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Turning Points in the Croatian Information Environment: From the 1980s to 2023

Abstract: The article deals with the development of standards and library information systems in Croatia from the late 1970s to 2023. Despite the turmoil of the dissolution of former Yugoslavia, the National and University Library in Zagreb (NUL) was able to continue its operations and was central to initiatives aimed at adapting national needs to international developments until the early 2000s, when it switched to a commercial system. The publication of the National Content Standard in 2021 has given the NUL the opportunity to assume again its central role in the Croatian bibliographic ecosystem.

Keywords: National and University Library in Zagreb; Zagreb; Croatia: 1980–2023; library systems and services; bibliographic standards

Wendepunkte in der kroatischen Informationsland-schaft: Von den 1980er-Jahren bis 2023

Zusammenfassung: Trotz der Wirren der Auflösung Jugoslawiens, bei denen auch Bibliotheken zerstört wurden, konnte die National- und Universitätsbibliothek Zagreb (NUL) kontinuierlich weiterarbeiten. Der Artikel beschäftigt sich mit der Entwicklung von Standards und Bibliotheksinformationssystemen von den späten 1970er-Jahren bis 2023. Die Herausforderung war, Lösungen für nationale Bedürfnissen den internationalen Entwicklungen anzupassen. Die National- und Universitätsbibliothek Zagreb (NUL), Kroatien stand bis zum Beginn der 2000er-Jahre im Zentrum dieser Entwicklung, danach wechselte man zu einem kommerziellen System. Die Publikation des Nationalen Standards für Inhaltsdaten 2021 gab der NUL die Möglichkeit, wieder die zentrale Rolle im bibliografischen System Kroatiens zu übernehmen.

Schlüsselwörter: National- und Universitätsbibliothek Zagreb 1980–2023; Bibliothekssysteme und -services; bibliografische Standards

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1 Introduction

First, we express our gratitude for the invitation to contribute to this special issue of the journal *BIBLIOTHEK – Forschung und Praxis*. The theme "A Turning Point to the Turning of the Times", which covers the period from the late 1980s to the 2020s, is more than intriguing. This is the period in which we started and ended our careers as professional librarians. This is the period in which we have actively participated and followed the events in our own and the international library and information community, especially relating to the development and implementation of standards and library information systems. And now, we have been given a unique opportunity to look at this period with the passage of time, objectively and critically, with all its difficulties and stagnations and its successes and failures. We hope that we have succeeded in that, at least to some extent!

This contribution is structured in three main sections: the late 1970s to the late 1980s, the 1990s to the early 2000s, and from the 2000s to 2023.

The National and University Library (NUL) plays a central role in the presentation and analysis of each period. In line with the *Law on Libraries and Library Activities*,[1] through its dual function as the national library of the Republic of Croatia and the central library of the University of Zagreb, NUL acts as the national information and bibliographic centre, the central library and information system; and it carries out scientific research and development activities for the improvement of Croatian librarianship and the development of the library system of the Republic of Croatia. On all these issues, through a special centre within the NUL, the library collaborates closely with representatives of all types of libraries, including research libraries. In recent decades, with the establishment of new universities across the country the latter have increasingly been transformed into university libraries.

Chronologically, the development of standards and information systems at the international level is intensively followed. International co-operation is established by active involvement in the work of international expert bodies and

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1 Zakon o knjižnicama i knjižničnoj djelatnosti (2019).

participation in international projects, which demonstrates that the influence in the development of standards and systems goes in both directions.

The period of the late 1980s and early 1990s, which brought turbulent political changes in Central and Eastern Europe, should be highlighted here. In effect, it was the time of the disintegration of socialist political systems and federal states, including former Yugoslavia, of which the Republic of Croatia was part. Unfortunately, this process was not conducted peacefully in Croatia or in Bosnia and Herzegovina. Many regions of Croatia were destroyed in the war and cultural assets, including libraries were particularly targeted, as is evidenced in the book *Wounded Libraries in Croatia*.[2] In that period (1991–1995) resistance to the killing and destruction, aside from weapons, was carried out through numerous humanitarian activities and actions to save cultural heritage. In the free and/or unaffected regions, these horrors were responded to through continuous, systematic, creative work, including in NUL, which is explained in a comprehensive and systematic way in section 3. It should also be noted here that the change in the socio-political system did not affect the professional and development activities of the central library institution, because it is clear from section 4 that projects, which has already begun, continued and new ones were started, were financed by the Ministry of Culture and the Ministry of Science and Education. In other words, in relation to funders NUL had – and maintained – a form of autonomy in making decisions about the development of the Croatian library system. Were there always correct? Were there any wrong ones? The latter are most often *implicit* in the text, and sometimes *explicit*. However, we believe that there were significantly more professional, original, innovative, progressive decisions made than not.

As for methodology, in addition to relevant literature and official archives we also used the method of interviews with experts who initiated and/or participated in truly pioneering ventures, not only at a national but also at an international level: Ana Bosanac, Željko Rajter, Tanja Buzina, and Ana Vukadin. We believe that their testimonies additionally document and enrich this text, and we thank them from the bottom of our hearts for their co-operation.

2 The Late 1970s to the Late 1980s

2.1 From Eva Verona to UNIMARC Implementation in a Library Automation System

Eva Verona, the renowned Croatian and Yugoslav, and acclaimed international expert in the theory and practice of cataloguing and bibliography,[3] laid the foundations and framework for national bibliographic control by her persevering work on international principles and standards and, in parallel, on the creation of national cataloguing rules. As keynote speakers at the "International Conference on Cataloguing Principles", held in Paris in October 1961,[4] Eva Verona and Seymour Lubetzky took an opposing stance on the question of the function of the main entry in an alphabetical catalogue. They argued that a distinction had to be made whether the main entry represented the "work" (the literary unit) or the "book" (the bibliographic unit). Regardless of the resolution of the argument, this analytic approach to the function of the main "access point of the catalogue record", as we would call it from the 1980s onwards, is the beginning of the approach at a more granular level to the functional requirements of bibliographic data as such: the WEMI: Work-Expression-Manifestation-Item stack of the conceptual models IFLA published first in 1998 (FRBR)[5], and then in 2017 the *IFLA Library Reference Model* (LRM)[6].

