The Digital Library of Slovenia Development Strategy – dLib.si 2007-2010

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The Digital Library of Slovenia Development Strategy – dLib.si 2007-2010

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Contents

I. Introduction 5

1. Purpose of this document 5
2. Terminology issues 6
3. National libraries and preservation of digital cultural heritage 6
4. Documents pertaining to the creation of the dLib.si digital library 9

II. Analysis of the current state-of-the-art 11

1. Digital libraries in EU countries 11
2. Digitization and digital library in Slovenia 16
3. State-of-the-art analysis of dLib.si 19
4. State-of-the-art analysis of dLib.si information technology 21

III. Bibliography 23

IV. dLib.si: vision, mission and goals 25

1. Vision 25
2. Mission of the Digital Library of Slovenia 25
3. Goals 25

V. Proposal for the dLib.si system 34

1. The roles and users of the dLib.si system 34
2. High level architecture of the dLib.si system 35
3. The process of digitization of library materials in analogue form 37
4. The life-cycle of the digital material in the dLib.si system 37
5. The information protection in the dLib.si system 38
6. The dLib.si portal services 39
7. Organizational support for dLib.si 42
8. Technologies and standards 44
9. Business model 44

VI. Strategy: implementation plan 46

VII. Appendix 47

1. Harvesting in dLib.si 47
2. Searching in dLib.si 48
3. Searching in NUK catalogue 49

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Figures

Figure 1: The dLib.si strategic goals 26
Figure 2: Life-cycle phases of digital contents stored in the digital library 29
Figure 3: High level architecture of the dLib.si system 35
Figure 4: The process of digitization of materials 37
Figure 5: The life-cycle of the digital material in the dLib.si system 38
Figure 6: Enhancement of the dLib.si system by backup repository (symbolic presentation) 39

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I. Introduction

1. Purpose of this document

The purpose of the »Digital Library of Slovenia Development Strategy – dLib.si 2007-2010« is to devise a strategy leading to creation of a comprehensive national digital library to cover the 2007-2010 period. NUK thus responds both to the EU initiatives and to current library user requirements, dictated also by advanced technology solutions to provide most state-of-the-art and refined information services.

In the above-mentioned period a number of projects will be carried out with the aim to create a modern, accomplished, user-friendly and simple-to-use digital library, which takes into account long-term preservation of most precious collections in the field of cultural heritage, providing access to these to the public at large. The main topics discussed by the Strategy are:

- building a comprehensive digital library,
- establishing organizational structure to support the Digital Library of Slovenia,
- enhancing quality service,
- selecting library materials for digitization at the national level,
- digitization of national collections,
- services offered via dLib.si web portal.

A comprehensive digital library will make use of the value chain approach to electronic publishing, embracing harvesting of publications, digitization, dissemination and long-term preservation of crucial and nationally important library material. Through creation of a comprehensive digital library NUK will become a development and services centre to both the national library network and users of library services. The essence of the digital library can be seen in the cultural heritage held by Slovenian libraries and other institutions are thus welcome to join due to the open source technology of the portal.

We believe that the Digital Library of Slovenia, dLib.si, is an important feature of democracy since information resources are openly accessible to all users, and digital libraries are reaching out a wider audience than traditional libraries ever did. The population of potential users is global with a wide range of information needs.

2. Terminology issues

Digital library versus electronic library

The terms »digital library« and »electronic library« are mostly used synonymously, although recent professional literature tends to classify the »electronic library« term as being obsolete. The digital library term emphasizes a crucial role of the binary sytem, representing the basis which all digital records within the library rely on, whereas the term »electronic« underlines the use of electrical devices (HW/IT) to access digital content through use of electric power. On the other hand, it has been noted that the term »electronic« has been used to designate access to the catalogues and other secondary and tertiary information resources, to differentiate it from »digital«, standing for access to primary information resources and full text.

Digital archive versus digital repository

Scientific literature often demonstrates inconsistent use of the two concepts, represented by the »digital archive« and »digital repository«. Reference model[1] for an Open Archival Information System - OAIS, subject to public discussion as early as 1999, and adopted in 2003 by the International Organization for Standardization as ISO 14721:2003 standard, establishes the digital archive as "a system for archiving information, both digitized and physical, with an organizational scheme composed of people who accept the responsibility to preserve information and make it available to a designated community " [3]. The identical definition is also used by the European partners of the NEDLIB (Networked European Deposit Library) project which can be seen as the first significant project in the field of digital archives creation not only in Europe, but also world-wide. Almost at the same time (2002) a group of American research libraries (*RLG - Research Library Group*) and the OCLC (Online Computer Library Center) Consortium released a report which introduced the term *trusted digital repositories*, whose definition nevertheless followed the previously mentioned ISO standard, thus making it equal in meaning to the concept of digital archives. It would seem obvious that RLG and OCLC take into account the possibility for some organizations to implement digital repository services in terms of long-term preservation on a commercial basis, provided they meet the relevant requirements. Thus the "digital repository" term, literally meaning »digital warehouse«, e.g. system for management and preservation of documents, has assumed additional connotations which continue to create confusion among professionals.

In continuation, the *digital archive* term will be used, according to ISO standard.

3. National libraries and preservation of digital cultural heritage

National libraries are responsible for **long-term preservation** of nationally important library materials (for instance, *slovenica*). In the archival profession there is a 25-year limit to long-term preservation, but such a limit cannot be imposed in the library field. In addition, libraries are

[1] See: ISO Archiving Standards - Reference Model Papers. http://ssdoo.gsfc.nasa.gov/nost/isoas/ref_model.html

required to provide access to library holdings regardless of the information carrier and record type. Hence a national library has to take care of both storage and preservation of library collections, now presenting an ever-growing amount of items in electronic form and within those items an ever-growing portion of documents in digital form. Arising from that, world's national libraries are forced to cope with the long-term preservation issue of digital items (encompassing both digital-born and digitized information). A number of libraries have already created their digital archives, while others are still heavily involved in the process of providing relevant programming, technical, organizational... support to start building and developing such an archive.

When it comes to creation and development of both digital archive and digital library, Slovenia lags behind several comparable (considering the level of development in the library field) European countries (for example, behind Finland, the Netherlands, Germany, United Kingdom etc.). When looking at the progress made in the national bibliographic system and bibliographic databases available online, along with provision of foreign-language electronic information sources and development of the national computer network, Slovenia compares favourably to or might even be ahead of some more developed countries. On the other hand, the country cannot boast achievements when it comes to a carefully planned, nationally agreed and implemented development strategy of the digital library. Nor is there a strategy to digitize nationally important library materials. As to the amount of library material already digitized, achievements are slim.

European initiatives in the field of cultural heritage digitization and digital library building have set out the framework for readily available and easy-to-handle access to information which will make use of opportunities offered by digitization technologies. The three key areas are:

- **online accessibility,** a pre-condition for maximising the benefits that citizens, researchers and companies can draw from the information;
- **digitization** of analogue collections for their wider use in the information society;
- **preservation and storage** to ensure that future generations can access the digital material and to prevent precious content being lost[2].

Envisioning future challenges, NUK has already set about the Digital Library of Slovenia Development Strategy to cover the 2007-2010 period, together with the creation of a knowledge management information portal – Digital Library of Slovenia, dLib.si. The digital library has been designed as a foundation for the knowledge-based society and infrastructure to lifelong learning of the population. Based on home-made technology and examples from abroad, the portal will be configured as a single access entry point to knowledge and treasures held by public institutions from the fields of culture, science and education. The Digital Library of Slovenia will provide equal opportunuities of access to knowledge for all citizens, regardless of who they are and their location, it will support learning, education, research, cultural endeavours and development, thus reinforcing the national identity in the virtual environment and enhancing Slovenia's cultural identity and competitiveness amidst European consortium of nations – the European Union. The innovative environment will be centred upon the digital content creation, new technologies to handle the content and provide access, together with sophisticated technologies for long-term preservation of the digital cultural heritage. The implementation of the innovation environment will rely on

[2] Commission of the European Communities. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. i2010: Digital Libraries.

measures to achieve strategic goals with individual strategic goals carried out through one or several projects.

NUK started to work extensively on the digital library issue many years ago within the framework of research projects with the aim to develop theoretical models for collection and long-term preservation of nationally important electronic publications (for example: *Methodology of Archiving Slovenian Electronic Publications on the Internet*); other topics of concern can be seen in the development of a web harvesting robot to collect the national web sites, and in the creation and operation of a national digital archive to provide storage for digital-born and digitized information, along with long-term preservation and access. The digital library concept, including all core issues, was also introduced to wider audience, for instance, Krstulović and Šetinc [22], Krstulović [23], Krstulović, Kragelj and Musek [24].

The production of digital documents has been increasing in size and speed, thus calling for solutions in terms of storage and preservation. For several years now commercial providers have been developing *document management systems* intended for businesses with the aim to store and retrieve information. A great many systems make use of ordinary relational databases which do not perform all functions necessary for long-term preservation of digital information. Some even maintain that digital documents preservation is pretty much straightforward requiring an application to manage the files and a powerful server featuring extra large storage capacity. However, many libraries, especially national ones (for instance, Scandinavian national libraries, the Library of Congress, the National Library of Australia) have been working on the issue over the last decade, thus having already started to systematically collect and store the national digital cultural heritage. Having gained considerable experience, the libraries believe that long-term preservation of digital documents calls for a wider approach to planning in terms of information technology, human resources, location, security and budgeting challenges. Future scenarios on the use of digital documents have to be designed as well, addressing copyright dilemmas related to access to digital information. The pace of information technology development continues to increase and a number of documents, currently accessible through use of existing computer applications, will be readable in the future only when running original software under emulation on future computers. On the other hand, documents will be periodically transferred (migrated) to other computer formats. Appropriate technologies will have to be used, new skills learnt and authors approached for permission.

Long-term preservation of digital documents is a very complex task, therefore the organization responsible for digital preservation has to meet a number of attributes, for instance:

- it has to make sure that the overall system for digital preservation conforms to the Reference Model for an Open Archival Information System (OAIS);
- it has to assume the responsibility to manage the system in accordance with the range of national and international standards to ensure the ongoing acquisition, description metadata, maintenance, security and preservation of documents;
- it has to demonstrate long-term viability, e.g. the decision to undertake long-term preservation should not be commercially motivated; and it has to accept responsibility for long-term preservation for the benefit of future generations as well;
- it should be able to prove its financial sustainability – it has to have a sustainable source of income and should be able to cover all the expenses incurred by long-term preservation;

- it will ensure that staff have adequate expertise and that it has in place all appropriate information technology;
- special attention will be given to disaster prevention and recovery, including network intrusion, and to copyright protection [3].

From the national point of view, several organizations usually assume responsibility for the preservation of digital documents, according to the type of material to be stored, but provided that they meet the previously mentioned criteria. Beside the national library, which is responsible for long-term preservation of library holdings, in Slovenia there are also other organizations to take on that responsibility, such as archives, museums and other organizations from the fields of culture, education and research. Co-ordinated approach to the issue is of paramount importance. Organizations are expected to understand the needs of their designated communities and have to be prepared to invest into the maintenance of information technology and digital collections. [3].

4. Documents pertaining to the creation of the dLib.si digital library

The digital library is a significant achievement, based on a number of elements defined in strategic documents, such as *Strategy of the Republic of Slovenia in the Information Society* and *Resolution on National Programme for Culture 2004-2007,* along with several international initiatives and documents; only the most important documents will be quoted.

