

A kaleidoscope of digital news media in a national library

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Abstract:

Due to the diversity of their production, issuance, content and usage, digital news media poses new challenges for libraries. Traditional activities focusing on print newspapers have since grown to include e-legal deposit, digitisation and digital print masters archiving. The paper uses an example of digital news media collection at the National and University Library in Zagreb (NSK) to illustrate challenges in news media management. NSK currently collects legal deposit copies of analogue and digital news media and digitises newspapers. Recently, NSK started negotiating with Croatian publishers the topic concerning digital print masters archiving. In order to support the aforementioned activities, the Library has to establish new working processes, improve its existing information systems or develop entirely new ones. The paper presents the Library's experience with the management of digital news media based on the results of the preliminary survey Digital news media in the HAW and DNC: 2004-2014. The investigation included gathering data on: quantity, types and formats of digital news media in digital library modules, e-legal deposit provisions, selection criteria, metadata, access and copyright, portal functionalities, and usage and promotion of portals. The challenges in relation to managing and providing a single access to all types of digital news media are also presented.

Keywords: digital news media, digitised historic newspapers, newspaper digital print masters, digital library, national library.

Heritage continuity and change in news media collections

Preservation of cultural heritage both in analogue and in digital form provides transfer of knowledge and brings a sense of identity and continuity. Newspapers and other news media (i.e. *continuing resources*) are today available due to heritage institutions, and especially national libraries. National digital news media collections are part of cultural heritage and an important research source that record past event, but also bring stories of everyday life that interest general public and scholars. The continuity of news media

collections is obvious in national library catalogues that virtually gather both diachronic and synchronic content and provide information on all types and manifestations of national news media (print, digital and microfilm).¹

A review of the literature on digital news media deposit indicates that national libraries all over the world are facing a challenge of digitally-born materials archiving, especially print masters deposit. As Kolding Nielsen points out: “We are running out of time if we are to avoid the loss of data and cultural heritage in the coming decades, as indeed has happened on the web in the 1990s.”² Integration of digital news media (i. e. *digital news media collection*) is challenged by administrative, legal and technical issues. Some national libraries have managed to provide both open access and virtual fusion of historic and contemporary digital content (e.g. Trove, NLA³) while others plan to provide a single access point to all digital media types (e.g. the National Library of Estonia⁴). In committing to increase the organisational and technical effectiveness of e-legal deposit management and provide a single access point to its digital resources, the National and University Library in Zagreb (NSK) has initiated several activities concerning *digital news media* integration. They include advocacy on the current legal deposit provisions' changes, testing of newspaper digital print master's deposit, analysis of new types of news media integration into existing workflow, technical infrastructure development, etc.

Therefore, the term *kaleidoscope* is used as a metaphor in the title of this paper to point out the idea of building a *harmonic view* of the variety of news media.

Digital news media collection at the National and University Library in Zagreb: an overview

Croatian earliest newspaper, *Kroatischer Korrespondent*, was first printed in 1789. Two centuries later, newspapers became available in digital form. In 1992, NSK started the

¹ Such fusion is less possible if libraries do not catalogue certain types of news media in the ILS. For example, harvested online news media and digitised newspapers.

² Kolding Nielsen, Erland. The National Library at a Crossroads: the Digital Content Revolution and its Consequences. // *Alexandria*, 23, 3 (2012) Available at: <http://dx.doi.org/10.7227/ALX.23.3.20>

³ Trove: Newspapers and more // National Library of Australia. Available at: <http://trove.nla.gov.au/newspaper?q=>