In 1962, immediately after the Conference, Verona started her work on the national Yugoslav Cataloguing Code, following the decision made by the Cataloguing Committee of the Yugoslav Library Association in December 1961.[7] The first part on headings and entry words of the *Code and Manual for the Compilation of Alphabetical Catalogues* was published in 1970. The second edition, updated with new IFLA documents, the development of cataloguing theory, and the need to align with the second part of the *Code*, was published in 1986.[8] The second part of the *Code* on the bibliographic description of monographs was begun by Verona immediately after the publication of the first part in 1970, with the first draft stipulations issued for consultation in 1972. Following the first standard edition of ISBD(M) in 1974 and its revised edition in 1978, incorporating ISBD(G) (1977) and the *Form and Structure of Corporate Headings* (1980), the second part was finally published in 1983.[9]

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2 Aparac-Gazivoda and Katalenac (1993). The data presented in the book were collected up to the end of December 1992. One of the main purposes of the book was to inform the international library community about the scope of destruction.

3 Anderson (1996).

4 International Conference on Cataloguing Principles (1969).

5 Functional Requirements for Bibliographic Records (1998).

6 Riva et al. (2017).

7 Verona (1986) 7.

8 Ibid.

9 Verona (1983).

This process was described in detail in the article "In Memory of Co-operation with Dr Eva Verona" by Liljana Gjuzelova-Hadži Boškova, which was published in the proceedings of the "International Conference in Honour of the 100th Anniversary of Eva Verona's Birth" held in Zagreb in 2005. Gjuzelova-Hadži Boškova, Verona's close associate in compiling the *Code* emphasizes Verona's pivotal accomplishment by interlinking practice and theory, the relevance of the terminology, and awareness of the technological underpinning of the Catalogue:

> The work on the *Code* was thus further complicated due to the need to follow a dual principle – that of the international harmonization and the need to find the solutions for the national requirements. I would like to paraphrase here the words of Eva Verona regarding the international recommendations: these we can and must accept, others do not suit our library practice – thus we shall find our own solutions. [...] Along with the individual elaboration on all of the issues of cataloguing, Verona also established the principles of the theoretical frame of the *Code*, based on the international standards, and other significant European and international cataloguing codes. At that time, her theoretical and practical engagement was a unique example in the region of former Yugoslavia and was in fact the first scientific approach to the issues of contemporary cataloguing practices. With her approach Eva Verona managed to bridge the wide gap within the field. [...] Eva Verona also played an important role in constructing the heretofore unfamiliar cataloguing terms, and thus defining new terminology. The *Code* also tried to anticipate the future requests of automated data processing which was introduced during the early 1980s.[10]

Verona's methodology, theoretical framework and responsiveness to new technologies[11] were applied in two crucial circumstances – "turning points": at the end of the 1970s with the design of the first library automation system for the National and University Library and the adoption of the IFLA UNIMARC bibliographic format with the implementation of Verona's rules; and in the middle of the 2010s with the design of the new Croatian content standard implementation of principles, models and standards for the archive, library, and museum communities. In 1979, NUL published the "Draft NUL Information System Project" listing the requirements for the development of an information system: design NUL's bibliographic database; open NUL's information system to the public through an information network; enable the exchange of bibliographic data with other library systems and networks; make resources operations efficient; and educate librarians and other users of the library system.[12]

In 1980, the following year, NUL established a new department: the Electronic Computer Centre, acquired – or, more precisely, was given by the Unisys company – a UNIVAC VARIAN computer, a demonstration piece from the Zagreb Autumn Fair Interbiro Informatika, and employed three computer specialists, a programmer, and a secretary. Two cataloguers were delegated to join the project, one to "read" UNIMARC to IT professionals (Mirna Willer) and the other, Vlasta Lešaja, to co-ordinate librarians' requirements and education. Following some market research, it was decided to create the system in-house. Prior to that point, NUL had to decide on the format for the bibliographic database design. It was decided to adopt the IFLA UNIMARC format as the internal database bibliographic format, and therefore as an exchange format. The main reason was that UNIMARC was an IFLA standard that incorporated other IFLA standards for universal bibliographic control, such as the International Cataloguing Principles and ISBD, on which Verona's cataloguing code was based. It was also a guarantee of a stable, continuously developing environment for the system and its services. Verona's work in IFLA professional bodies gave an example for involvement in such processes. Following the results of the experimental phase of the application of the UNIMARC 2nd revised edition, 1980[13] in the NUL's system, the UNIMARC format was adopted as the national, Croatian, and Yugoslav machine-readable format for cataloguing and bibliography, and as the exchange format between Yugoslav national libraries. This decision was reached at the 4th Yugoslav Conference on the Application of Computers in Libraries, held in Sarajevo, 1986. It was also decided that a manual for the use of UNIMARC in Yugoslav libraries should be developed.[14]

The implementation of Verona's cataloguing rules in an international UNIMARC bibliographic format and its application in the database design required a series of systematic decisions. The bibliographic format was initially designed following the Entity-Relationship Model which became fully operational with the publication of its complementary format UNIMARC/A: UNIMARC Authorities format in 1991. UNIMARC/B provided methods of linking records which suited Verona's rules perfectly, enabling the description of complex bibliographic relationships. It was also necessary to

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10 Gjuzelova-Hadži Boškova (2007) 276.

11 When working on the implementation of Verona's *Code* to UNIMARC, I wasn't quite sure which tag to use for formal headings (used in the *Code* for legal works only), so when I heard that Eva Verona was in the NUL searching for examples for the 2nd part of the *Code*, I approached her and explained my problem. She didn't even raise her head from her work, and just said in her beautiful alto voice "503". That is the UNIMARC tag for uniform conventional headings, later renamed as preferred conventional headings (note by Mirna Willer).

12 Kvaternik (1979).

13 UNIMARC (1980).

14 IV jugoslovensko savjetovanje o primjeni računara u bibliotekama (1986). See also Willer (1988).

clone UNIMARC fields for authority data which were missing in the bibliographic format but were essential for the full functional requirements of the catalogue and bibliography. Another task was to design a specification for the printout of catalogue cards and bibliography. Verona's *Code* Part 2 dealing with the bibliographic description was still in the pre-publication phase, so it was necessary to consult parts ('bundles') of the rules Verona was issuing for final review and approval by the Yugoslav Committee on Cataloguing. Ana Bosanac, one of the system designers, recollects the focal points of their work in the interview she gave us.[15,16]