4.1. Documents issued by the Republic of Slovenia

Strategy of the Republic of Slovenia in the Information Society,

http://unpan1.un.org/intradoc/groups/public/documents/UNTC/UNPAN015723.pdf

Resolution on the National Programme for Culture 2004-2007, http://www.mk.gov.si/en/legislation/

4.2. EU documents and initiatives

Memorandum on Lifelong Learning [6],

http://www.europarl.europa.eu/oeil/resume.jsp?id=201662&eventId=65446&backToCaller=NO&language=en (summary)

Lund Principles [7],

http://cordis.europa.eu/ist/digicult/lund-principles.htm

Charter of Parma [8],

http://www.minervaeurope.org/structure/nrg/documents/charterparma031119final.htm

Permanent Access to the Records of Science, EU Conference: Conclusions and Recommendations[3] [9],

MINERVA Project, http://www.minervaeurope.org/ and Dynamic Action Plan [25], www.culture.gov.uk/mobility/dynamic_action_plan.pdf

CENL Resolution on Digitization of European Cultural Heritage, Luxemburg 2005, http://www.nlib.ee/cenl/vision.php

EC Communication: i2010: DIGITAL LIBRARIES [15], http://ec.europa.eu/information_society/activities/digital_libraries/index_en.htm

The Digital Library Manifesto [28],

http://www.delos.info/index.php?option=com_content&task=view&id=345

Commission Recommendation on the Digitization and Online Accessibility of Cultural Material and Digital Preservation (2006/585/EC), [29]

http://ec.europa.eu/information_society/activities/digital_libraries/doc/recommendation/recommendation/en.pdf

4.3. Other international initiatives

Declaration of Principles, 2003 [16], WSIS-03/GENEVA/DOC/4-E, **http://www.itu.int/wsis/docs/geneva/official/dop.html**

Plan of Action, 2003 [17], WSIS-03/GENEVA/DOC/5-E, **http://www.itu.int/wsis/docs/geneva/official/poa.html**

[3] Permanent access to the records of science. Conclusions and recommendations of the EU conference. The Hague, 1 November 2004.

II. Analysis of the current state-of-the-art

1. Digital libraries in EU countries

1.1. EU national libraries and access to digital contents

Europe's national libraries have a huge role to play in the preservation and accessibility of our written cultural heritage. Several national libraries have already set about the digital library creation, thus providing access to various databases of their own creation as well as to other digital collections (for example, national libraries of UK, France, Portugal, Norway, Denmark, Spain etc.), whereas the national libraries of the new Member States are involved in these activities to a much lesser extent. Within the framework of TEL-ME-MOR project a survey[4] was carried out among the new Member States, which revealed some key issues to prevent major involvement of the national libraries in research and development programmes, especially in creation of and access to digital collections. The key issues are varied, ranging from intellectual, financial and organizational to the lack of experience in the management of digitized and digital-born documents. Problems may arise in adoption and application of international standards, as well as in the development of technolgical infrastructure. According to the final report of the survey only four out of ten national libraries surveyed have made important progress in the amount of digitized documents, thus the national libraries of the Czech Republic, Estonia, Hungary and Slovenia. These four libraries have been involved with a number of European research and development projects and have also built considerable infrastructure such as digitization facilities, mass storage systems, web harvesting, and search and retrieval gateways.

The aim of the European Commission Information Society Technologies (IST)[4] Programme is to ensure better access to resources by fostering European partnerships and increasing the participation of new Member States in EU research activities. The vision can be fully realized in a shared European cultural heritage network, with its foundation already laid by The European Library[5]. To fulfil their role in the vision of a shared European heritage the survey concludes that libraries should find a more prominent role in their national research and development programmes, that more resources need to be digitized and new funding models uncovered and that more effective systems for the management of research need to be put in place. The gaps need to be overcome at the European level[6].

The level of digital library development in European national libraries depends on the level of national welfare in general. Most national libraries receive an annual grant-in-aid, therefore the

[4] IST (Information Society Technologies). http://www.cordis.lu/ist/about/about.htm
[5] http://www.theeuropeanlibrary.org
[6] The final report of the Analysis of Research Activities and Requirements of the National Libraries of the New EU Member States (2005) is aimed at the European and national policy-makers, library specialists, and the managers of the EU research networks in cultural heritage and can be downloaded at: http://www.theeuropeanlibrary.org/portal/organisation/cooperation/archive/telmemor/results.php

share of digital library funds relies heavily on the money allocated by the Government every fiscal year to any given national library.

Digital collections, created by digitization projects, from physical collections held by national libraries, are usually included into the digital libraries which are made available on the web pages of European national libraries. Access to collections is provided through links from the library's web page, through links from within the digital library, or via a digital library portal. When comparing the number of digital collections created, the national libraries from West European countries stand out (for example, the Netherlands 57, United Kingdom 54, Norway 22, Finland 14…).

Digital collections (bibliographic, data files, image collections, full-text etc.), purchased or leased by the national libraries on the commercial market, are present in a majority of the European national library web pages. Access is provided in three ways:

- access is provided separately from the rest of the collections – but from within the digital library;
- access is provided to all digital collections using a single user interface,
- access is provided via a digital library portal.

The National Library of Iceland ranks first in the total number of commercially available digital collections (201). The national libraries of Austria and Slovenia follow immediately behind (150 and 100, respectively), while the rest of the national libraries lease or purchase between 17 and 86 collections. It is often impossible to track down the exact number of commercial digital collections – either because of the way access has been configured, or because commercial digital collections have been inconsistently defined. The national libraries with their digital library still in its initial phase of development, tend to classify among commercial digital collections also links leading to collections that are not available from their home pages. Most European countries are involved in formal consortia established for managing digital collections. Only seven countries (all Scandinavian countries – except Norway -, Iceland, Baltic countries, and Slovenia) have established a consortium within the national library.

Four national libraries plan to create a digital archive within their digital library (Austria, Czech Republic, Finland, the Netherlands and Slovenia). UK is developing a distributed digital archive, involving all the UK national libraries (British Library, National Library of Scotland, National Library of Wales) and other insitutions, some of them specialized, for example, JSTOR (Scholarly Journal Archive), National Archives[7]. In most cases the digital archives are not publicly available and on the national library web pages mention is only made of their existence.

The national bibliographies, accessible via the Internet and using a purpose-made user interface, are available on four European national library web pages (Finland, Germany, Portugal and Slovenia). Some national libraries provide the national bibliography listings in .pdf format, while in some cases the overall electronic library catalogues also include the search for bibliographic records (e.g. ALEPH, OPAC) [27].

[7] More at URL: http://www.dpconline.org/docs/guides/directory.pdf, providing the list of »digital repositories«.

1.2. The national libraries of the new Member States

As evident from the *Analysis of Research Activities and Needs of National Libraries of the New EU Member States* [18], the strategic priorities of national libraries from the new Member States in the cultural heritage area coincide in general with the major EU trends in research and development. Preservation of analogue materials, preservation of and access to digital documents, along with collection and representation of resources and services, made available via portals, seem to be the most common strategic orientation in the national libraries of the new Member States.

Between individual national libraries there are significant differences in possibilities for development. The national libraries have been reasonably successful in facing new technological challenges and the increased pace of development. Most libraries provide a fast enough Internet connection for easy access to their digital information resources. In the preservation field all national libraries are dealing with acid-paper embrittlement, microfilming programmes, and special attention is paid to long-term preservation of digital-born and digitized material. Library portals can be seen as another crucial element of the current library information infrastructure, enabling the creation and use of important library and information networks. Despite the fact that most national libraries do not participate actively in research on portal implementation, half of them plan to implement one, since portal implementation has been identified as a priority action.

The highest priority for digitization among the national libraries is material representing the national cultural heritage. Digitization of manuscript material has been reported as a mainstream digitization activity in all national libraries. In digital collection management all national libraries differentiate digital documents, intended for preservation, from digital documents, intended for user access. In the time of the survey only three national libraries were applying the most recent standards, guidelines and recommendations for creating digital resources and providing access to material in digital form (Czech Republic, Hungary and Slovenia). Among institutions operating in the field of cultural heritage preservation, national libraries are the most significant creators of digital information.

When compared to other national libraries from the new Member States, NUK has a relatively low research and development budget. The library staff have nevertheless acquired considerable expertise and experience due to co-operation in several international research and development projects. The Library lags behind in the development of both digital library portal and archive because of the comparatively modest investments in the development of technological solutions to support creation of and access to digital collections and other digital library services. Similarly to other national libraries, NUK has to cope with the ever growing preservation and conservation concerns (the biggest threat being decay of materials caused by acid paper). The scale of microfilming and digitization programmes - as a means of document preservation – cannot keep pace with the speed of paper deterioration. Currently there is no overall preservation strategy for audio/video documents, nor are there systematic solutions for technological obsolescence, combined with preservation of electronic and digital information resources (migration and refreshment). As far as the development of web harvesting tools is concerned, in the time of the survey NUK was considered to be one of the technologically advanced national libraries from the new Member States, but the Library is currently losing this position due to partial or incomplete solutions in the field. Compared to other national libraries, the quantity of library materials NUK has digitized so far is fairly insufficient which has been closely related to scarce finance available for digitization activities. The Library has been more successful in the application of metadata

standards and communication protocols, but when it comes to the implementation of technological solutions, lack of user-oriented approach is apparent.

1.3. Co-operation of NUK in the European digital library initiatives

The European Library and NUK

The European Library service is an outcome of the TEL project, funded by the EC 5th Framework Programme (2001-04). At the beginning the portal provided access to digital collections and catalogues of eight European national libraries with the aim to include all 47 libraries – members of the Conference of European National Librarians (CENL) over a five-year time span. NUK was the founding member of the service. The European Library portal was launched in 2005 and can be accessed at http://www.theeuropeanlibrary.org/portal/index.html.

Participating in the »European Digital Library« Initiative

The initiative was launched by the Bibliothèque nationale de France and later on reiterated by the French President Jacques Chirac in the framework of *Rencontres européennes de la culture* at the beginning of May 2005. NUK joined 20 European national libraries that had signed the letter to support the development of the European Digital Library, emphasizing the need for the European Member States to defend their cultural and linguistic diversity.

The European Library is the organizational ground for the European digital library. This European Commission initiative will encompass not only libraries but also museums, archives and other holders of cultural heritage material. Further details can be accessed on **EDLnet** web pages, http://www.europeandigitallibrary.eu/edlnet/.

TELplus

TELplus, http://www.theeuropeanlibrary.org/portal/organisation/cooperation/telplus/, is a project funded by the European Commission under the eContentplus Programme (2007-08). TELplus is a targeted project that will run for two years. It aims to OCR more than 20 million pages of content in many languages, to make library data OAI compliant and therefore harvestable, to address usability issues through improved presentation of search results and to make improvements in semantic interoperability including multilingual search and retrieval.

EDL project

EDL project, http://www.edlproject.eu/about.php, is a targeted project funded by the European Commission under the eContentplus Programme (2006-08). The project, started in September 2006, works towards the integration of the bibliographic catalogues and digital collections of 9 national libraries from the European Union/European Free Trade Association. The project also addresses the enhancement of multilingual capabilities of The European Library portal, takes first steps towards collaboration between The Eurpean Library and other non-library cultural initiatives, and expands the marketing and communication activities of The European Library service.

Participating in the TEL-ME-MOR Project

TEL-ME-MOR was a project funded under the 6th Framework Programme (2005-07). Building on the results of the TEL project, it had two main objectives:

- TEL-ME-MOR was supporting the 10 national libraries from the new Member States, which were partners in the project, in becoming full members of The European Library, an initiative, established under the aegis of the Conference of European National Librarians (CENL), providing unified access to the electronic resources and services of the main European national libraries. By the end of the project, a comprehensive and easily searchable pan-European collection of top quality information resources covering all subject areass of interest to the research community would be available online via The European Library. Multilingual interfaces were to be developed to enable users from the new Member States to access the online facility in their own language;
- The second objective of TEL-ME-MOR was to raise awareness and disseminate information on the opportunities for participation in future projects, aimed at fostering an increased participation of institutions and organizations from the new Member States in future calls for proposals published by the European Commission within the Cultural Heritage and Learning sectors of the Information Society Technology Programme (IST).