⁴ Kiisa, Krista. Digitisation of historic newspapers and voluntary digital deposit of newspaper pre-print files in the National Library of Estonia. // IFLA 2013 Satellite Meeting On Newspaper & Genloc Sections, 15 August 2013. Available at: http://www.ifla.org/files/assets/newspapers/Singapore_2013_papers/day_2_01_2013_ifla_satellite_kiisa_krista_digitisation_of_historic_newspapers_and_voluntary_digital_deposit_of_newspaper_pre-print_files_in_the_national_library_of_estonia.pdf

digitisation of contemporary newspapers to create a collection of articles covering news from the Croatian War of Independence.⁵ The Republic of Croatia first gained internet access in 1991 and “the first online media which regularly published information was HRT (Croatian National Radio and Television) in 1994.”⁶ Referring to the fact that there were only 50 .hr domains in 1995, Brautović concludes that “online journalism and online media have developed simultaneously in Croatia and in western democracies” and that “such development was more a result of following trends than real consumers’ needs”.⁷ While the first national and international Web resources archives were launched in 1996 (*Internet Archive*, web archives in Australia, Sweden, and New Zealand⁸), the first Croatian online news portal entitled *Internet Monitor* appeared in 1997. In 1999, together with other Croatian serials and news portals, *Internet Monitor* became an equal part of the NSK’s catalogue.⁹

In 1997, new Croatian Library Law brought an important amendment in legal deposit provisions stating that deposit libraries were obliged to collect and preserve *online publications* along with other types of material, as legal deposit.¹⁰ It took time before the NSK could begin implementing legal obligations due to its inadequate technical infrastructure.¹¹ Things changed in 2004 when the National Library established a program of identification, selection, collection, cataloguing, archiving and giving access to online resources in the *Croatian Web Archive (HAW)*¹². A digital archiving management system was built in collaboration with the *University of Zagreb - University Computing Centre* (Sveučilišni računski centar Sveučilišta u Zagrebu, Srce). Financial resources were provided by the NSK. As one of the pioneers in selective harvesting in Europe, the first content of HAW was mostly online news media.¹³

⁵Digitisation of newspaper articles (1991-1993) was the first digitisation project of the NSK but, due to historical and economic circumstances, digitisation activities were temporarily put aside until 2004.

⁶Brautović, Marko. Razvoj hrvatskog online novinarstva 1993-2010. // *MEDIANALI – znanstveni časopis za medije, novinarstvo, masovno komuniciranje, odnose s javnostima i kulturu društva* 4, 8(2010), p. 24.

⁷Brautović, Mato. Ibid, p. 26.

⁸Daniel Gomes, João Miranda, and Miguel Costa. A survey on web archiving initiatives. *International Conference on Theory and Practice of Digital Libraries 2011*. Springer, 2012. Available at: <http://sobre.arquivo.pt/about-the-archive/a-survey-on-web-archiving-initiatives>

⁹Internet resources have brought several dilemmas to libraries - during the 90s the cataloguing and preservation of Web resources was one of the most frequently discussed topics followed by e-legal deposit and copyright issues. Klarin, Sofija. *Elektronička građa u knjižnici : s primjerima zapisa daljinski dostupne građe u CROLIST-u*. // 2. i 3. Seminar Arhivi, knjižnice, muzeji : mogućnosti suradnje u okruženju globalne informacijske infrastrukture / Willer, Mirna ; Katić, Tinka (ur.). Zagreb : Hrvatsko knjižničarsko društvo, 2001. P. 159-165.

¹⁰ Zakon o knjižnicama (1997). Available at: <http://narodne-novine.nn.hr/clanci/sluzbeni/267274.html>

¹¹ Legal deposit of online publications is done only by NSK.

¹² Hrvatski arhiv weba. Available at: <http://haw.nsk.hr>

¹³ Klarin, Sofija. Ibid.