> Requirements for the system design envisaged a full integrated library system, which implied that search and retrieval of data, as well as their entry, update, and correction in each of its modules should be designed as a full online application. The module for data entry and storage were designed first, to be followed by the retrieval module, and other processing modules. It was decided therefore that data should be stored in a logically linked structure and that UNIMARC format with its implementation requirements should be built into the online data storage. At the same time, it was important that the conceptual solution of the system should be independent from the software design and hardware configuration.
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> In its design the data storage solution had to take into account the extreme variability of the length of bibliographic record: bibliographic data are diverse in appearance (none, one or more), in length (variable), and also in importance (mandatory/optional). Besides, it is unpredictable whether these data will be alpha or numeric or even special characters. This characteristic of bibliographic data does not allow any control during entry, so the availability of updating and correcting once entered data was of vital importance. Design of such a module was of the highest challenge, therefore, especially due to the restriction of data storage capacity of the computers of the time. The design of the UNIMARC format offered solution for the file storage system technology, and we made use of its methodology of recording data as defined by its Directory structure. UNIMARC was also implemented as a kind of online input manual, which helped librarians in a user-friendly manner to more easily adapt to the new cataloguing environment: from typewriters to online computer system.
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> Development of the second module – OPAC: Online Public Access Catalogue depended again on finding solutions to the design of our own search programmes because the Querry Language (QL77) which was bought with the machine was not usable. Search and retrieval of data with predictable length and value (ISBN, ISSN, etc.) and authorised access points of names caused no problem; the problem was designing an algorithm for title key word retrieval because of their unpredictable length, and grammatical and multilingual forms. We began designing retrieval with four letters of title field words considering the grammatical forms of the Croatian language, but it proved deficient because of high recall. The improvement of algorithm with filtering criteria, however, was not finished. Although the NUL as such embraced the technological progress and, indeed, the prestige it brought,

the attitude towards the vision and further development it implied did not equal it anymore. With our decision to leave the library an important body of knowledge was lost.

2.2 ELAG: European Library Automation Group

It was a paradox that shortly before NUL lost its key computer personnel, it participated for the first time in the ELAG 10th Seminar held in Madrid in 1986. The ELAG: European Library Automation Group,[17] led by its president Paula Goossens, KBR (Royal Library Belgium) was – and has remained – a vibrant, prolific catalyst, and mediator of ideas in the design and development of library systems and services. ELAG's first seminar was held in 1979 in Copenhagen. The annual seminars were particularly vital in the 1980s, when national and research/university libraries were developing their library systems in-house and when system designers were in direct contact (and vice versa) with the so-called system librarians: cataloguers interpreting MARC standards to IT professionals. Such close co-operation was crucial for acquiring an understanding and knowledge of what a library system is: its technical functionality, how it is used by librarians, what are its products, and – eventually – what end users (readers) can/should expect from it.

The topic of the Madrid ELAG was the OPAC: Open Public Access Catalogue, the very module that Ana and her colleagues had been designing before they left the NUL! The presentation of an annual progress report, a mandatory contribution for every participant, was recognised as a significant achievement and "earned" NUL the invitation to host a future ELAG seminar in Zagreb, which was realised in 1989.[18] However, it was earlier at the 12th Seminar on Local Systems held in Stockholm in 1988 that NUL presented its report on the use of Oracle RDBMS for the database design of its new, pilot system CROLIST. Some public comments were quite critical: university students were not being trained in relational database systems!

2.3 CCF: Common Communication Format and UNIMARC

Another important landmark in the late 1980s was the seminar in Zagreb in 1987 organised by the NUL and the Boris Kidrič Institute in Vinča, of the Mihailo Petrović Alas

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15 Ana Bosanac. Interview, 20 November 2023.
16 Detailed description of their work in Bosanac and Seder (1984).

17 https://elag.org/.
18 Willer (1989a).

Institute for Informatics, Belgrade.[19] The seminar was entitled "Implementation of UNESCO's Common Communication Format (CCF) in Yugoslavia": the aim was to present the results of the two-year project of the same name carried out by the two institutions.

CCF: the Common Communication Format was developed by Peter Simmons and Alan Hopkinson for the UNESCO General Information Programme (GPI) and UNISIST (United Nations International Scientific Information System) in 1984 as an exchange format between the two communities: the ISO 2709 MARC bibliographic formats – national MARCs, MEKOF and UNIMARC, and indexing and abstracting formats, particularly the *UNISIST Reference Manual.* The Zagreb seminar covered various topics around the possible use of CCF in an integrated Yugoslav library, scientific and technical community.[20]

The project brought into the limelight two exceptional experts, each with their experience, who made a notable impact on (our) dealing with the future development of library information systems and services, and on the understanding of the development and interaction of international bibliographic and non-bibliographic standards. The two experts were Alan Hopkinson, at the time consultant for the UNESCO Institute of Development Studies, and Snežana Pantelić from the Vinča Institute. Alan[21] had by that time already co-authored the *UNISIST Reference Manual* and published the *UNIMARC Handbook* (1983)[22] for the IFLA International Office for Universal Bibliographic Control (UBC) and was establishing his name internationally as a specialist in standards development and library systems. His knowledge and his generosity in sharing it knew no bounds; his work was instrumental in many a project in the UK and world-wide. At the time of his visit to Zagreb, the *Priručnik za UNIMARC* (*UNIMARC Manual*),[23] the implementation of the Verona cataloguing code to the UNIMARC bibliographic format, was in its final stage of preparation, and Alan's advice on the concept of implementation of a format and to solutions of some concrete technical issues were invaluable. Snežana Pantelić brought to the table her technical expertise in "reading" the ISO 2709 format and, in general, the importance of understanding the technical background of a standard used as a tool for a (generation of) technology in

developing a library system. With that as a background, she also shed light on the levels of interoperability, called "conversion" at the time: interoperability at the level of "content designators" – ISO tagging scheme (formats), the aim and purpose of the use of exchanged records – the culture of the institutions involved, and data – depending on the cataloguing rules in use.

3 The 1990s to the Beginning of the 2000s

3.1 Distributed Library System and Integrated Bibliographic and Authority Databases – UNIMARC/B & UNIMARC/A: 1988–1991

In 1988, national libraries in Yugoslavia started a library automation project within the centralised co-operative library network implementing UNIMARC format. The library system chosen through a public tender was COBISS.[24] It was a system provided by the Institute of Information Sciences in the University of Maribor (IZUM), Slovenia, which had been established as a public institution by the Government of the Socialist Republic of Slovenia as an information service for Slovenian science, culture, and education. The National and University Library of Croatia decided not to join the network because the idea of a centralised network was considered an outdated one,[25] unlike the distributed system based on a relational database and the use of telecommunication standards and protocols, which NUL recognised as relevant new technology. Besides, the NUL already had experience in building an automated system and expertise in implementing UNIMARC format, which was considered an asset that had to be used in designing a future, new automated system for the NUL and Croatian library network.