The activities of the TEL-ME-MOR[8] project were organized into four workpackages (WPs). Three of them were led by organizations from the new Member States.

WP1 Analysis of research requirements

The objective was to investigate the research requirements of national libraries and their clients from the research and technological application sector, in the new Member States, focusing on research and new services in areas that are relevant to the Information Society Technologies (IST)

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[8] The most important materials and results of TEL-ME-MOR are available on the project web pages:

- Analysis of Research Activities and Needs of National Libraries of the New EU Member States (http://www.theeuropeanlibrary.org/cooperation/archive/telmemor/docs/WP1_FinalReport_July2005.pdf ;
- The European Library development and implementation plan for 9 New Member States (http://www.theeuropeanlibrary.org/portal/organisation/cooperation/archive/telmemor/docs/TMM-D2.2-ImplementationPlan20051007.doc) ;
- New Member States Requirements Analysis Report on Collections and Digitisation (http://www.theeuropeanlibrary.org/portal/organisation/cooperation/archive/telmemor/docs/D2.1%20-%20NMS%20Requirements%20Analysis.doc);
- Report on TEL Unicode Requirements (http://www.theeuropeanlibrary.org/portal/organisation/cooperation/archive/telmemor/docs/D3.1%20v.1.0%20Report%20on%20TEL%20Unicode%20requirements.pdf);
- Report on Subject Access Tools (http://www.theeuropeanlibrary.org/portal/organisation/cooperation/archive/telmemor/docs/D3.3-Report_on_subject_access_tools.pdf);
- First report on using and disseminating knowledge (http://www.theeuropeanlibrary.org/portal/organisation/cooperation/archive/telmemor/docs/D4.6-First_knowledge_report.pdf).

Programme. The result was a validated orientation tool for would-be IST actors in the new member states as they respond to future calls and strive to develop new ICT based services for the research communities. The workpackage was led by the National Library of the Czech Republic.

WP2 Developing the network for access to national resources

The objective was to assist national libraries from the new Member States in introducing effective information and communication technology tools and networked support services as a basis for offering all the features of The European Library environment whereby researchers could access the information they need anywhere and at any time. In addition it resulted in raising the profile of this knowledge network in the new Member States. The package was led by the National Library of the Netherlands.

WP3 Developing the multilingual capacity of the network

The objective was to lay the foundations for developing multilingual capabilities, thus making information and knowledge available from the national libraries in the new Member States easily accessible to their principal clients, namely researchers, educational and cultural workers through interfaces and search mechanisms in each of the national languages. The package was led by the National and University Library of Slovenia in co-operation with the National Library of Switzerland.

WP4 Awareness building and electronic information space for research partnerships

The objective was to build awareness of key actors in the knowledge society in the new Member States of the opportunities for involvement in research partnerships and their potential contribution to the shaping of research agendas. Methods used included linked websites in all new member states' languages, regional conferences, newsletters and organization of a European conference, which widened the impact to other CENL members in the European Union, Commonwealth of Independent Nations and Balkan countries. The package was led by the National Library of Estonia.

2. Digitization and digital library in Slovenia

2.1. SWOT analysis

Strengths:	**Opportunities:**
• rich library collections • wide-spread Internet access and use • efficient library network system and communication support • national bibliographic information system at an advanced level • expertise and experience acquired through co-operation in international	• the role of libraries as key players in the development of information society • the role of libraries as key players in the knowledge society and learning • creation of and access to value-added information and services • reinforcement of national identity and

projects • developed electronic publishing • new Legal Deposit Act stipulations to ensure legal deposit of e-publications	support of Europe's multicultural society • provision of access to Slovenian intellectual creativity • fostering the presence of Slovenian culture and language on the web • promoting partnerships
Weaknesses: • lack of national policies and strategies in providing access to and preservation of digital cultural heritage • lack of strategic goals and objectives in digitization and digital library building within the national library and information system • lack of staff expertise in areas necessary for digitization and digital library building • lack of thorough national cultural heritage inventory of materials to undergo digitization • uncoordinated efforts in digitization of library materials • scattered access to digital collections • non-compliance with international standards regulating creation of and access to digital collections • lack of qualified IT staff in libraries • significant parts of library collections waiting to be bibliographically catalogued (library online catalogues are incomplete) • Centre for Co-ordination of Digitization of Library Materials within NUK not yet operational (positions unfilled due to employment restrictions) • limited public funds allocated to digital library creation, maintenance and development	**Threats:** • decay (loss) of digital cultural heritage • »digital poverty« e.g. hindered access to information, available on modern information carriers, for citizens • competition with commercial providers and their attempts at limiting access to digital information • limited access to digital information due to unresolved copyright issues • irrational and inefficient use of funds • non-compliance with standards regulating creation of, maintenance and access to digital information

• lack of adequate facilities to ensure storage, manipulation, security, migration etc. of digital information • insufficient dissemination of information about developments and achievements in the national environment	

2.2. Access to the digital library and digital collections in Slovenian libraries

In the period from 12 April to 15 April 2006 a digital library survey was carried out in Slovenian libraries, concentrating on the provision of digital information. In the framework of the survey 133 institutional web pages listed by the COBISS[9] system were examined. 22 (16,5 %) web sites could not be accessed during the time of the survey. Web pages were checked for whether there was a digital library, its access point (from the home page or another library web page), what was available, and the way digital content was organized. Special attention was given to digital collections (containing digital-born or digitized information), created by the libraries themselves.

Unfortunately, not all web sites could be accessed during the analysis; some higher education institutions did not provide access to the library from the parent organization home page, moreover, one was required to search for access to the library using the web page search facility; several web sites were being reconstructed, thus lacking library-related data etc. A number of libraries were supplying just basic information about opening times, contact persons etc., with no links to information resources whatsoever. Another group of libraries were providing access to a range of digital-born information resources, but under most varied headings (a number of them within a single web page). Only a handful of libraries were operating a digital library and digital collections. In most cases access was provided to digital-born information resources, while collections created in-house could not pretend to be digital »in real terms«, for they were lacking an appropriate search facility, along with bibliographic information according to standards (it was mainly a question of image collections and collections containing electronic texts). [26]

The results of the survey showed that the understanding of the digital library concept differed from one library to another. It was also obvious that digital library building and creation of digital collections were taking place by and large as uncoordinated and unstructured efforts. This was largely related to the lack of strategy to define digital library policies at the national level, as well as to the lack of a nation-wide plan to determine priorities in digitization of analogue materials. It was therefore very important to draft pertaining documents to put in place field-related criteria and standards to foster the digital library development. This was the only way to ensure that documents would be adequately digitized, quality metadata provided and duplication of efforts avoided. The challenge is to create a quality digital library taking into account all standards and requirements.

[9] Co-operative Online Bibliographic System and Services, URL: http://home.izum.si/cobiss/hp/knjiznice.htm

2.3. Public library efforts (KAMRA project)

The aim of the KAMRA Regional Portal is to collect information from most diverse areas, traditionally associated with public libraries. Through co-ordinated action of regional partner institutions information can be accessed from a single entry access point, while information is being provided by the institution with the broadest coverage and/or competence in any given subject area. The portal solution provides access to digitized content, full-texts, information, programmes and projects, thus ensuring a time-effective, easy-to-use and targeted information search and retrieval. Personalization services enable the users to creatively participate in cultural and social events of the community, and regionally oriented electronic services underpin the role of cultural policy in shaping the regional landscape. In this way all citizens become familiar with the national cultural heritage and activities of regional libraries, archives and museums. Easy access to cultural content is thus provided to all those who are, for various reasons, unable to visit cultural institutions or participate in their programmes. The spirit of closeness and regional co-operation is being strengthened by establishing various partnerships on a regional basis (culture, other public services, local economy, tourism, non-governmental organizations).

In the initial phase access will be provided to a selection of contents covering the fields of culture and local studies, including partnerships with archives, museums, art galleries, associations and other organizations operating in culture field. In the second phase the KAMRA portal will present a standardized directory of web services, provided by libraries, archives, museums and other project partners, thus enabling an efficient and transparent access to e-contents for both public and trade sectors. Project partners include larger regional libraries (responsible for update of portal content related to their particular regions), Public Library Association and NUK (as a part of its coordinating efforts in central regional libraries).

3. State-of-the-art analysis of dLib.si

During the creation of this strategy, the dLib.si digital library is already an established information system including the majority of the basic utility functions which will be provided by the complete dLib.si implementation. Via the web portal at www.dLib.si, the existing IS provides access to journals, books, manuscripts, maps, photographs, music and reference material. The information system and the web portal are mainly internally developed solutions by the NUK staff. The portal user interface is based on the search engine which provides a single and quick search across all dLib.si content.

The main purpose of the portal is to provide a single access to diverse electronic (digital) sources through one entry point. To that end, the following options are integrated into the portal:

- **basic search** provides for searching the author, title, database, subject heading, publisher, publishing year and keyword. When searching by author, it does not make any difference if the author's name is entered in the form first name, surname or inverse. On the right side of the screen, the results divided into databases are shown, and on the left side, there is a list of results in the selected database;
- **advanced search** allows all sorts of combinations of metadata categories quoted above and the use of Boolean operators. Advanced search also provides full-text and metadata

searches simultaneously. When selecting this option, the search is done automatically in the full-text databases. It offers one word or phrase search, e. g. if we want to limit the search only to one author's works, or articles from one subject etc.

Search results are displayed on the left side of the screen, and metadata is described in Dublin Core format. A click on the title opens or closes the bibliographic record, which includes a link to the digital object – digital material. Full-text search results are shown in HTML format. The words, phrases or character strings searched for are automatically marked up. The full-text in PDF format is available for reading or printing.

For the present, the majority of items published to the Digital Library of Slovenia portal are no longer eligible for copyright protection due to their age. In order to provide access to the copyrighted materials, the adequate agreements have been signed with their publishers or copyright holders (e.g. the journals in the scientific articles database). NUK follows two principles in publishing digital content: first is the principle of open access, and the second is that what is produced by public funds should also be publicly available.

The Digital Library of Slovenia currently provides online access to a number of databases covering a wide range of disciplines:

- **Scientific articles:** the digital database includes a collection of key scientific and scholarly journals. The portal offers the full searchable text and also provides a search by bibliographic data. The long-term objective is to include all Slovenian scientific, sholarly and professional journals.
- **Older articles:** this special database contains early Slovenian periodicals and provides full-text search and search of bibliographic data. It is our objective to include all earlier Slovenian journals in the collection of older articles according to their usage frequency.
- **Photographs:** the database consists of more than 10.000 digitized photographs, postcards and drawings of the most famous Slovenian poets, writers, scientists, musicians, artists and politicians from the advent of photography in Slovenia to the present. It is also planned to include the documentary photographs by Peter Naglič and studio portrait photographs from Slovenia. Searching by bibliographic data is provided.
- **Maps:** the collection includes the maps of the Slovenian territory dating from the period 1548-1924, and plans of the capital Ljubljana dating from the beginning of the 19th century to the first half of the 20th century. The bibliographic data is fully searchable.
- **Posters:** the database contains digitized illustrated posters, which are available in JPG format. You can search the database by bibliographic data. Posters from 1946 to including 1952 are currently accessible. It is our objective to incorporate the complete collection of 7.000 digitized posters into this collection.
- **Older sound recordings:** the database offers listening to sound recordings of the solo singers and ensembles, mostly the popular arrangements of the Slovenian folk music from the beginning of the 20th century until World War II. Search by bibliographic data is provided.