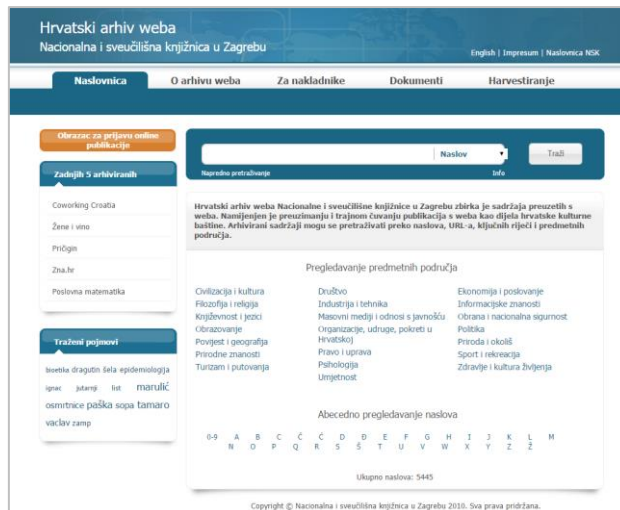


Fig. 1. Croatian Web Archive (2004-2015) title page

In 2004, NSK also continued its Newspaper Digitisation Project. Learning from examples of other historic newspaper portals (*Chronicling America* (2005), *Australian Newspapers* (2008)), the NSK launched *Croatian Historic Newspapers Portal* in 2010. The portal was built in the project *Digitised Croatian Historic Newspapers and Journals* (DNC, 2009-2010) by NSK and IT company Conscius.¹⁴ It provides access to 119 digitised historic newspapers from 1789 to 1940. A collaborative digital library system enables cooperation of multiple partners from various Croatian heritage institutions (public libraries, museums and institutes).

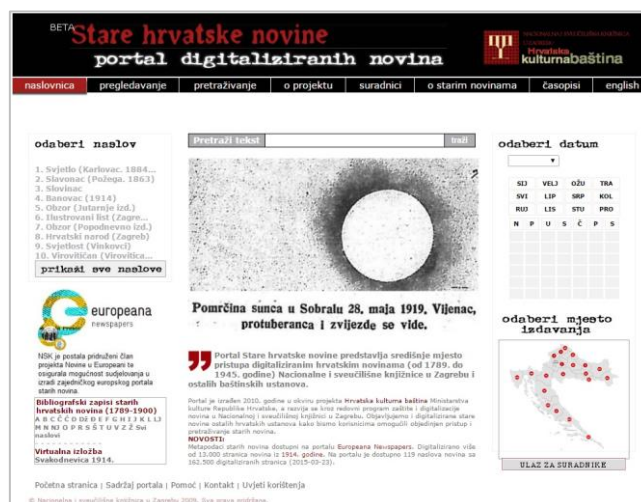


Fig. 2. Croatian Historic Newspapers (2010-2015) title page¹⁵

¹⁴ The project was realised with the support of the Ministry of Culture of the Republic of Croatia. Digitalizirane stare hrvatske novine i časopisi. Available at: <http://dnc.nsk.hr>

¹⁵ The portal was modeled in 2009 after NLA's digitised newspapers portal.

In 2011, the coverage of the HAW was expanded by national domain (.hr) harvesting and thematic harvesting. The NSK has recently begun the archiving of freely available newspaper digital print masters. Since most Croatian newspaper publishers' print masters archives are password protective, more intensive negotiations are necessary as well as an appropriate technical solution for contemporary newspaper print masters ingest, storage and access.

An insight into historic and contemporary Croatian digital news media management

Previous research of Croatian digital news media

Analysis of Croatian digital news media and the development of Croatian online journalism dates from 1995 when Malović started publishing a series of articles dedicated to Internet media and Croatian Internet journalism¹⁶ followed by a number of authors from the publishing and journalism sector (Hebrang, Sviličić (1998), Rakar (2009), Brautović (2010), Benković and Balabanić (2010) etc.)¹⁷. The first digital news media analysis deriving from the library sector dates from the year 2000. Their authors were mostly focused on the analysis of the available sample in the Croatian web archive.¹⁸ The most recent results relating to the content analyses of the most visited Croatian Internet portals conducted by Benković and Balabanić (2010) showed that the portals “dedicate their virtual space mostly to information from the area of entertainment and show business, sport, criminal news, culture and art, politics, and information about various unusual and bizarre situations”¹⁹ while “technology Internet options such as multimedia and content linking are used in a small degree.”²⁰ Since the first Croatian daily newspapers had produced their iPad versions in 2010, further research of newspaper mobile applications have yet to be conducted.²¹

¹⁶Malović, Stjepan. Hrvatska na Internetu: Neiskorištene mogućnosti. // Trenutak hrvatske komunikacije. / uredio Pavao Novosel. Zagreb : Fakultet političkih znanosti Sveučilišta u Zagrebu, 1995. P. 30.