That same year 1988, the NUL started assessing the use of UNIMARC in ORACLE, a relational database for personal computers, with the aim of using such technology for the future library system and national network. The test period lasted for two years and, in 1990, the NUL signed the contract with the Croatian company UNIBIS (formerly 3A) after

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19 Pantelić and Willer (1987).

20 INDOK: information documentation centres and special libraries.

21 A. Hopkinson's book co-authored with Ellen Gredley *Exchanging Bibliographical Data: MARC and Other International Formats*, was published in 1990 and won the Library Association Book of the Year prize.

22 UNIMARC Handbook (1983). It happened that in the same year, 1987, an updated edition under the title *UNIMARC Manual* (1987) was published.

23 Willer (1989b).

24 https://www.cobiss.net/.

25 Željko Rajter in his interview (03-11-2023): "Library System was based on DEC Central Computer with asynchronous terminals (Vt220 type) linked with modems over leased telephone lines. Software was developed in COBOL programming language, data stored in files, and was supporting cataloguing in modified UNIMARC/Bibliographic format (COBISS MARC: COMARC)."

a public tender to develop a fully integrated library system under an arrangement where 3A kept all rights reserved on the software. In this test period, UNIMARC for authority data was implemented, as it was considered an indispensable component part of a fully integrated bibliographic and authority database system module. The UNIMARC/Authorities draft version of 1989-06-29[26] was obtained thanks to the kindness of Christine Bossmeyer, Die Deutsche Bibliothek, Frankfurt, Chair of the Steering Group on a UNIMARC Format for Authorities. The format was eventually published in 1991.[27]

Željko Rajter, one of the UNIBIS owners and principal developers of the system, reflects on the tasks of designing the system in the interview[28] he gave us for this article:

> At that time there was a new technology arising, based on UNIX machines instead of mainframes, relational databases instead of file systems, and C language along with 4 GL programming instead of COBOL, RPG and PL programming languages. There were few vendors of such technologies (IBM DB2, INFORMIX, ORACLE RDBMS). Respectable authors stated that relational databases were not suitable for library systems, and they were mostly influenced by legacy system vendors. The company was familiar with UNIX ORACLE technology, being pioneer in relational database development, having experts at their disposal who were capable of designing and programming full integrated distributed relational database conceptual, logical and physical data model of all standard library system modules (UNIMARC Cataloguing, Search/Retrieval, Acquisition, Circulation, Serials Control, Conversion, Export, etc.). The most important achievement of that time was the ability to use public networks for interaction with computer systems, using Personal computers as Client devices. This led to development of OPACs using Internet and TCP/IP protocols for connecting users to the system. The most important challenge of developing the product (called CROLIST) was the development of fast search and retrieval structure of the database, because without it the system would not have been capable of serving millions of user catalogue queries over Internet. The inhouse development of UNIMARC relational database model perfectly served as a very fast and efficient structure for information retrieval. Web OPAC (CGI) was programmed in C language which also speeded up the response time of the system.

In January 1991, based on a new method of processing library material required by the CROLIST system, a Department for Authority Control was established with the task of providing authority records for all types of material. That was the beginning of the full-scale cataloguing of newly acquired library holdings.[29] Bibliographic records from the VARIAN system were successfully exported into the CROLIST bibliographic database.

3.2 UBCIMP, PUC: Permanent UNIMARC Committee and IFLA Standards: Since 1991

The Permanent UNIMARC Committee (PUC)[30] held its first meeting in Florence in 1991 and was chaired by Sally McCallum, Library of Congress, whose experience with the development of UNIMARC bibliographic and authority formats was based on her work with Henriette Avram and Lucia Rather, "the original framers" of both those formats.[31] The PUC was the newly established standards body of the IFLA Universal Bibliographic Control and International MARC Programme (UBCIMP), one of IFLA's core programmes. The UBCIMP was established in 1990, and was hosted by Die Deutsche Bibliothek, Frankfurt, with Marie France Plassard as Programme Officer, and later Director.[32] It was a successor to the IFLA UBC core programme hosted by the British Library since its establishment in 1974.[33] The programme was closed on 1 March 2003, when its tasks moved to the IFLA CDNL Alliance for Bibliographic Standards (ICABS).[34] The National Library of Portugal, thanks to its Deputy Director and PUC ex-Chair Fernanda Maria Campos, took over the hosting of the PUC for the continuation and further development of UNIMARC[35] until 2017, since when the Institute of Information Sciences, University of Maribor (IZUM), Slovenia, has been acting as its successor host, with Gordana Mazić as Chair.

The purpose of the UBCIM Programme was to

> Coordinate activities aimed at the development of systems and standards for bibliographic control at the national level and the international exchange of bibliographic data, including the support for professional activities of appropriate IFLA Sections and Divisions, maintenance of bibliographic and format standards, and acting as clearinghouse for information on all IFLA endeavours in these fields.[36]

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26 UNIMARC/Authorities (1989).
27 UNIMARC/Authorities (1991).
28 Željko Rajter. Interview, 3 November 2023.
29 Willer (1994).

30 IFLA PUC: UNIMARC Committee: https://www.ifla.org/units/unimarc-rg/.
31 McCallum and Willer (2018) 398 ff.
32 Part of the UBCIM Programme activities related to PUC is archived at: https://archive.ifla.org/ubcim/ubcim-archive.htm.
33 Anderson (1974).
34 "The coordination of bibliographic standardization was moved to the IFLA-CDNL Alliance for Bibliographic Standards (ICABS), which was later changed to the IFLA-CDNL Alliance for Digital Strategies (ICADS). In 2011, it was decided to discontinue ICADS. During the 2011 WLIC conference the idea arose of revitalizing UBC and the Bibliography Section took on this task." December 12, 2011: https://www.ifla.org/wp-content/uploads/2019/05/assets/bibliography/Documents/ifla-professional-statement-on-ubc-en.pdf.
35 https://archive.ifla.org/ubcim/.
36 https://archive.ifla.org/ubcim/ubcim-archive.htm.