4. State-of-the-art analysis of dLib.si information technology

4.1. Basic features of dLib.si information system

The heart of dLib.si information system can be seen in its data server. The data server is used to store access copies of digital documents, intended for web browsing. Preservation copies of digital documents are stored on separate media, mass storage systems and tapes. Preservation copies have been produced to ensure high qualitiy images and professional reproduction, while access copies are stored in compressed file formats, appropriate for web browsing. The digitization of library materials on traditional carriers involves creation of both preservation and access copies.

In the time of writing this document, the data storage capacity of the media is 12 TB of information. The system architecture is designed to allow for increased data storage capacity if required. Despite being in its initial phase, offering a limited amount of cultural heritage in digital form, the dLib.si archive has almost exhausted the storage capacity available. A fully operational dLib.si will encompass an incomparably greater amount of digital information (including digital-born items acquired through web harvesting efforts) thus calling for substantial expansion of data storage capacity. NUK as the dLib.si project leader will thus have to take care of purchasing additional disk space to be able to handle newly added digital content. In the light of dLib.si growth NUK will purchase yet more sophisticated storage facilities[10], combined with the introduction of Information Lifecycle Management (ILM) to assure that frequently accessed items are stored on faster media.

The dLib.si information system is completely autonomous and all items that can be retrieved through the portal are actually stored within dLib.si. In addition, dLib.si is closely connected to The European Library, which has the possibility to harvest metadata related to the digital contents stored in dLib.si. In this way The European Library users are able to access digital information available through dLib.si by being redirected to the portal. The connection to The European Library has been established using the OAI (Open Archive Initiative) Protocol, an efficient mechanism to exchange metadata.

4.2. Information security

Digital information stored within dLib.si represents a high value content, especially if one considers the ever more delicate state of some analogue materials. Therefore information security happens to be one of the key issues the Library is being faced with in dLib.si creation.

The dLib.si data are regularly replicated in four security copies, one of them being stored off-site, five kilometers away from the Library headquarters. In spite of what NUK as the project leader has been already doing in the area a higher level of data security is required. Therefore a complete *Disaster Recovery System* will be prepared and introduced. The system will be activated in the event of a primary system failure with the aim to re-establish the dLib.si full operation as quickly as possible. The off-site system will perform all functions with only slightly diminished capacity. The launch of the Disaster Recovery System is envisaged for 2008-2009.

With the growing number of information security concerns it is becoming increasingly more difficult to fully address the issue. NUK is aware that information security needs to be addressed not only

[10] Implementation of blade server technology is envisaged to optimize data storage capacity.

at the technological level, but at policy levels as well as an integral part of business processes. Thus a planned and organized approach to information security will be implemented during the Strategy time span consisting of information security policy development, along with a continuous operation plan to be drawn up.

4.3. IT organization

NUK as the dLib.si project leader has successfully completed the initial implementation of the national digital library using its scarce IT staff. Despite a very satisfying project launch the total amount of tasks yet to be accomplished exceed the capacity of such a small group. Therefore NUK plans to increase the number of dLib.si staff to work on the maintenance and development of the portal. Newly engaged staff will be deployed in the recently established Digital Information Infrastructure and Preservation Department.

Following the increase in both the number of staff and issues related to information security, NUK also plans to gradually implement IT management concepts and ideas. IT management brings about a systematic, controlled and business goals oriented approach to IT, including not only technology but organization and finance as well. The introduction of IT management system will be based upon most recent developments in the field (ITIL – The Information Technology Infrastructure Library is a set of concepts and techniques for managing IT infrastructure, development and operations; COBIT – The Control Objectives for Information and Related Technology is a set of best practices for IT management).

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IV. dLib.si: vision, mission and goals

1. Vision

The Digital Library of Slovenia will play an active role in building the national information society, library network and research community of the future through its collections, services and expertise.

The Digital Library of Slovenia will promote equal opportunities in access to knowledge to all citizens, thus supporting learning, education, research and cultural endeavours of its users, along with creative use of spare time. Access to the nation's cultural heritage in digital form, combined with its long-term preservation, will reinforce the national identity in the virtual environment as well. With a wide range of national and international knowledge resources available it will stand as a foundation for the national learning society, thus enhancing Slovenia's cultural identity and competitiveness amidst European consortium of nations – the European Union.

2. Mission of the Digital Library of Slovenia

- **Provision of information resources, information and services for the needs of the development of the information society and to foster the socio-economic development of Slovenia.**
- **Long-term preservation of the national cultural heritage in digital form by maintaining and developing a trusted digital repository / digital archive.**
- **Building, development and management of digital collections, following user needs, existing legislation and standards, in co-operation with various strategic partners from the fields of culture, science, education and economy.**
- **Provision of open and free access to digital content, including the development of tools to use it.**
- **Promoting the digital library as infrastructure to education and research process, lifelong learning of the population, and a feature of democracy with unprecedented access to digital information for all users, regardless of who they are and of location they wish to access the information from.**

The National and University Library (NUK) holds the leading position in the development of dLib.si, being responsible for the collection, description and preservation of the national cultural heritage, along with providing access to collections of nation's intellectual memory and scientific literature.

3. Goals

The goals of the digital library strategy have been divided into strategic and object goals. Strategic goals are associated with final results and purposes to achieve by the end date of the Strategy. On

the other hand, object goals can be related to specific cornerstones to reach over the strategy time line. In this way, object goals can be directly translated into projects whose implementation will be quantitatively measured.

The goal hierarchy is shown in Figure 1.

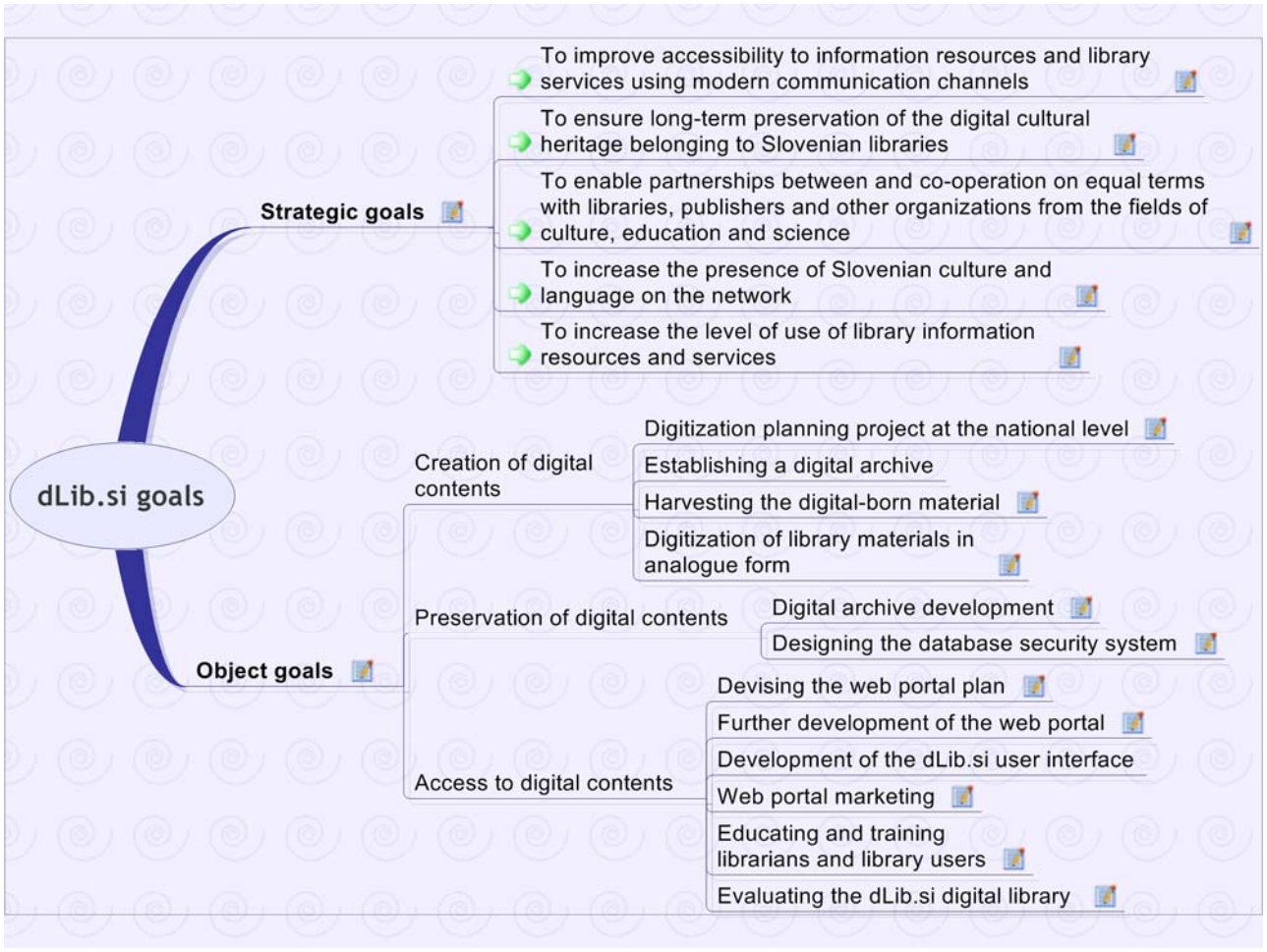


Figure 1: The dLib.si strategic goals

3.1. Strategic goals

S1 To improve accessibility to information resources and library services using modern communication channels

One of the fundamental tasks of a national library can be seen in providing access to the national cultural heritage, including documents in digital form. The digital library promotes access to information resources and services in many ways, thus:

- **users gain access to material stored within dLib.si from any location provided with access to the Internet**. In this way ready access to Slovenian cultural heritage is facilitated

to remote users, Slovenians living abroad and citizens of other countries with an interest in the materials;

- **the digital library enhances easy use of library services.** Within the dLib.si portal the required information can be retrieved and browsed using just a few clicks. Besides, dLib.si features the useful option of cross-searching, unavailable in traditional libraries;
- **the digital libarary provides a single and highly structured point of access to digital born material.** Due to unparalleled growth of electronic publications, which are made available on various web pages, it is sometimes a daunting task to keep abreast with the latest developments in a given field, let alone search for relevant information. As dLib.si will be organized as a single access point to all nationally important materials, the possibility of retrieving the required information will be greatly improved and speeded up;
- **The digital library will make use of advanced technology in terms of audio interpretation and provision of Braille material.** The digital form of library materials will greatly improve access to contents for library users with special needs;
- **mobile modifications of dLib.si services** will enable the use of library services via diverse mobile devices (mobile phones, handhelds etc.).

S2 To ensure long-term preservation of the digital cultural heritage belonging to Slovenian libraries

An important reason to start building the national digital library can be seen in the possibility of long-term storage of the electronic record, now offered by state-of-the-art information technology. dLib.si will co-operate in preserving the national cultural heritage for future generations in three ways:

- **conversion of analogue materials to a digital format and storage of digital copies in the digital library archive.** Compared to longevity of analogue materials, durability of library materials in digital form can be substantially enhanced, provided that they are appropriately managed. New solutions that present improved durability include regular replacement of disks, migration to newer formats etc. Practically unlimited durability of digital items can be thus achieved;
- **harvesting of the digital-born material (*slovenica*), published on the network.** Due to the ever changing nature of the Internet currently available content on the Internet might well not be available in the future;
- **collection of the digital-born material from other sources.** Electronic publications are also subject to legal deposit, together with other digital-born material.