¹⁷The list of the references is available in: Brautović, Mato. Ibid.

¹⁸The list of the references is available at: <http://haw.nsk.hr/bibliografija>

¹⁹Benković, Ivan Balabanić. Analiza sadržaja najposjećenijih hrvatskih internetskih portala // Medijska istraživanja 16, 2(2010)43-56.

²⁰Benković, Ivan Balabanić. Ibid.

²¹Wruss, Tomislav. Kako smo napravili prvu iPad aplikaciju u Hrvatskoj. // Jutarnji list (2010-09-25). Available at: <http://www.jutarnji.hr/jutarnji-ipad---revolucija-u-citateljskom-iskustvu/889466/>

Digital news media in the HAW and DNC: 2004-2014

The goals of the preliminary survey *Digital news media in the HAW and DNC: 2004-2014* were to investigate the *content* and *procedures* in two digital library systems dedicated to digital news management. The survey was conducted as a part of the NSK's activities in improvement of e-legal deposit which includes work on a revision of the Croatian legal deposit law, negotiations with publishers, library organisational changes, building of a digital deposit system to support the deposit of newspaper print masters, the creation of a single access point of all digital news media, and the promotion of national news media collection as an indicator of national heritage continuity and change. It also included a study of formal characteristics of 19th century newspapers (2012) and a semantic analysis of the users' queries in the Historic Newspapers Portal (2012).²²

For the purpose of this paper, the following characteristics of digital media archived in the DNC and HAW will be presented: *types, size and formats*. The difference of their management at NSK will be presented in terms of: *e-legal deposit, selection criteria, metadata, access and copyright, portal functionalities, and usage and promotion of portals*. Analysis was based on 291 online news media archived in the HAW (2004-2014) and 119 digitised historic newspapers available in the DNC (2009–2014).

E-legal deposit and ingest methods

Croatian Library Law from 1997 is not precise in definition of the types of *online publications* considered as part of the legal deposit, and leaves enough space for misinterpretation. While web sites are recognised as *online publications*, digitised newspapers have been voluntarily deposited to NSK with the permission of their producers and/or owners to be made available on the Croatian Historical Newspaper's portal. Digital equivalents of printed newspapers are part of the legal deposit when they are freely available on the Internet as *e-newspapers* (i.e. *pdf versions of the newspapers*) but newspaper digital print masters (i.e. "files that are used to produce a paper publication"²³) have not been archived.

²² Klarin Zadravec, Sofija. Semantic analysis of the user queries in the Croatian Historical Newspapers Portal log files. // IFLA WLIC 2014. Available at: <http://library.ifla.org/1028/1/170-zadravec-en.pdf>

²³ Solbak, Svein Arne. Implementation of digital deposit at the National Library of Norway. // IFLA WLIC 2014 - Lyon - Libraries, Citizens, Societies: Confluence for Knowledge. Available at: <http://library.ifla.org/id/eprint/992>.

Table 1. Ingest of the historic and contemporary news media at the NSK

Type	Part of legal deposit	Producer	Type of ingest	Method of ingest	Quality control	Adjustment to the system	Other activities during ingest
Digitised newspapers	No	NSK and other heritage institutions	Voluntary deposit	Submitted by heritage institutions	Yes	Yes (image quality, file names and formats)	OCR
Online news media ²⁴	Yes	Publishers, individuals etc.	Harvesting	Selective harvesting, thematic harvesting, national domain harvesting	Yes	No ²⁵	-
Digital print masters	No	Publishers	(test period - voluntary deposit)	(test period - submitted and harvested)	Yes	Yes (image quality, file names and formats)	OCR

Historic newspapers have been digitised at the NSK and other Croatian heritage institutions since 2004. There are still no commercial digitisation projects of newspapers in Croatia even though NSK has encouraged publishers to launch such projects.

Online news media (*news websites*) have not been delivered by publishers but selectively harvested by HAW.