The promotion, development, and maintenance of UNIMARC formats formed part of these activities. This is not the place to describe UBCIMP activities (a full volume would be needed for that), but it is important to reflect on them as it shows the decline of the status of the UBC concept and its relevance within IFLA after 2003. As an example, the UBCIMP Report on Activities 1993–1994[37] shows the range of coordination and co-operation within IFLA standards bodies and beyond, one of them being the Consortium of European Research Libraries (CERL). Already in 2011, IFLA recognised the consequences of disbanding the programme and, in 2012, a notification was issued: "During the 2011 WLIC conference the idea arose of revitalizing UBC and the Bibliography Section took on this task."[38] That task was never accomplished, but was picked up in 2021 by the Cataloguing Section, which reported on the lack of an IFLA overall vision on bibliographic standards and the need for standards harmonisation within a coordinating body.[39] No official report has been issued or decision acted upon by the time of writing this article, but a satellite meeting on the general topic of UBC entitled "Universal Bibliographic Control at the Crossroads" was organised in August 2023, with a conclusion to review the UBC concept.[40]

Although the "political" environment was not favourable for standards development, particular professional groups were productive, which in fact spurred on the need for the 'overall vision'. Beginning in the 2010s, IFLA started to publish ISBD standard and UNIMARC formats in RDF, the standard of the Semantic web for linked open data applications.[41] A new conceptual model was published – *IFLA Library Reference Model* (LRM)[42] in 2017, while in 2019 the ISBD Review Group set up a task force to create a new ISBD standard, *ISBD for Manifestation* (ISBDM) as an implemen-

tation of LRM.[43] At the time of writing this article, the ISBD Review Group has started the official review process of ISBDM with the plan to send it for official adoption by the Advisory Committee on Standards, the coordinating body,[44] by August 2024.[45]

In 1991, the NUL representative Mirna Willer was invited to serve as a member of the Permanent UNIMARC Committee and since then Croatian experts have actively taken part in the development of IFLA standards, models, and guidelines. The transfer of knowledge and expertise in both directions has been instrumental in the development of the Croatian bibliographic information ecosystem.

3.3 UNIMARC and CERL: Old and Rare Book Cataloguing: Since 1992

During the 1980s and 1990s many European libraries, among them NUL, began the retrospective cataloguing of old and rare books as well as converting traditional catalogues of this type of material into machine-readable form. As it was a demanding and expensive job, it became necessary to establish co-operation not only within a particular country, but also at an international level. In 1984–1987, the Council of Europe engaged in the promotion of automation, the development of networks, and international co-operation with its recommendations. Two Munich conferences on retrospective cataloguing (1990, 1992) followed this route, but with clearer goals and more concrete results, whose work the NUL followed closely, especially the founding of the Consortium of European Research Libraries (CERL) in 1992. CERL's main goal was creating a database that would function as a union catalogue for books printed between 1450 and 1830: the HPB, i. e., the Hand Press Book Database, later renamed the Heritage of the Printed Book Database.

At the same time, the NUL worked intensively on the standardisation and automation of early book cataloguing,[46] which it informed the Croatian library community about at the seminar on the "Standardization of Cataloguing Old and Rare Printed Materials" in 1992.[47] In his invited talk, Šime Jurić, doyen of Croatian incunabula and early book bibliographer, defined the concept of the early book, periods of early book printing, and the cultural and historical context of bibliographic description of important

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37 Report of IFLA CORE Programme for Universal Bibliographic Control and International MARC (UBCIM), Report on Activities 1993–1994, Marie France Plassard, Programme Officer: https://origin-archive.ifla.org/IV/ifla60/60-plam.htm.

38 https://www.ifla.org/wp-content/uploads/2019/05/assets/bibliography/Documents/ifla-professional-statement-on-ubc-en.pd.

39 Cataloguing Section, Action Plan 2021–2023: Cataloguing Section's letter to the Committee on Standards, by the end of 2021, "We lack an overall IFLA vision on bibliographic standards and all aspects thereof. We need to work together and therefore we need a coordination body. We are on the cost of being in the position to create unified coordinated IFLA bibliographic standards that work well with one another, and we are the only organization that is doing this right now. We need to identify this concern to the CoS, now the Advisory Committee.": https://repository.ifla.org/bitstream/123456789/1887/1/action-plan_CAT_2021-2023.pdf.

40 Henry et al. (2023).

41 IFLA Namespaces: https://www.iflastandards.info/. See also Willer and Dunsire (2013).

42 Riva et al. (2017).

43 IFLA ISBD for Manifestation Task Force: https://www.ifla.org/g/isbd-rg/isbd-for-manifestation-task-force/, ISBD for Manifestation: https://www.iflastandards.info/ISBDM/.

44 https://www.ifla.org/units/cos/.

45 ISBD for Manifestation (2023).

46 Katić and Willer (1993).

47 Katić (1993).

relevance of their physical characteristics. In addition, the seminar introduced the participants to the possibilities of opening access to Croatian printed materials not only to the Croatian, but also to the international user community, primarily through the HPB. Although held in wartime conditions, the seminar aroused a positive atmosphere and the interest of younger librarians who, over time, became the main initiators of retrospective projects in different types of libraries, excellent compilers of bibliographies and authors of numerous studies and papers on the history of the book, publishing, printing and the book trade, as well as the history of libraries, which is associated with the increase in journalistic activity in the 1990s and later.[48]

The NUL joined CERL as an associate member in 1994. Despite the limitations that associate membership brings and due to the involvement of its representative, Mirna Willer (also adviser on automation and Vice-President of the PUC) in CERL working groups, especially in the Advisory Task Group (member 1994–1998, Chair 1999–2007), the NUL significantly contributed to the development and establishment of the HPB. Likewise, the NUL was among the first to deliver a test file to CERL with records from two retrospective conversion projects and two retrospective cataloguing projects led by Tinka Katić. Although numerically modest, the file was chosen as one of three files for HPB testing at RLIN, CERL's system at the time, due to the quality of the records. Among them, the *cinquecentine* records that were originally catalogued based on national and international standards for early books in the UNIMARC format (the official HPB format) stood out. What made them special is, that the new UNIMARC fields (tags) created for the needs of the early book cataloguing in the NUL, under the mentorship of Mirna Willer, were used for the first time in these records.[49] And that was one of the tasks of the future Consortium declared at the 2nd Munich Conference.[50]

Later, NUL became a full member of CERL and gathered a cluster of Croatian research libraries, which by this means gained access to the HPB. But over time, it lost inter-est in further participation. Nevertheless, in the HPB (which is publicly available today and contains over 6 million records) there are 8,200 NUL records left, as a reminder of the time when we were convinced that we *little ones* were participating in something *big*.