The digital archive must have reliable security against unpredictable natural and other disaster in terms of a sophisticated data security system, including off-site storage of data at multiple locations.

S3 To enable partnerships between and co-operation on equal terms with libraries, publishers and other organizations from the fields of culture, education and science

The digital library has put forward new practices in co-operation between the national library and other libraries, publishers, authors and other institutions from the fields of culture, education and science. As the digital library management is based on data in digital form, electronic business methods can be a primary solution to the exchange of data between NUK and its partners.

Easy reproduction of material in digital form has given rise to new concepts of partnership with publishers and authors, which would ensure access to copyrighted materials, at the same time complying with the existing legislation in the field. Access to copyrighted material has to be limited to individuals that have gained the right to use these materials (for instance, through purchase of material in a web shop).

Building dLib.si and provision of smooth service will call for creation of permanent partnerships between NUK and other institutions, also interested in long-term preservation of and access to written and other cultural heritage. Being the leading stakeholder in the dLib.si building, NUK will establish relevant partnerships already in the planning phase of the strategy to create the necessary conditions for co-ordinated collection, preservation and access to library materials.

S4 To increase the presence of Slovenian culture and language on the network

Web content in Slovenian is by and large scattered all over a myriad of less comprehensive web pages. The dLib.si digital library will therefore represent one of the most important centres of Slovenian culture on the Internet, providing greater variety and a structured overview of the Slovenian cultural heritage. dLib.si collections will be linked to The European Library, which will increase the visibility of Slovenian works to citizens from other countries.

S5 To increase the level of use of library information resources and services

The Digital Library of Slovenia, dLib.si, opens up a totally new channel to all informed citizens, in terms of providing access to library information resources and services, together with other institutions from the fields of culture, science and education. An increased use of information resources can be anticipated with younger (and future) generations, who will have found access to library services through the use of web portal easier and more comfortable. When compared to traditional libraries, the usability of dLib.si will have significant impact on research and scholarship, considering a faster and simpler information search and retrieval, built into the digital library system.

To achieve an increased level of use of library information resources and services permanent marketing and promotion activities will need to be carried out.

3.2. Object goals

Object goals have been defined as following the life-cycle phases characteristic of digital items, contained in dLib.si. The life-cycle phases can be seen in creation, preservation and access (Figure 2).

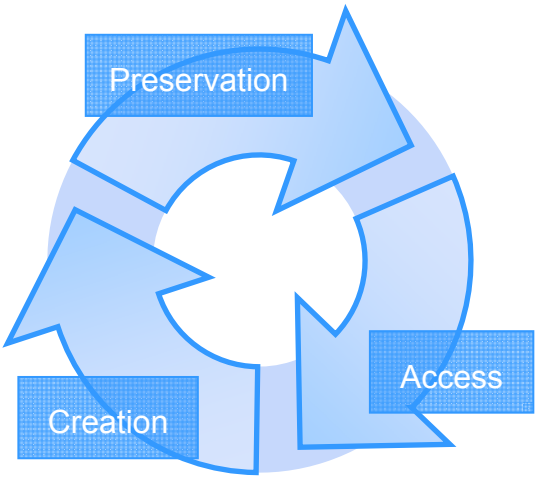


Figure 2: Life-cycle phases of digital contents stored in the digital library

O1 Creation of digital contents

O1.1 Digitization planning project at the national level

Digitization of library materials will produce digital surrogates for information objects in analogue format. Due to the enormous amount of library materials to digitize it is of critical importance to approach the process systematically, devising a plan to cover the needs at the national level. The national digitization plan is designed in three distinct phases:

- **selection of criteria,** to determine which material will be given higher/lower priority in the digitization process;
- **development of the list of collections,** which will be gradually digitized over the Strategy 2007-2010 time span;
- **development and maintenance of technical specifications** for meeting the objectives of the digitization project to define the quality of digital records (the quality may vary according to various types of material) and a comprehensive metadata specification to describe the intellectual content of the object.

The national digitization plan will ensure rational deployment and use of public resources, since it will help avoid duplication in the efforts. A national approach to the issue will be the key to consistency in the quality of digital objects as well as in providing access to them through a single entry point. NUK aims to implement a national registry of digital collections to monitor the digitization activities in the country.

O1.2 Establishing a digital archive

The implementation of software application to harvest *slovenica* publications on the web will make it possible to collect web pages, electronic publications and other forms of web content, fulfilling criteria to fall into the *slovenica* category. Thus a snapshot of web-based slovenica will be created (with the exception of contents which will be left out of the harvesting process due to technical limitations) in a given time. The repetitive nature of harvesting will provide an insight into various historical periods and development phases of *slovenica* on the web.

The harvesting process will be automated to a great extent. A program (»harvesting robot«) will be used to browse the web pages, collecting and archiving all pages and materials meeting the automated harvesting criteria (for instance, the entire *.si* domain, pages in Slovenian etc.)

O1.3 Harvesting the digital-born material

If in compliance with technical standards on the quality and form of the digital record, the digital-born material will be directly stored in the digital archive and subsequently made available via dLib.si web portal. Libraries and other institutions from the fields of culture, education and science, along with publishers and authors, will be in a position to use the dLib.si portal service in order to submit the legal deposit copy of a given publication in digital form.

The great majority of newly published library material in analogue form (for example, printed materials), which is to be included into the NUK collection, originate in digital form before going to print. It is therefore relevant for NUK, as a national depository organization, to make appropriate arrangements with publishers and authors to receive the publications not only in analogue form, but in digital form as well (pre-print). In case the digital copy of the work is copyright protected, NUK will proceed to store the item in the digital archive and no access to it will be provided, whereas in some cases limited access will be provided according to carefully negotiated terms. However, copyright free publications will be added to the publicly accessible part of the digital archive. Needless to say, collection of the digital-born material diminishes the demand for digitization.

O1.4 Digitization of library materials in analogue form

The digitization of library materials in analogue form (for example, books, analogue sound and video recordings) consists in conversion from analogue to digital form. The digitization process will follow previously determined plans according to all technical specifications. The most important activities of the digitization process can be seen in:

- conversion of physical or analogue library item into digital form of record (for instance, scanning, recording, image collection…),
- quality control of the digital copy,
- metadata assignment process, and
- transfer of the item, along with its metadata description, into the digital archive.

Efficient workflow organization is called for to cope with digitization, because bulk digitization – despite sophisticated technology – requires a considerable amount of staff time both in dealing with operational tasks and coordinating efforts. A special Centre for Co-ordination of Digitization of Library Materials has been therefore established at NUK, but it is understaffed and needs additional human resources to successfully perform its assignments.

O2 Preservation of digital contents

O2.1 Digital archive development

In developing dLib.si, the digital archive stands as one of the core requirements to be taken care of since it will represent a comprehensive and integrated collection of digital resources on *slovenica*. The digital archive development will employ a highly efficient database structure and software suport to effectively manage the archive contents. The basic function of the archive is the long-term preservation of digital-born documents and items that have been digitized including quality control to ensure that original items have not deteriorated in any manner. As to user access to the digital archive, restrictions will be implemented for security reasons. A separate distribution database has been developed to cater for the needs of the dLib.si portal with an emphasis on accessibility, rapidity and security.

O2.2 Designing the database security system

Given the exceptional importance of the long-term preservation and retrieval of the digital content, the provision of database security system stands as an independent goal in itself, with the aim to reduce risk of loss of digital objects practically to zero. The provision of database security system consists of security policy planning and implementation, along with a continuous operation plan to be drawn up.

The two documents will define regulations to ensure proper management of information resources, as well as technological requirements to prevent data loss due to hardware malfunction and other unpredictable events (for instance, earthquake, fire etc.). To achieve optimal security level, a backup dLib.si system will be set up at alternative location to be activated in the event of a primary system failure.

O3 Access to digital contents

O3.1 Devising the web portal plan

In its final phase, the dLib.si web portal will provide access to a large number of information resources, therefore web portal design and development can be seen as an independent goal to achieve. The planning document will cover detailed information on the structure, functional entities and basic elements of the user interface with regard to future user needs. In addition, a map of the portal will be added to the dLib.si web site to visually and hierarchically represent user accessible categories within the portal and to allow for alternative map browsing options, the primary option being the use of search engine.

O3.2 Further development of the web portal

Creating and managing content for a sophisticated, dynamic and expandable web site should primarily result in a user friendly interface to search, retrieve and browse the digital objects, available via dLib.si. The foundation of the web portal operation can be thus seen in the digital

object database that stores digital items in a variety of formats (PDF, JPG, MP3 etc.), optimized for web browsing.

Further development of the dLib.si portal will ensure its long-term usability and up-to-date approach, thus also including:

- Development of new services within the dLib.si portal, bringing added value to the users. Additional services will determine new ways of access to library materials, together with access to most diverse materials;
- Recurrent improvements of the user interface with the aim to largely facilitate the use of the web portal. Improvements of the user interface will take into account current trends and guidelines in design;
- Implementation of future web technologies to make sure that the dLib.si portal keeps pace with on-going developments in the field.

Further development of the web portal will be based on careful identification of the needs pre-defined in the plan.

O3.3 Development of the dLib.si user interface

An independent goal can be identified in the user interface development to allow for content management of the dLib.si portal. The user interface will provide the portal manager with the following funcionalities:

- A simple-to-use tool to add new materials and to apply changes in the existing ones,
- Sorting materials by category,
- Metadata description update,
- Adding collections to The European Library portal.

In web portal design the current Web Accessibility Guidelines apply, as specified by W3C, http://www.w3.org/ .

O3.4 Web portal marketing

Insofar as a comprehensive service, reaching the widest audience possible, the web portal needs to be appropriately marketed. In this regard a market-driven strategy will be defined and subsequently carried out, taking into account all basic elements of online marketing. An effective marketing strategy will help raise public awareness of dLib.si in terms of perceiving it as one of the cornerstones in the digital environment. Major attention will be paid to acquiring feed-back information from the users of the dLib.si services, thus representing a starting point in further development.

Activities in the fields of dissemination of information, promotion and marketing of the digital library will be focused on the following stakeholders: education and research community (students, teachers, university collaborators, research staff), business community (journalists, designers, creative arts representatives, entrepreneurs), library community (representatives of all library

types), general public (local community, families, tourists, participants in the lifelong learning process), government agencies and policy makers, museums and archives, IT businesses.

O3.5 Educating and training librarians and library users

A systematic approach to continuing education of librarians is called for to enhance the use of digital library facilities, which will be carried out in co-operation with strategic partners. To achieve an efficient and wide-spread use of the digital library it is primarily necessary to inform the library users about its possibilities for use, along with provision of relevant assistance in the use of services. Creation and development of elaborate training programmes intended for librarians and other digital library users therefore make part of the overall digital library strategy.

O3.6 Evaluating the dLib.si digital library

The digital library evaluation issue has been theoretically well backed up and some concrete evaluation results, based on various evaluation methods, have been made available. Elements to evaluate can be seen in appraisal of performance, effectiveness and quality assessment in terms of system and technological solutions; we can approach evaluation from the services point of view, for example, measuring the volume of use, quality and relevance of digital collections, user satisfaction and benefit etc. Both quantitative and qualitative data collection methods apply, depending on the type of information to assess. Collected information will represent a sound basis to decide upon future development of dLib.si. NUK will devise an evaluation method in terms of data collection, analysis and interpretation to assess the performance of dLib.si over the strategy time span.

V. Proposal for the dLib.si system

1. The roles and users of the dLib.si system

The key system audience can be classified into four different roles[11], the first two including external users and the other two internal NUK users:

- potential users,
- content providers,
- a digital curator,
- a portal editor.

The respective roles are described in more detail below.