Preservation of newspaper print masters is still partly in the test phase - different approaches of their delivery and/or archiving are being tested. Up till now, only two publishers of daily newspapers have shown interest in the digital print master's deposit.

The NSK has defined a standard for digitised newspaper voluntary deposit (formats, file names and image quality). Newspaper file names include collection name, newspaper ID, date and volume-number-page information. It enables extraction of the metadata and files ingestion into the OCR module and newspaper digital library system.

The quality of the web news media's archived copy in HAW depends on the technology used when creating a website as well as on the harvester quality. Recommendations made by NSK and Srce help publishers and webmasters to standardise

²⁴ Including 4 e-newspapers titles.

²⁵ Preporuke za izradu mrežnih publikacija. // HAW. Available at: http://haw.nsk.hr/preporuke_za_izradu_mreznih_publicacija

solutions in website construction and design and therefore achieve a better quality of the archived copy.²⁶

A standard for the newspapers digital print masters deposit is to be defined this year.

It is expected that digital reproductions will become part of the legal deposit after the revision of Croatian Library Law in 2015 while newspaper's digital print masters (as well as digital print masters of the books) will not be covered by the Law amendments.

Size and formats of digital news media in the NSK systems

Table 2. Size and formats of archived historic and contemporary news media at the NSK

News media type	Number of news titles	Coverage of news media	News media size in TB	News media Formats
Digitised newspapers	119	1789-1940	1.31 TB	image/TIFF, image/ jpeg, application/pdf, text/html
Online news media	291	2004-2015	3.86 TB	text/html, image/jpeg, image/png, image/gif, application/javascript, etc.
Newspapers print masters	5	2015	3.7 GB	application/pdf

The data presented in Table 2 shows a significant difference in the size and number of formats in news media types at NSK. The amount and size of newspaper print masters (450 Mb) are negligible due to the archiving period while the small number of digitised newspapers (119 titles) is the result of the inadequate resources of Croatian heritage institutions involved in newspaper digitisation.

The Croatian Web Archive currently contains 5445 titles (7.6 TB) which have been archived in the last ten years. There are 291 selectively harvested news media (3.86 TB). The most common formats of the archived news media are: *text/html*, *image/jpeg*, *image/png*, *image/gif*, *application/javascript*, etc.

Digital print masters are supposed to be delivered to the NSK as pdf files.²⁷ Assessment of the growth of the archive will be possible after the completion of the test phase of the print masters archiving project.

²⁶ Ibid.

²⁷ Since DNC ingest module accepts both jpeg and pdf files there are no obstacles of print masters delivery into the DNC system. HAW system is also suitable for archiving new types of material but it does not support OCR.

Selection criteria and types of digital news media

Selection criteria for digitisation and web harvesting are based on Croatian Library Law and the NSK's collection strategy. *Selection criteria in the NSK digitisation project* (NSK, 2004)²⁸ determines priorities in digitisation. The focus of the newspaper digitisation program is on the creation of digital reproductions of 19th century newspapers, and priorities are determined by content and preservation experts.

The newspaper reproductions have been submitted to the digital newspaper's system by: the *NSK digitisation program* that follows selection criteria but also relays on available microfilm reproductions, the *NSK digitisation on demand program*, and voluntary deposit by other Croatian heritage institutions. The analysis of the titles available on the Historic Croatian Newspaper's portal showed that it consists of 32.77% digitised local newspapers published since the beginning of the 20th century. It means that the Portal is the result of the available digital reproductions, rather than conforming to selection criteria.

Online news media have been collected selectively according to *HAW's general Selection Criteria*.²⁹ Therefore, harvesting is focused on news media published by Croatian publishers, news media in Croatian and about Croatia. Also, selected material must also meet other criteria such as: content quality, structure, reputation and reliability of the publisher, type of domain, format and uniqueness. Since the content of the news media is extremely dynamic, their archiving requires special care and adjustment of the archiving frequency and method.