3.4 AKM Seminars: 1997 and Beyond

One of the polygons for informing the Croatian information and heritage community about developments in IFLA's standardisation processes but also beyond, testing standards and reporting on their implementation, has definitely been a series of annual seminars entitled "Archives, Libraries, Museums: Possibilities for Co-operation Within the Environment of the Global Information Infrastructure" (AKM: Arhivi, knjižnice, muzeji, Rovinj-Poreč, Istria 1997–2019, since 2021).[51] The seminar is organised by three national associations, with three national heritage institutions and departments for information sciences in Zagreb, Osijek and Zadar Universities, and ICARUS Hrvatska[52] as co-organisers. The seminar was primarily conceived as a meeting point for co-operation between heritage institutions and the information technology sector on current issues of common interest; but, no less importantly, it was an opportunity for a university cohort once dispersed across diverse institutions to reunite. Issues presented and discussed ranged from theoretical reflections primarily, but not exclusively, within the field of information sciences, to current technology and standards development, information organisation in the design of finding aids and their application in information systems and user services, and the presentation of current practices and projects. Proceedings of the seminars have been regularly published and they now function as an invaluable archive of the activities and endeavours of the Croatian heritage community over the past 25 years; and they also provide reflections of international efforts in the field. One of the most regular lecturers and an invaluable contributor to the idea of AKM and to professional and academic life in Croatia has been Gordon Dunsire,[53] then of the Centre for Digital Library Research, University of Strathclyde, Glasgow, Scotland, UK, now acting as a freelance consultant.

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48 Tomić et al. (2020) 540.

49 Our former librarian colleague, Milan Pelc, a distinguished scientist with various specialties, among which were the history of European and Croatian graphics and book illustrations in the early modern period (1400–1700) and the history of books and visual media, often visited NUL for his research. On several occasions, we unsuccessfully tried to arrange a meeting where, with his exclusive help, we would define the UNIMARC codes for the illuminations and other illustrations in early books. And then, quite unexpectedly, an opportunity presented itself. An air alert was sounded (Croatia was still in a state of war!) and all employees and users went to the shelter. Milan was among them. When the siren sounded to signal the end of the danger, we had the codes! (Note by Tinka Katić).

50 Katić (1996) 155.

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51 https://akm.hkdrustvo.hr/.

52 ICARUS Hrvatska, "non-profit association dedicated to historical heritage research, promoting the availability of archival sources through modern technologies and developing inter-institutional and international cooperation in the field of cultural, scientific and professional activities": https://www.icarushrvatska.hr/.

53 http://www.gordondunsire.com/.

Apart from providing a platform for testing ideas and "products", AKM's major contribution to the Croatian heritage information community has been in the raised awareness of its ideas taken over by the Ministry of Culture and Media, which financially supported the organisation of the seminars and publication of its proceedings, but more importantly, that it recognised the importance of assessing the heritage sector under one "roof".

4 From the 2000s to 2023

4.1 NISKA II: 2002–2003

By 2001, the NUL was able to continue its planned activity that had begun in 1997 with the first phase of the project "Design of the National Library Information System of the Republic of Croatia", i. e., NISKA (Nacionalni informacijski sustav knjižnica Republike Hrvatske). The project was supported and financed by the Ministry of Culture and the Ministry of Science and Technology. The second, executive phase of the two-year project (2002–2003) was assigned via tender to IBM Croatia.[54] The five constituent modules of the project were: the Croatian library system, comprehensive computer processing of collections, building a national digital library, computer infrastructure, and network infrastructure. Although the full documentation with recommendations in all five segments were delivered within the period of the project, the NUL and its partners in the network did not implement them. The documentation is still registered as confidential.

One reason for such an outcome can be attributed to the disunity of the Croatian library automation space: there were already well-established library information systems in different types of libraries with different stakeholders with their particular interests – one system financed by the Ministry of Culture through the NUL and its consortium (some public and research libraries: CROLIST) and the other systems designed by local private companies and financed by their users (some public, research, and school libraries). Another reason was the autonomy – or self-gained autonomy – of some types of libraries in choosing an operational library system, which resulted from a failure of government to pursue systematic solutions in this area of the public sector. Still another reason, and linked to the latter, is the decline of interest in the full realisation of the project by

its funders, the Ministry of Culture and Ministry of Science and Technology.

4.2 HAW, Croatian Web Archive: Since 2003

However, one of the features of the project did see the light of day: the Digital Library module promoted the results of the European Commission DG XIII, Telematics for Libraries Programme NEDLIB (1998–2000) project, specifically, the implementation of the OAIS Reference Model for library management of digital documents with the aim of creating a (national) depositary system of electronic publications (DSEP). The core of a digital library model was designed from integrating the depository system of electronic publications with the existing library information (automation) system.[55]

The NEDLIB model was recognised as a potential implementation model and subsequently used as a basis for the project to design a system for harvesting and archiving Croatian web resources. The project entitled "Design of the System for Capturing and Archiving of Legal Deposit of Croatian Online Publications" was carried out by the NUL and the University of Zagreb Computing Centre (Srce) in co-operation with the UNIBIS software company, designers of the library information system CROLIST, with each of the two IT partners designing their part of the system in-house. The project, which was built on the concept of selective harvesting and archiving web resources, had started by early 2004 and became operational by the end of the same year.[56] The original title of the service *Digital Archive of Croatian Online Publications* was changed in 2010 to *Croatian Web Archive* (HAW). In her interview, Tanja Buzina,[57] co-leader of the project and Head of the Cataloguing Department, reflects on the challenges and results of the project that had successfully turned into a full working process and service, while recognizing the problems and challenges to be solved.

> The biggest challenge was how work processes should be adapted to the new medium. From the beginning, a group of four cataloguers worked on the task of archiving the web, who communicated with IT specialists from Srce and assessed the system after the completion of the first concept. The work on archiving the web took place with pioneering enthusiasm; organizationally it was an activity independent of other activities of the NUL – it was even considered that it should be organised as a separate collection. At the time (2003), there were not many examples of web archives from other national libraries. HAW is one of the oldest web archives in the world; only since 2010, the number of web

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54 Sporazum o nastavku suradnje na izvedbi projekta Nacionalni informacijski sustav knjižnica Republike Hrvatske – NISKA (2003).

55 Steenbakkers (2000).

56 Buzina and Willer (2007), Willer et al. (2008).

57 Tanja Buzina. Interview, 3 January 2024.

archives has grown rapidly.[58] The NUL's membership in the International Internet Preservation Consortium (IIPC) in 2008 contributed to a better insight into the development of standards and the exchange of experiences in the use of open-source tools for creating web archives.

The archiving method, which was based on a selective approach (each publication is processed independently through the entire cycle from identification to final access) was predetermined by the existing situation of already catalogued publications in the NUL's OPAC. Due to NUL's limited financial resources for computer servers, it was agreed that the contents of the archive would be stored on the servers of the partner institution (Srce). As the size of the archive grew (initially only text files were harvested, later images and video), it became more and more demanding to provide computer storage. For example, the total size of HAW has grown from 2.9 TB in 2010 to 140 TB in 2023.