1.1. Potential users

Potential users are all those users who access the dLib.si information resources via publicly accessible dLib.si web portal. The users who belong to this group include citizens, libraries and other cultural institutions, or anybody else who accesses the dLib.si web portal intentionally or incidentally.

Potential users can use the services provided by the digital library in different ways. The openly accessible services (e.g. freely available information resources and user's help) are used without identification and authentication. Users use the search engine to retrieve the resources, and then decide to either read or download the data to their computers.

Restricted access services require prior registration.

1.2. A portal editor

A portal editor is an employee of NUK, who has a full access to the portal administration and application development of the dLib.si web portal. His/her role is to manage the structure and the portal site content, which also includes creating new categories, adding access copies of material and setting of parameters for their inclusion in the existing portal structure, and defining the access restrictions.

The portal editor can be the same person as the digital curator.

1.3. A digital curator

A digital curator is an employee of NUK who is responsible for the digital archive management. The digital curator collects new digital material submitted by libraries, other institutions from the

[11] The traditional information technological and other support roles are not described in particular, like system administrator, database administrator, network administrator etc.

fields of culture, science and education or publishers via the dLib.si ingest server or directly from the NUK digitization staff. The material is checked and validated for compliance with previously agreed technical and content specifications, and then the digital curator assigns the metadata to the preservation copy and the content is stored into the digital archive.

The digital curator can be the same person as the portal editor.

1.4. Content providers

In relation to the information system, the role of content providers is played by libraries and other institutions from the fields of culture, science and education, which digitize the materials in analogue form, along with publishers and authors. The registered content providers deposit current digital materials via the dLib.si ingest module. The materials are preserved and stored in the digital archive and a long-term access via the dLib.si web portal is provided. By depositing their materials, the content providers collaborate in the development of the digital library of Slovenia in accordance with the national digitization plan and selection criteria for the archival of and access to digitized material. Before archiving the material, the digital curator reviews and evaluates every deposited publication for completeness in order to ensure that the prescribed conditions for inclusion in the collection are met.

2. High level architecture of the dLib.si system

The dLib.si system is tailored to support different types of users to access the system in several ways adapted to their particular needs (Figure 3).

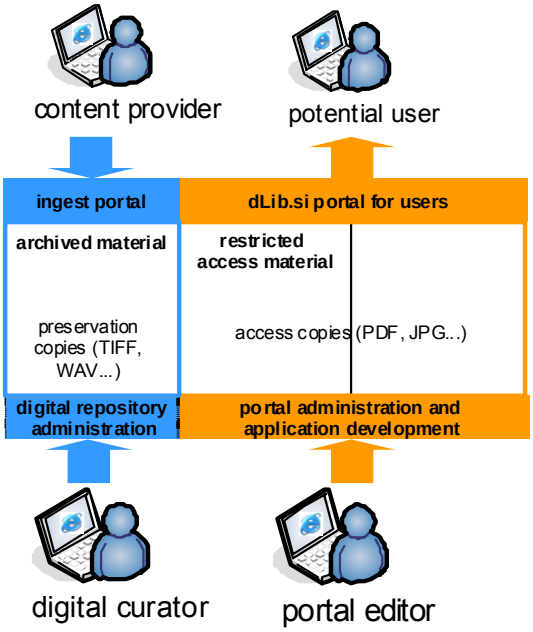


Figure 3: High level architecture of the dLib.si system

From the information system perspective, there are four predefined roles for users (chapter V. 1.), which are supported by four basic widget blocks. These are:

- dLib.si portal for users,
- dLib.si ingest portal,
- digital repository administration,
- portal administration and application development.

Details of particular widget blocks are given below.

2.1. The dLib.si portal for users

The dLib.si portal for users ensures current and future access to electronic material and library services to the widest possible group of potential users. Through the portal, they can view the freely and publicly accessible material, which is not protected by copyright and related rights, and the restricted access resources, which are protected by copyright and related rights. The latter are made available to potential users if they identify themselves when they access the protected area of the portal and if they fulfill the necessary conditions. It is also possible to use other library services described in chapter 6.

2.2. The dLib.si ingest portal

The dLib.si ingest portal enables the content providers to deposit the materials which have been digitized, or digital-born materials to be preserved and stored in the digital archive. Through the dLib.si ingest portal, the collection of legal deposit of digital material will be carried out. However, it will also be possible for publishers and authors to deposit their works, and for other libraries or institutions from the fields of culture, science and education, to submit the material that is converted from analogue to digital forms. The dLib.si ingest portal will be one of the web portal services which will demand the identification of the user, but due to its significance and content specificity it is presented as a separate widget block of the system.

2.3. The digital repository administration

The digital repository administration enables the digital curator to manage the content of the digital repository in which the digital collections of »slovenika« are permanently stored (open access and restricted access resources, but also the material which is not accessible via the portal). The digital repository administration allows the archiving of new digital materials, including their metadata descriptions, but it also provides the possibility to apply changes in the existing ones.

2.4. The portal administration and application development

The portal administration and application development allows the portal editor to manage the content of the digital library web portal. The basic functionality of the application is to add access copies of the material to the portal. Each digital object which is published to the portal must be described with a specific metadata format (e.g. Dublin Core), which is, however, less

comprehensive than the one needed for the preservation copies[12]. By submitting the material to the portal, it is necessary to set up different parameters which define the implementation of the material into the web portal structure and its accessibility.

3. The process of digitization of library materials in analogue form

Figure 4 describes a typical process of digitization of material in analogue form. The final result of the process is a library item in digital form, which represents the input of the dLib.si information system. The digitization process is not directly supported within the dLib.si system.

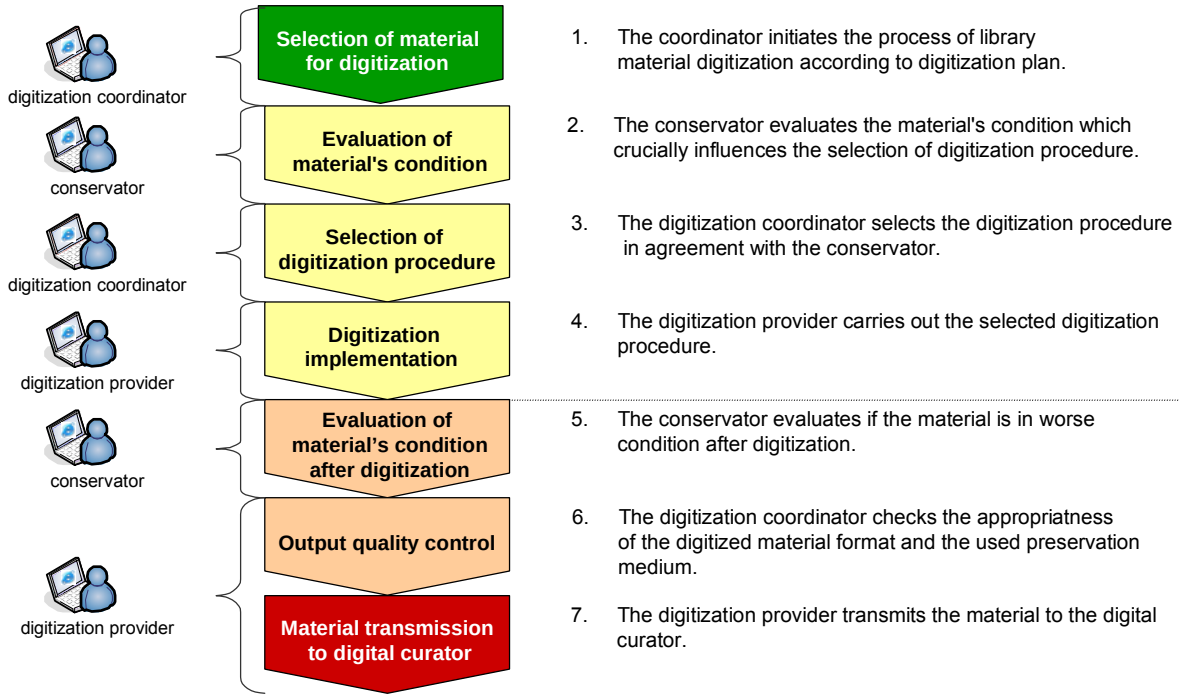


Figure 4: The process of digitization of materials

4. The life-cycle of the digital material in the dLib.si system

Figure 5 presents a typical process – from the receipt of the new digital material in the digital library to its publication on the web portal. The dLib.si system architecture is provided for the process implementation as described in chapter IV.2.

[12] Metadata of the preservation copies include administrative, content related and management metadata.

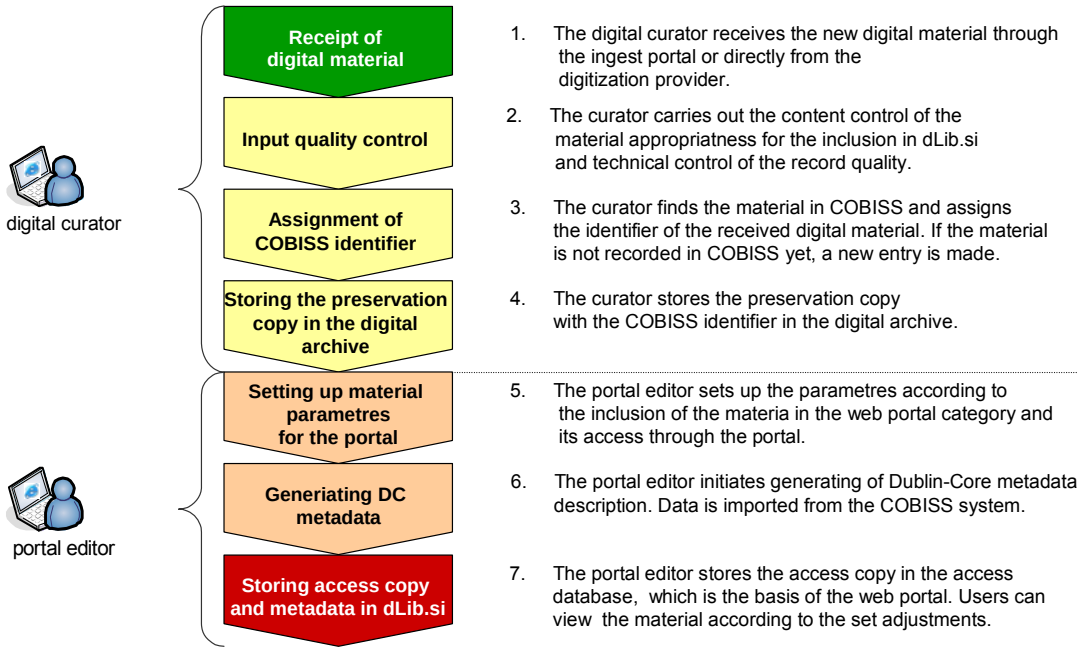


Figure 5: The life-cycle of the digital material in the dLib.si system

The basic input is the digital-born or digitized materials. The digitization process is not directly supported within the information system. It is described in chapter 3.

5. The information protection in the dLib.si system

The protection of information which is preserved in the digital library is an extremely important issue that is solved by technology in two fundamental ways:

- **by systematic creation of backup copies**: backup copies on permanent carriers (tapes) are produced systematically when new material is added to dLib.si. More copies are made and maintained for each object. Maintenance eliminates the possibility of losing the backup copies due to aging or damages of the data carrier. The creation of backup copies and other activities directed towards the information preservation are defined in detail in the security policy;
- **by the development and maintenance of a backup repository:** the backup repository will be built at the remote location with the identical[13] functions and content as the primary dLib.si system (Figure 6). The backup repository will be activated in the event of the primary system failure and it will continue to operate until the primary system is restored.

[13] The backup repository is based on technologically less capable communication infrastructure due to expense optimization.