Table 3. Types of archived online news media in the HAW

Type of contemporary news media	Number of titles (%)
Regional news portals	146 (50.17%)
National news portals	74(25.43%)
Radio& TV portals	29 (9.97%)
Regional newspaper portals	21 (7.22%)
National newspaper portals	15 (5.15%)
E-newspapers	4 (1.37%)
Press agency portal	1 (0.34%)
Blog	1 (0.34%)

As shown in Table 3, news media in HAW includes national and regional newspaper portals,

²⁸Projekt digitalizacije građe Nacionalne i sveučilišne knjižnice u Zagrebu : radni materijal. / uredila Sofija Klarin. 2004.

²⁹ Selection criteria // Croatian Web Archive. Available at: <http://haw.nsk.hr/en/selection-criteria>

blogs, national and regional news portals, press agency portals and radio & TV portals i.e. those which report about topical events and subjects concerning the general public both nationally and abroad. HAW also includes four e-newspapers (i.e. publicly available newspaper digital print masters) that have been harvested continuously (number per number) or once (a whole archive) from 2006 to 2014.

There are certain technical issues in news media harvesting that impede the application of the selection criteria at HAW. For instance, Flash content harvesting is often unsuccessful because of the nature of Flash format. Web sites using JavaScript for site navigation or content fetching are rarely successfully archived.³⁰ A video published on YouTube and similar streaming audio or video files are very difficult to harvest. In addition, some titles have not been harvested (even though they meet the Criteria) due to their site design, site size or access restrictions imposed to HAW robot.

Selection criteria for the newspaper print master's deposit will be established during 2015. For the purpose of the print master's archiving test phase (2014-2015) in both digital library systems, NSK has selected only daily newspapers (ten titles).

Access and copyright

According to Croatian Copyright Law, newspapers belong to the category of anonymous works and the copyright is valid seventy years from the year when they were printed.³¹ Since NSK is digitising the oldest part of its newspaper collection, all digitised content in the DNC is freely available for public access. For newspapers that are selected for digitisation but fall within copyright, heritage institutions (producers) clear copyright.

Table 4. Conditions of access of digital news media at the NSK

Type of news media	Open Access	Restricted access	Access in the library
Digitised newspapers	117	0	4
Online news media	287	4	4
Digital print masters of daily newspapers ³²	0	1 (test phase)	0

³⁰ That is the main reason why social networks are not harvested.

³¹ Zakon o autorskom pravu i srodnim pravima. (2003) Available at: <http://narodne-novine.nn.hr/clanci/sluzbeni/306987.html>

³² Also, ten national and regional newspapers provide restricted access to their archives of digital print masters while just one daily newspaper offers open access to the current issue in pdf format.

As shown in Table 4, there are 4 digitised newspaper titles that have restricted access at the moment due to their politically sensitive content. The majority of the archived copies of harvested online news media in the HAW are publicly available and only four publishers have demanded restricted access (within NSK) for their publications.³³

Portal functionalities

Two NSK news media portals were analysed: the *Digitised Newspapers and Journals* (DNC) and the *Croatian Web Archive* (HAW).

Table 5. Functionalities of the NSK digitised newspapers and harvested online news media portals

Portal	Searching		Browsing							
	Simple	Advanced	Full text search	Alphabetically (by title)	Subject	Interactive Map	New titles	Timeline	Calendar	Collection
DNC	+	+	+	+	-	+	+	-	+	+
HAW	+	+	+	+	+	-	+	+	-	-

Digitised newspaper user interface has a set of features that are designed to search and browse digitised newspapers: a search box on the title page³⁴, a list of digitised titles, a calendar, an interactive map of Croatian counties with links to the local newspaper's metadata, etc. Significant functional and visual improvements of the DNC are needed: metadata searching, design of the portal, and newspaper viewer.

Online news media archived in the HAW can be searched using several criteria: title, URL and keywords, and browsed alphabetically by title or by an organized subject list. Improved user interface that is planned for construction in 2015 will include calendar browsing and metadata searching improvement.

During the analysis of possible improvements of the DNC and HAW portals, a proposal for the newspaper digital print master's portal functional requirements was made. Due to hybrid characteristics of the print master's collection, its future portal can benefit from the experience of both news media portals' features development. The proposal of the digital

³³ Web publishers can deny public access to the archived copy, but NSK must ensure a minimum level of access i.e. one authorised user within the Library.