We saw the advantages of a selective approach to archiving in the better preservation of content, its presentation and formatting, the availability of titles through the NUL's catalogue, the possibility of analysing the technical specifics of each publication, which contributed to the further development of archiving tools. The selection criteria were language, publisher, non-commercial public availability on the web, and file format (type). Given the small number of experts working on the web archive (two full time cataloguers and occasionally two IT specialists), the selective method of archiving and cataloguing each title has also shown its biggest drawback – the large expenditure of time for processing each publication. In addition, with a selective approach, a large number of publications do not even reach the focus for processing and are left out. In order to compensate for this deficiency, in 2011, the annual harvesting of the national domain .hr and thematic harvesting began.

Let me point out some of the achievements so far: in HAW website the search related to selective capturing (search by title, URL and keywords, full text of the archive content is indexed) is separated from the search of the harvested domain .hr; with the experience of working on the web archive, the librarians acquired new knowledge that later enabled them to more easily join the work of the digital library as core staff; to IT specialists from Srce who worked on the web archive, this experience helped them establish other systems such as digital repositories; since 2012, HAW metadata has been available in Europeana; thematic harvesting has outgrown the framework envisioned at the beginning (significant events at the national level): local community web collections are created in cooperation with public libraries (crowdsourcing activity); started the HAWathon project in cooperation with high school students and public libraries: students collect links for thematic collections and through this activity they learn to evaluate internet sources (educational function of HAW).

What we have learned: tools for creating web content are constantly changing and we needed to adapt the settings of the archiving system to that. But over time, it turned out that the lack of staff who can devote themselves to it in full capacity, either on the part of librarians or IT specialists, is becoming an increasing problem. All the more so as other jobs related to the management of digital content in libraries are multiplying. In general, tasks related to the adaptation of library processing to the digital environment are often not accompanied by sufficient digital competences of librarians, especially those with longer working experience. As the size of the archive is constantly growing, the control of the archiving process and the quality of the stored data has become increasingly difficult to maintain in the existing system. Work has to continue on the development of a new version of the system for selective archiving, but also on greater automation of the archiving process and the use of open-source tools that have appeared in the meantime. The needs for computer storage resources are constantly increasing and should be anticipated in Library's financial plans.

4.3 MARC21: Since 2006

In 2005, NUL opened a public tender for a new library information system. The basic reason was that the then functional software CROLIST was considered inadequate for the development and functional requirements of the library and its national network, in particular the network of research libraries of the University of Zagreb, for which the NUL was responsible. The Voyager Library Management System Software developed by Endeavor Information Systems Inc. was chosen. The system, however, did not support the UNIMARC format, and mapping between UNIMARC and MARC21 had to be undertaken so that the full migration of the NUL's database would be finished as planned by the end of 2006. The installation of the system in the central Faculty and Institute libraries of the University of Zagreb started before the end of 2006. In December 2006, Endeavor Information Systems was merged with the Ex Libris-Group, the developer of the Aleph system.

Another paradox related to NUL decision-making: in the 2005 tender, the Aleph system was at the top of the list, but the tender was annulled, and a contract was made with Endeavour IS. If Aleph had been chosen in the first place, there would have been no need for format conversion and the subsequent adjustments of Verona's Code to the Anglo-American practice implemented in MARC21. Aleph supported the UNIMARC format. The implementation of Aleph started in 2009. By introducing MARC21 format into the central library of the Croatian library information system, and with the implementation of Voyager and then Aleph, the development of planned activities stalled: the full cycle of implementation of a format and its adjustment to national cataloguing rules (Verona) and practices, the education of cataloguers, and other activities and services that it entailed, had to be redone. That decision also introduced a schism into the Croatian library information space in terms of uniform standards use, their maintenance, implementa-

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58 List of Web archiving initiatives: https://en.wikipedia.org/wiki/List_of_Web_archiving_initiatives.

tion, and development, as well as efficient and economic functioning of library systems. Through this decision, the NUL eventually lost control of its own destiny, and made the Croatian library information space even more dysfunctional. Today, CROLIST is very much alive and – in fact – constantly developing (third generation OPAC with faceted search, relevance ranking, resource management, etc., CLOUD multi-tenant state of the art system). If the NUL had decided otherwise, it could have been a driving force for the development not only of its own system but for managing the development of the profession at a national and subsequently international level, which is its central function, strategically positioning itself using the expertise and knowledge gained since the 1980s.

4.4 KAM and eCulture: 2013 to 2023

The endeavour to unite the dispersed library ecosystem undertaken by the Ministry of Culture and Media in 2020 was demonstrated by its support for two strategic projects running in parallel, but intrinsically interconnected: the development of national cataloguing rules for heritage content and eCulture – the digitisation of cultural heritage.

4.4.1 eCulture – Digitization of Cultural Heritage: Since 2020

The development of the NUL's digital library system started in 2004 with the help of external partners (Srce, Conscius, ArhivPRO) through regular programme activities and projects. In 2015, the Centre for the Development of the Croatian Digital Library was established with a remit to coordinate the development of systems for managing digital materials, implementation of digitisation projects, quality control of digital objects and metadata, and the promotion of digital libraries and new digital products.[59]

In August 2020 after a public tender, the Ministry of Culture and Media signed an agreement for the public procurement of ICT system development and maintenance services for the eCulture project, *Digitalization of Cultural Heritage*, with the Ericsson Nikola Tesla Group, Croatia. With NUL's experience and results in digitisation projects, it was natural that it became one of the project partners together with Croatian Radio and Television, Croatian State Archives and the Museum of Arts and Crafts, Zagreb. The purpose of the project was to "increase access to cultural heritage

in digital form and to protect cultural heritage from deterioration and loss by systematic, standardised and permanent storage in digital form in one place".[60] The project was co-financed within the European Fund for Regional Development's 'Competitiveness and Cohesion' Operational Programme for 2014–2020. The elements of system delivery were establishing a central system for standardised access to digitization, storage, access, aggregation and search of cultural heritage materials, development of e-services, and strengthening of the capacity of the community of archives, libraries, and museums.[61]

The project was officially launched in September 2023, and the results from the test period and subsequent imports of aggregated contents can be viewed at https://ekultura.hr/en/.

