b>1,570</b>

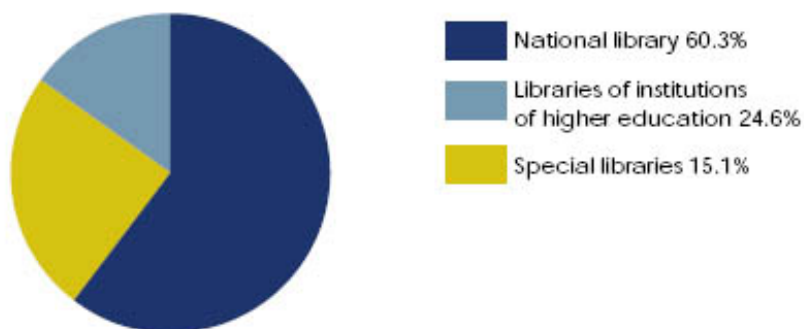


Table 5. Research libraries stock in 2004

National library	26,573,386
Libraries of institutions of higher education	10,834,470
Special libraries	6,633,201
<b>Total</b>	<b>44,041,057</b>

Table 6. Serials subscriptions

National library	61,270
Libraries of institutions of higher education	32,388
Special libraries	14,021
<b>Total</b>	<b>107,679</b>

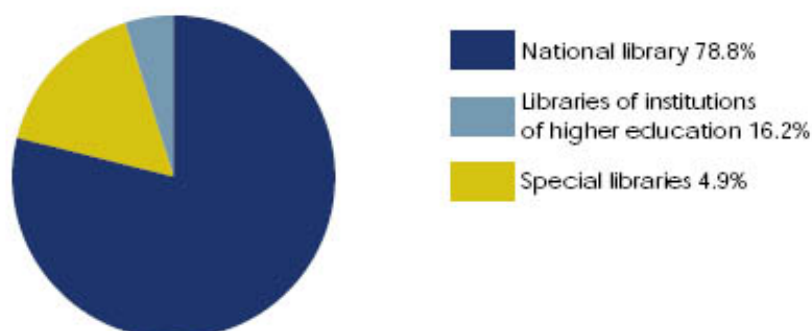


Table 7. Research libraries additions in 2004

National library	1,221,707
Libraries of institutions of higher education	251,679
Special libraries	76,085
<b>Total</b>	<b>1,549,471</b>

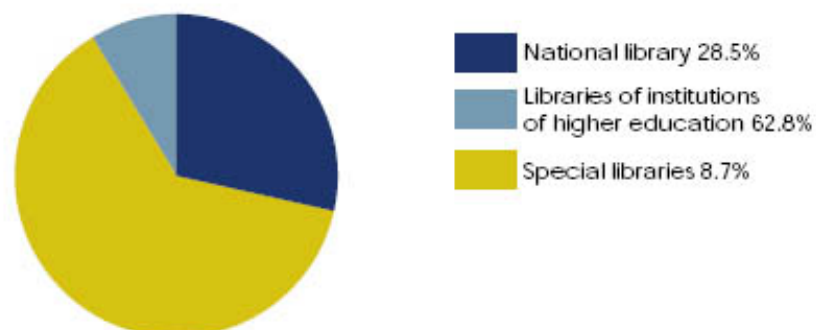


Table 8. Research libraries loans including renewals in 2004

National library	2,759,796
Libraries of institutions of higher education	6,088,009
Special libraries	844,535
<b>Total</b>	<b>9,692,340</b>

Table 9. Interlibrary loans supplied

by National library	513,604
by libraries of institutions of higher education	507,662
by special libraries	41,423
<b>Total Interlibrary loans supplied</b>	<b>1,062,689</b>



## E-Services in Danish Research Libraries

Table 10. Interlibrary loans received

by National library	61,256
by libraries of institutions of higher education	151,862
by special libraries	25,444
<b>Total Interlibrary loans received</b>	<b>238,562</b>

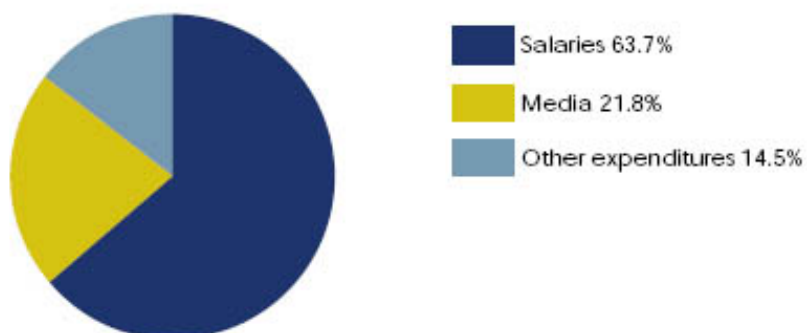


Table 11. Research libraries operating expenditure in 2004

	1,000 DKK
Salaries	537,372
Media	183,687
Other expenditure	122,501
<b>Total</b>	<b>843,559</b>

Table 12. Research libraries operating expenditure in 2004

	1,000 DKK	%
National library	295,588	35.0%
Libraries of institutions of higher education	436,042	51.7%
Special libraries	111,929	13.3%
<b>Total</b>	<b>843,559</b>	<b>100.0%</b>

## ENDNOTE

- <sup>1</sup> These statistics are adapted from the Danish Library Authority Statistics (<http://www.bs.dk/publikationer/english/statistics/2004/index.htm>). The figures apply to the 180 Danish research libraries which are funded by the government, open to the public and employ professional librarian(s) on a permanent basis. There are a further 583 smaller research libraries which do not meet these requirements, including 122 institute (departmental) libraries at universities and institutions of higher education.