³⁴ A full text search box is also available on each digitised newspaper's title page.

print master's portal includes improvement of content access control and more detailed guidelines for library patrons on access possibilities.³⁵

Metadata

Bringing together historic and contemporary news media collections requires gathering metadata of related entities in bibliographic families and presenting continuity of news media issuance as well as the transition from paper form to an online edition.

The NSK catalogue integrates bibliographic data on several news media types and formats: *print*, *microfilm*, *online* (selective web harvesting), and *digitised historic newspapers*. Descriptive metadata on the online news media archived in national domain web harvesting and newspaper digital print masters are not available in the catalogue. Separate records model for cataloguing print, digitised and online newspapers (with links between the records) was introduced at the NSK in 1999 by cataloguing online news media and has continued with digitised newspapers in 2014. As shown in Table 7, most types of Croatian news media publications are assigned with ISSN.

Table 6. Metadata of analogue and digital news media at the NSK

News media type	Bibliographic description (MARC21) in ILS	Descriptive Metadata (Dublin Core) in Digital library system	ISSN
Print	Yes	Yes, 19 th century newspapers	Yes
Microfilm	Yes	Minimal description + holdings information	Yes
Selective web harvesting	Yes	Yes, both title and archived copies	Yes, mostly
National domain web harvesting	No	Minimal description	No
Digitised historic newspapers	Yes, completely digitised title	Yes, title and issue	Yes (completely digitised title)
Newspaper digital print master	No	No	Under consideration

³⁵ Besides technical (temporal database) and financial limitations, there are also linguistic challenges in the integration of historical and contemporary language. Not only in the area of Information Retrieval (historic and contemporary corpora), but also in the selection of the Croatian term for *news media* and its digital collection. There are several Croatian terms that could be used for the translation of the English term *digital news media* (*online mediji*, *digitalni mediji vijesti*, *mediji digitalnih vijesti*, *digitalne vijesti*, *digitalne novine i portali s vijestima*, *digitalizirane novine*, *e-novine*, *novinski portal i portali s vijestima*) but there is still no consensus on the proper one.

Data presented in Table 6 also shows the different approaches in the bibliographic organisation of digitised and harvested online news media. Modelled after the *U.S. Newspaper Directory*³⁶ that is available on the Library of Congress *Chronicling America*.

The DNC includes bibliographic data on Croatian 19th century print newspapers. The federation of several digitised collections on the Portal has determined the metadata model (i.e. collection level metadata, digitisation project metadata etc.). In the absence of a union catalogue of Croatian historical newspapers, it has also started to integrate holdings data of print, microfilm and digitised newspaper manifestations from NSK and other heritage institutions.

Cataloguing of online news media in the library catalogue is part of the selective harvesting working process.³⁷ Descriptive metadata is automatically transferred from the ILS to the harvesting system initiating archiving process of the described web resource.³⁸

Bibliographic description of both analogue and digital Croatian news media are part of The European Library portal that integrates them with the European news media bibliographic data. Metadata of digitised newspapers and selectively harvested online news media are available in Europeana while a part of the digitised historical newspaper collection can be accessed by the Europeana Newspapers Portal. Availability of Croatian news media metadata in other systems can improve access and usage of the collection and enable comparative studies in the European context.

Usage and promotion of the portals

*Table 7. Users of the HAW and DNC in 2014.*³⁹

Portal name	Number of visits	Number of users	Number of page views	Avg. session duration (min)	Number of pages/session	New sessions (%)
Digitised newspapers and journals (DNC)	38,364	20,778	172,615	5.18	4.5	52.15%
Croatian web archive (HAW)	21,783	16,526	46,987	1.53	2.16	74.2%

³⁷ Manual for cataloguing web resources was published in 2011. Buzina, Tanja; Holub, Karolina. Mrežna građa: upute za katalogizaciju u bibliografskom formatu MARC 21, izdanje 1999., 12. verzija dopuna. Zagreb: Nacionalna i sveučilišna knjižnica, 2011. Available at: http://haw.nsk.hr/upute_za_katalogizaciju

³⁸ Holub, Karolina ; Rudomino, Ingeborg. Croatian Web Archive: an overview. // Review of the National Center for Digitisation, 25(2014), 11-16.