4.4.2 KAM: 2013–2021

The project to develop rules for description of cultural heritage resources has been seen as one of the major results of the AKM seminars. Called "Production, Publishing and Maintenance of the National Cataloguing Rules", the project represented a consortium of three heritage communities and the academic institutions and was submitted by the NUL to the Ministry of Culture and Media in 2013. The Ministry recognised its relevance and has been financing it since 2014 as an ongoing project, including the development and maintenance of the online interactive database service for publishing the rules designed by a local company. The aim of the project was to harmonize cataloguing practices in Croatian libraries, archives and museums within a common content standard based on linked data technology. The *Rules for Description and Access to Resources in Libraries, Archives and Museums* (KAM) was published online in 2021[62] and is freely[63] available. The activities to publish its ontology (namespaces) and its implementation in heritage institutions are ongoing. KAM's author Ana Vukadin reflects on the task in the interview[64] she gave us for this article:

> The work on KAM began in 2013. At the time it was still referred to as the National Cataloguing Code, a working title that eventually would be abandoned, because, as Karen Coyle once pointed out, cataloguing is a process aimed at creating a catalogue – and

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59 Digitalna zbirka Nacionalne i sveučilišne knjižnice u Zagrebu: https://digitalna.nsk.hr/, Klarin (2020).

60 Potpisan ugovor za projekt "e-Kultura – Digitalizacija kulturne baštine" s tvrtkom Ericsson Nikola Tesla d.d. (2020): https://min-kulture. gov.hr/vijesti-8/potpisan-ugovor-za-projekt-e-kultura-digitalizacija-kulturne-bastine-s-tvrtkom-ericsson-nikola-tesla-d-d/19960.

61 Karlović (2024).

62 Vukadin (2021), Vukadin (2020).

63 https://pravilnik.kam.hr/.

64 Ana Vukadin. Interview, 2 January 2024.

from the very beginning the goals of this project were much wider. The essential goal was to develop a metadata content schema and rules that would be applicable to all GLAM communities in Croatia and enable metadata sharing across the heritage sector. It was also supposed to be compliant with international standards and to fit into the new technological environment, which primarily meant linked data technologies. When I was approached by Tinka Katić and Mirna Willer with the suggestion to become the editor, at first, I declined because the project looked extremely complex and ambitious. However, eventually I realised it was too exciting an opportunity to be missed. At the time I was attending the doctoral program at the Department of Information Sciences at the University of Zadar under the mentorship of Dr Willer, and my main area of interest were conceptual data models in the cultural heritage sector, so I was thrilled by the opportunity to 'translate' them into practice, all the more because it was really a pioneering endeavour. By that time there were only two attempts of metadata content standards based on the IFLA FR-models: REICAT and RDA, with results that were noticeably different from one another. However, Croatia has a long tradition of participating in international standardization bodies, as well as implementing international standards into national practices, so I believed our community had the power to rise to the challenge.

Our work began with mappings of relevant international standards, models, and data formats: FR-models, ISBD, ISAD(G), ISAAR(CPF), CDWA, UNIMARC, etc. It was a time-consuming job, but it was necessary for aligning the standards (where possible) and eventually bring them to the level of concrete, practical rules. Adhering to international standards was of the utmost importance, but at the same time it was a great challenge, because the standards themselves were in the state of constant flux (which is a strange thing to say about a standard, but it is an expected consequence of seeking to keep up with technological changes). In 2017 the FR-models were replaced by the *IFLA Library Reference Model* (LRM). The consolidated ISBD (2011) was brought in line with linked data paradigm, but it still represented a pattern quite different from FR-models and LRM. In 2019 the ISBD for Manifestation Task Force was established with the goal of working on the alignment between ISBD and LRM. Meanwhile, in 2016 the International Council on Archives released the first version of their conceptual model and ontology, *Records in Contexts* (RiC), which was radically different from ISAD(G), the standard commonly used in state archives in Croatia. We had to take all this into account and constantly adapt to new circumstances. Often, we had to go back and change what had already been done. For example, we had been relying on FRBRoo, which was the result of the alignment between library and museum conceptual data models, but with the advent of the LRM much of it became obsolete. However, I hope we have succeeded in developing a structure that is both logical and flexible enough to accommodate the changes that are still taking place. For example, since the release of the final version of KAM in 2021, the work of the ISBD for Manifestation Task Force has been going forward and has resulted in proposals that bring ISBD much closer to LRM, which might again require some changes in the KAM rules. But thanks to the structure based on individual data elements, KAM can be easily updated if need be. On the other hand, it is ironic that flexibility turned out to be a challenge to a wide implementation of KAM. Many practitioners working with metadata still look at their job exclusively through the prism of their specific data formats and information systems

and are used to detailed rules dealing with every situation or telling them exactly what to write in which field. But in a networked environment this kind of specificity is no longer possible. A digital information landscape provides more freedom, but also requires more responsibility. Today the application of a metadata content standard requires expertise and cooperation from practitioners. This includes mapping metadata elements to specific data formats and information systems and creating policies and application profiles based on institutional needs. It is not an easy job, but it is critical if we want to be able to collaborate in a digital environment while maintaining our distinctiveness.

5 Conclusion

In the late 1970s Eva Verona set up the standard for bibliographic control in former Yugoslavia. That implied theoretical and practical adherence to international – IFLA normative documents with their implementation in library services considering national specificities, terminological clarity and precision, awareness of current and upcoming technologies, and all these framed in active engagement in national and international bibliographic processes. The standard was followed, we could say adamantly, at the bibliographic and technological levels for the next two decades with the development of local systems and practices. The National and University Library in Zagreb was in the focus of these activities, fulfilling its role as a national bibliographic centre. This role was lost at the beginning of the 2000s by the decision to change the library system developed through the professional and organisational expertise of the national bibliographic community and the financial support of the state for the foreign commercial system and MARC format with a different culture. That caused a considerable stagnation in the development of NUL's services. On the contrary, the three projects that brought advancement and change since 2000 have been using systems each developed locally and based on international standards, i. e., HAW: Croatian Web Archive, NUL Digital Library and KAM: heritage content metadata standard.

In a time of changing technologies, which is our present time, library systems and present MARC formats lose their relevance! For more than twenty years now we have been dealing at all levels, with interoperability, building systems and services to function in such an environment. What the new, linked data technology has brought is the relevance of data! This is not news, however. At the beginning of library automation, there was a warning: the main asset of any library is not its computers/systems: it is data, later called metadata, now (metadata) content. With the publication of the National Content Standard in 2021, *Rules for Description*

and Access to Resources in Libraries, Archives and Museums, the NUL has a chance to resume its central role in the Croatian bibliographic ecosystem; as Ana Vukadin succinctly states, "A digital information landscape provides more freedom, but also requires more responsibility" and "Today the application of a metadata content standard requires expertise and cooperation from practitioners. [...] it is critical if we want to be able to collaborate in a digital environment while maintaining our distinctiveness."[65]

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