The technical and organizational protocols of the backup repository operation are defined in detail in the continuous operation plan.

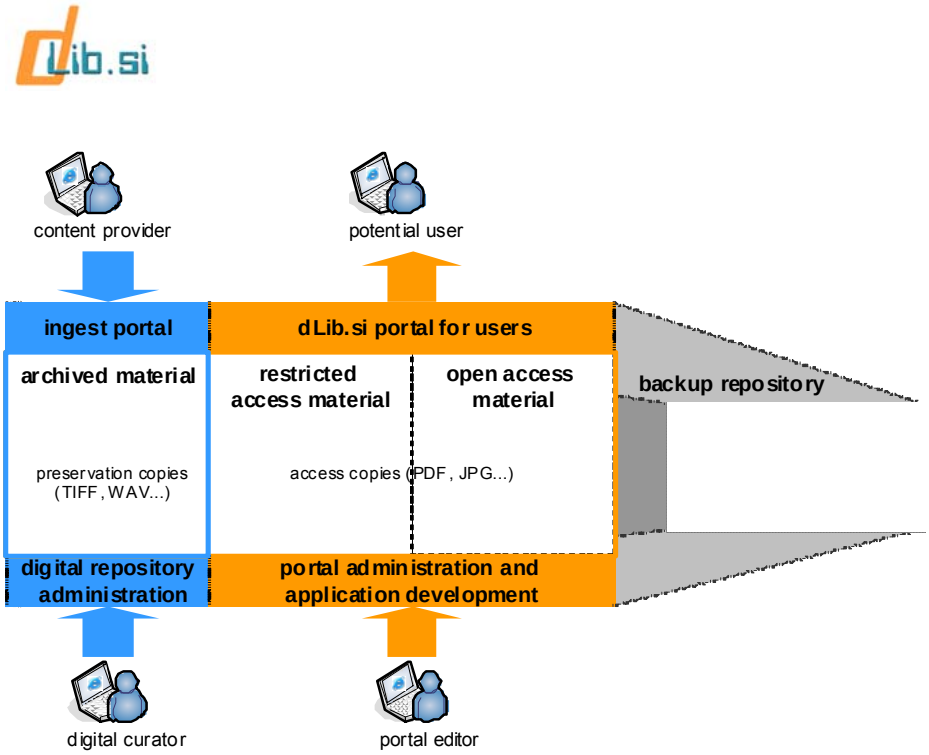


Figure 6: Enhancement of the dLib.si system by backup repository (symbolic presentation)

The information protection issues are also solved at the organizational level. Different protocols of information protection and measures in the event of security threats are defined in detail in the security policy.

6. The dLib.si portal services

The dLib.si portal provides two types of services, i.e. openly accessible and restricted access services. Both types are described in detail below.

6.1. Searching the digital information resources

Service with open access

The user can search and browse the available information resources in different ways via the dLib.si web portal. The basic search is a search by keywords as is used in the majority of

traditional web search services. The alternative way is an insight into the hierarchy of the portal content categories (site map), which is mainly intended for users who do not search any specific material.

Via the dLib.si portal, the user can also find the licensed databases, which are not preserved in the dLib.si system.

6.2. Viewing the dLib.si information resources

Service with open access

When the user retrieves the requested information resource, the portal enables him/her to view the material. If it is not copyrighted material or if it is intended for non-commercial use the user can access the full text.

Service with restricted access

When searching the dLib.si web portal the user can also find restricted access resources, which are copyright protected or intended for commercial use. Access to such material is only provided to registered users when they fulfill the requirements to view the specific material, which depend on the business operation model of the digital library (e.g. a membership fee to use the library, a fee to view the individual material).

To view such material, special attention has to be paid to the protection of copyright. By using the state-of-the-art technologies, we will try to transfer the lending from a traditional library into the digital world. We will enable a limited period of using the borrowed access copy (a file is rendered unreadable after an expiry date) and we will limit the possibility of its unauthorized reproduction (the file text is not possible to be copied or printed)[14].

6.3. Viewing the licensed databases

Service with restricted access

Access to external licensed databases is also provided via dLib.si. In case that the user finds the licensed database of the external provider via the dLib.si portal, he/she can access it if the requirements to view the specific material are fulfilled. In this case, the material becomes available in the dLib.si user interface (the preferred solution) or the user is directed to the web site of the licensed database provider.

6.4. Online help and support

Service with open access

The use of a modern digital library can represent a difficulty to some users, therefore, more possibilities to acquire help will be available. The guidelines for using different functions of the web portal will be prepared in advance. In addition, the possibility of interactive help will also be

[14] The concept of the files with the expiry date and protection against copying the text (copy/paste function is disabled) and against printing is already embedded in the Adobe Acrobat technology.

available through the modern communication channels, like chat rooms and e-mail[15]. The provision of efficient help will be especially important when the number of digital library users increases.

6.5. Acquisition of copyrighted material

Service with restricted access

It is possible that the user purchases the requested copyrighted material in agreement with the author or the publisher through the dLib.si web portal.

6.6. Re-direction of the user

Service with open access

In case that the user retrieves the material which is available in some other library (e.g. in the European Digital Library) via dLib.si, he/she is re-directed to appropriate digital library. Through dLib.si, users can also discover commercial databases, which can be bought. In this case, they can be re-directed to other web sites where they can get additional information on the requested material or can even purchase it (e.g. they are re-directed to web bookstores, web music stores etc.).

6.7. Digitization on demand

Service with restricted access

The dLib.si portal also offers the digitization on demand service, which enables users to process a request for the digitization of the national library material which has not been digitized yet. In case that the material fulfils the previously set criteria, NUK takes care of the digitization of the requested item in a certain time period, and then informs the user that the material is available in the digital format.

6.8. Deposit of electronic publications

Service with restricted access

Through the dLib.si ingest module, registered content providers have a possibility to deposit digital materials which have been digitized in accordance with the national digitization plan, or the digital materials which are subject to legal deposit and must be preserved in the archive. According to Legal Deposit Act, the service provides publishers to supply electronic publications or other legal deposit material in the digital format. The content provider can deliver either a file, or a password and location of the electronic publication where the digital curator can harvest the publication. After the confirmation that the prepared publication is in the adequate form (e.g. the appropriate format, quality, adequate standards used), the content provider receives an electronic receipt with the date of delivery and the title of each delivered publication. The digital signature and timestamp technology will be used to guarantee the authenticity and credibility of the forwarded data.

[15] A similar service is provided by NUK within the COBISS system – the service »Ask a Librarian«.

The submission of digital information resources can be carried out by other libraries or institutions from the fields of culture, science and education, along with authors, and thus they can also contribute to the development of the digital library of Slovenia.

7. Organizational support for dLib.si

All NUK organizational units are practically involved in the development and operation of the digital library dLib.si. The Digital Library Development and Strategy Division was established in 2005 for the purpose of creating, managing and maintaining the digital library dLib.si. It is described in detail below, along with the inclusion of NUK into The European Library.

7.1. Digital Library Development and Strategy Division

The Division consists of three departments:

- E-Library Creation, Management and Maintenance Department,
- Digital Information Infrastructure,
- Centre for Co-ordination of the Digitization of Library Materials.

The main tasks of **the E-Library Creation, Management and Maintenance Department** are:

- to provide leadership in the creation and development of the Digital Library of Slovenia - dLib.si;
- to co-ordinate digitization of the national library material;
- to manage and co-ordinate the acquisition of licensed resources on behalf of NUK and COSEC Consortium;
- to follow and promote recommendations and guidelines for the acquisition, creation and supply of e-resources;
- to carry out the day-to-day activities according to the needs of The European Library;
- to develop, manage and promote the services of the digital library;
- to provide metadata for digital objects and collections;
- to implement the National Register of digitized library material;
- to prepare the proposals and implement the projects in the framework of the e-content program.

Digital Information Infrastructure primarily takes care of the technical aspect of the digital library dLib.si. Its tasks are [19]:

- development and maintenance of the digital library portal,
- NUK's web site development and maintenance,
- maintenance of the digital archive,

- maintenance of an application to harvest »slovenika« online,
- integration of NUK's own databases into international databases,
- provision of access to digital collections developed by other institutions through the Digital Library of Slovenia portal.

Centre for Co-ordination of Digitization of Library Materials functions as an advisory body for the digitization of library material at the national level. Its areas of responsibility are [19]:

- to organize and co-ordinate digitization at the national level,
- to take care for the reconciled collaboration of libraries in the field of digitization,
- to follow and promote international standards, recommendations and guidelines for digitization in Slovenia,
- to prepare recommendations for digitization,
- to collaborate by the organization and implementation of training for digitization,
- counseling in the field of digitization,
- to develop education programs in the field of digitization and to cooperate in their implementation.

7.2. Digitization Centre

Being the leading stakeholder in the dLib.si building, NUK will establish its own capacities for digitization in order to be more independent of external contractors. Within the User Services Division and its Library Reproduction Services, the Digitization Centre will be established. Its task will be to digitize the material in analogue form according to the national plan of digitization. It will collaborate with other departments in NUK, especially with the Centre for Co-ordination of the Digitization of Library Materials, and the Conservation and Preservation Centre.

Due to the enormous amount of library materials in analogue form, which need to be digitized, and due to regular annual intake of material, it is anticipated that the capacities of the Digitization Centre (5.000-10.000 digitized books per year) will be constantly utilized.

7.3. External contractors

Due to the complexity of problems and lack of staff, NUK as the lead partner of dLib.si also takes advantage of the external contractors' services. This applies to areas such as:

- digitization,
- software development,
- advisory services in the field of dLib.si building.

Digitization of library material is a very demanding and time-consuming process. It also requires professional knowledge and expensive and special equipment from the digitization providers. Due to lack of human and financial resources, NUK has carried out digitization mainly in cooperation

with specialized external contractors until now. The strategy envisages the establishment of the new digitization centre with the capacity of 5.000 - 10.000 digitized books per year. But in spite of that NUK is also going to continue with the collaboration with external contractors to ensure even faster digitization of NUK collections and current materials (e.g. newspapers).

In accordance with the existing NUK policy, the major part of the digital library development is carried out internally - within the Digital Library Development and Strategy Division. In case of a substantial increase in the scope of work or the need for specialized knowledge in the fields of software development and counseling, the collaboration with the external contractors will be established.

8. Technologies and standards

Most state-of-the-art and universally adopted technologies are used in building the dLib.si system. Some technologies and standards, respectively, which are important regarding their content and which are used in dLib.si, are presented below:

- **Dublin Core** is a metadata format for cross domain description of information resources. It is made up of 15 core elements and some optional additional qualifiers. It is used to describe digital objects on the dLib.si portal, and it also aims to provide a basis for interoperability with other digital libraries, primarily with The European Library.
- **XML** (Extended Markup Language) is a semantic standard, which defines the semantics of metadata in dLib.si. Its primary purpose is to identify the hierarchic structure of the record, which is necessary to specify the metadata descriptions. XML is a universally adopted standard which facilitates interoperability at the semantic level.
- **OAI protocol** (Open Archive Initiative Protocol) is created to facilitate an automatic metadata exchange among digital libraries. Within this framework, other digital libraries (e.g. The European Library) can harvest and aggregate metadata from dLib.si, and thus they provide a transparent subject search of the Slovenian digital library for their users.
- **Z39.50** is a standard for the metadata exchange, which enables the conversion among different metadata formats. Its basic function in dLib.si system is to support the interoperability between different library material cataloguing systems.
- **OAIS** (Open Archival Information System) is the reference model for open archival information system. Its great importance is shown by the fact that this model has been adopted as a standard for the creation of all digital archives. ISO defines that OAIS »is an archive, consisting of an organization of people and systems, that has accepted the responsibility to preserve information and make it available for a designated community". The reference model OAIS provides a theoretical framework which addresses all processes of a comprehensive system for long-term preservation of digital material.