Available at: <http://elib.mi.sanu.ac.rs/files/journals/ncd/25/ncd25011.pdf>

³⁹ Source: Google Analytics.

The portal of digitised newspapers and journals (DNC)⁴⁰ drew more unique Web visitors (20,778 in 2014⁴¹) than any other digital content held by NSK. The majority of visitors came from Croatia and neighbouring countries, spending 5.18 minutes per visit on the Portal.⁴² In 2014, the DNC team promoted the Portal and a collection of digitised newspapers from World War I by launching a virtual exhibition entitled *Everyday life in 1914*, it was created through the use of digitised newspaper clippings only.⁴³

Over 46,986 pages were viewed on HAW's website in 2014, for an average of 2.16 pages per session. The HAW team is very active in the promotional activities of the content contained in the archive as well as activities using both news media and social networks.

Conclusion

Historic evidence of *national heritage continuity* surely ascertains a new meaning when one can gain an insight into it in national digital (news media) libraries. In context of the NSK's news media management strategy, integration of all digital news media into the *national digital news media collection* with a single access point will be a next step.

NSK has built two systems that include digital news media: the *Croatian Historic Newspapers Portal* and *Croatian Web Archive*. Implementation of the Croatian daily newspaper digital print master's archiving at NSK requires new technical solutions and procedures that must also increase the organisational and technical effectiveness of the whole e-legal deposit management process. Experience gained in newspaper digitisation and web harvesting is a good starting point for dealing with new challenges: deposit infrastructure development and access (for instance, information retrieval of contemporary and historic content). Solbakk's report on newspaper print master's deposit in the National Library of Norway shows that the print master's deposit workflow definition and implementation of new tools for the handling of legal deposit benefit greatly from the experience and technical solutions in historical newspaper digitisation.⁴⁴ According to Oury, the Bibliothèque National de France also decided to follow the procedures used for mass digitisation and manage both digitised newspapers and print masters in the same workflow.⁴⁵ Results of the analysis of the

⁴⁰ Data on digitised newspaper users only in DNC are not available.

⁴¹ Source: Google Analytics.

⁴² Ibid.

⁴³ 1914. : svakodnevnica u starim hrvatskim novinama. Available at: <http://virtualna.nsk.hr/1914>

⁴⁴ Solbakk, Svein Arne. Ibid.

⁴⁵ Oury, Clément. When press is not printed: the challenge of collecting digital newspapers at the Bibliothèque National de France. // Proceedings of the IFLA Preconference, newspaper section (Mikkeli,

Croatian digital news media collection gives an insight into a segment of the working process of digital news media at the NSK. There are possibilities for digital news management integration but not without significant investment and improvements and also intensive negotiation with newspaper publishers. Informations gathered in the NSK project the *E-book ingest module*⁴⁶ and the *National ETD repository*⁴⁷ will surely help to accomplish the goals of print master's deposit implementation.

Availability and integration of national and international news media collections in the online environment (i.e. Europeana Newspapers Portal – Historic Newspapers) enables new library services that support research of digital news media collections themselves - their analysis and comparison, analysis of international news history and the continuity of news production, journalism studies etc.

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⁴⁶ Klarin Zadravec, Sofija; Tanja Buzina; Dunja Seiter-Sverko. E-Book Ingest Module at the National and University Library in Zagreb // *IFLA WLIC 2014*. Available at: <http://library.ifla.org/1028/1/170-zadravec-en.pdf>

⁴⁷ Klarin Zadravec, Sofija ; Karolina Holub. Repozitoriji završnih radova u Dabru / *SRCE Novosti*, 57(2015). Available at: <http://www.srce.unizg.hr/srce-novosti/sazetak/srce-novosti-broj-57-tema-broja-digitalni-akademski-arhivi-i-repozitoriji-942/>

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