9. Business model

Development of more complex information systems such as a digital library requires an adequate financing. The dLib.si business model is defined in detail in the marketing strategy, but some possible key financial resources are highlighted below.

- **Budget funding** is the main instrument for providing funds for the development and maintenance of dLib.si. The dLib.si building project is included in the plan of development programs, so the financial resources are secured. Nevertheless, it is necessary to indicate that there are significantly higher funds provided for the comparable projects in other EU countries (even 5 - 10 times more).
- **The European Development Fund** represents a possibility to gain additional funding for the dLib.si development. The dLib.si development project meets a number of criteria to get financial resources from the European Development Fund due to its innovation and utmost importance in the fields of culture, science and education at the national and also international level.
- **Compensation for expenses** incurred by the dLib.si operation can play an important role by ensuring sustainable development of the digital library. The digital library can provide a range of payable services[16] for more demanding users of dLib.si through various mechanisms (membership fees, »coins«…). Among other things, dLib.si users can be offered to purchase commercial material based on the partnership agreements with publishers. dLib.si can also represent a platform for target advertising.
- **Public-private partnership** is based on risk allocation and distributed profit of the investment between a public institution and a private company. The most frequent form of public-private partnership presumes that the public institution defines the desired results of the project (output) and the private company the necessary infrastructure and knowledge (input). The public institution keeps the majority of control over the project results. Because the digital library development is a commercially interesting project, it is reasonable to address this approach in financing the project.

[16] See restricted access services in chapter 5.

VI. Strategy: Implementation plan

The strategy will be implemented on the basis of projects that generate direct and indirect impact on the achievement of pre-set strategic goals. The projects can be divided into four groups:

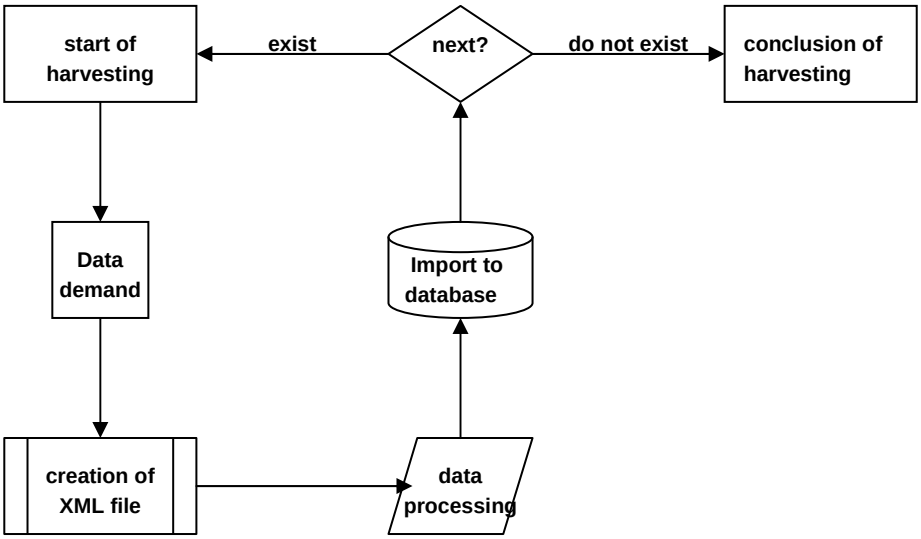
- development projects,
- research projects,
- organizational projects,
- digitization projects.

Estimated values of the projects have been defined, taking into account various elements, such as duration of the projects, internal staff effort and contribution of external collaborators to cover the projects' time span. The value of internal staff effort has been calculated using in-house cost price estimates which include total gross earnings (salaries) of the staff and all costs incurred by their work (premises, operational expenditure etc.). Thus, per hour value amounts to € 35.

External staff expenditure hovers around € 50 per hour, whereas the price of digitization amounts to € 0,31 per page. In case purchase of new equipment is envisaged, the value has been added to the final sum.

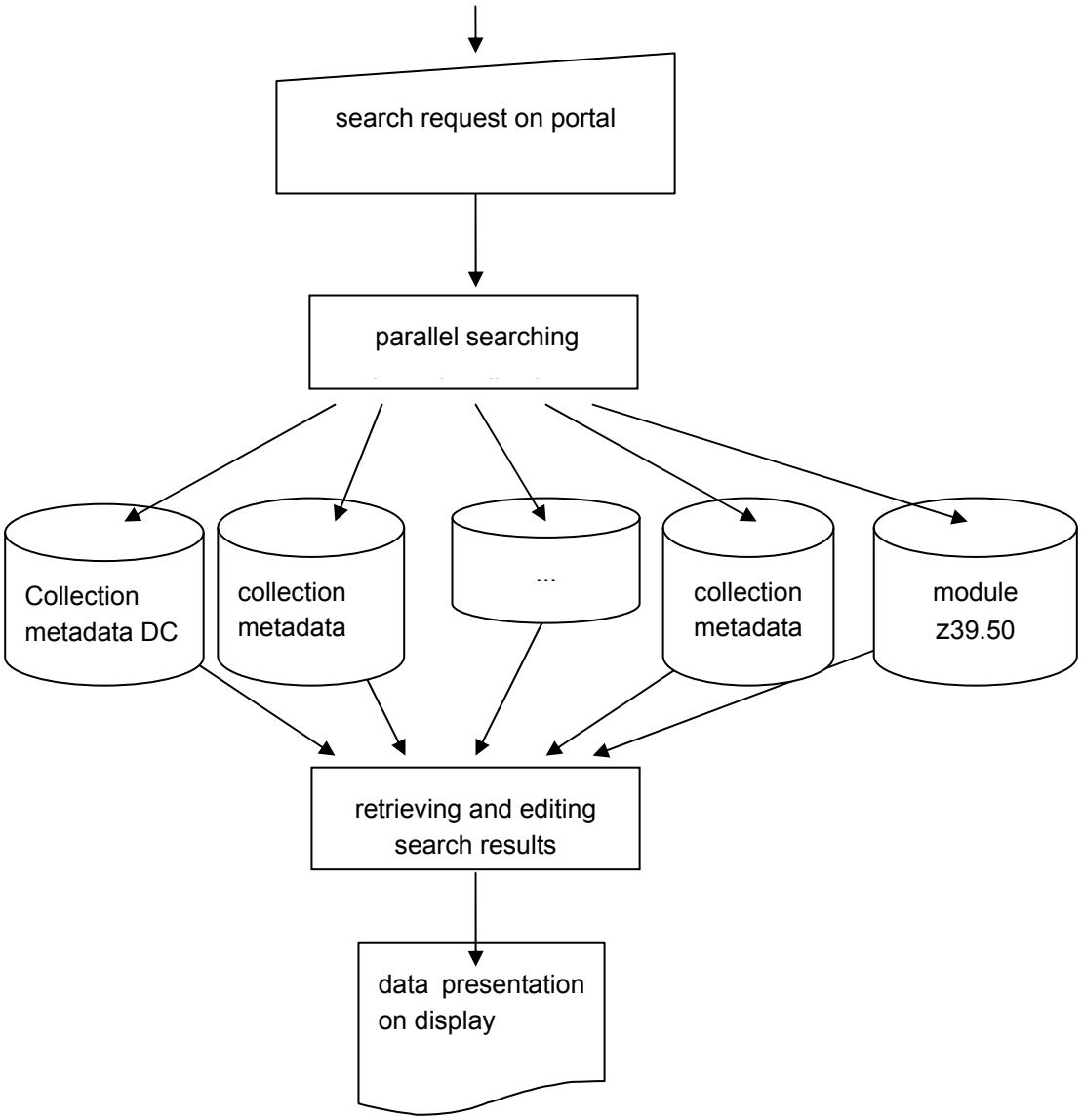
VII. Appendix

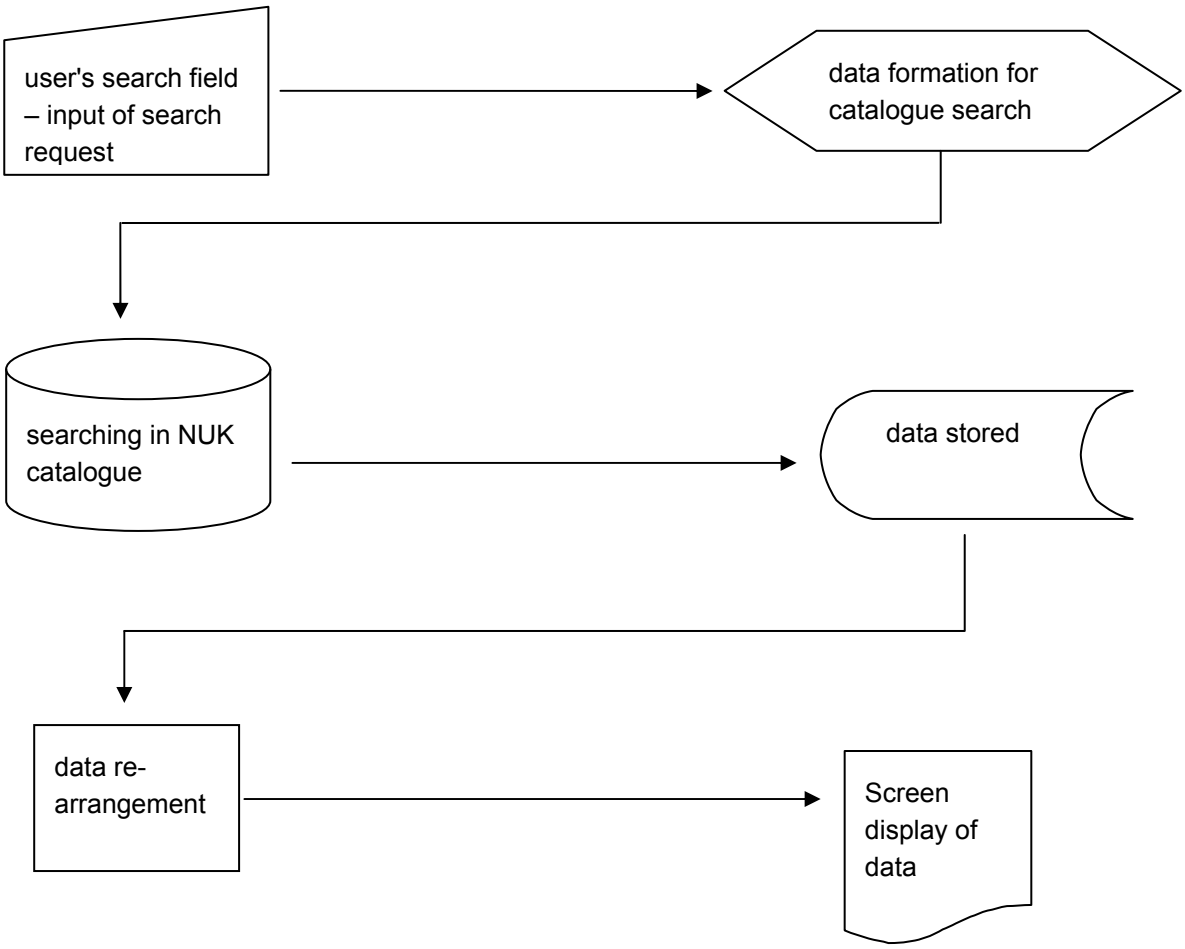
Harvesting in dLib.si



Searching in dLib.si

Search module



Searching in NUK catalogue

Module for searching local catalogue with Z39.50 protocol