

Komparativna analiza odabranih standarda metapodataka za obradu nematerijalne kulturne baštine

Comparative Analysis of Selected Metadata Standards for the Processing of Intangible Cultural Heritage

Anida Ibrčić

Univerzitet u Sarajevu – Institut za historiju, Sarajevo, Bosna i Hercegovina / University of Sarajevo – Institute of History, Sarajevo, Bosnia and Herzegovina

anidaibricic@iis.unsa.ba

Article Info / Informacije o članku

Primljen / Received 12. 4. 2024.

Prihvaćen / Accepted 20. 9. 2024.

Dostupan online / Available online 24. 12. 2024.

Keywords / Ključne riječi

nematerijalna kulturna baština, obrada građe, standardi metapodataka, Dublin Core, CCO, VRA Core, CDWA, MODS

intangible cultural heritage, material processing, metadata standards, Dublin Core, CCO, VRA Core, CDWA, MODS

Abstract / Sažetak

Cilj: Nematerijalna kulturna baština predstavlja “živu” kulturu koja se prenosi s prethodnih na buduće generacije, čineći vitalnu važnost očuvanja kulturnog identiteta jednog naroda. S tim u vezi, a s obzirom na to da nije izvršena komparativna analiza standarda metapodataka za obradu nematerijalne kulturne baštine u digitalnom okruženju, cilj ovoga rada je ponuditi standarde metapodataka koji će biti primjenjivi za obradu takve vrste naslijeđa.

Metodologija: Istraživanje je izvršeno analizom Dublin Core, CCO, VRA Core, CDWA i MODS standarda metapodataka. Uz procjenu njihove kvalitete deskriptivnom metodom te njihovom komparativnom analizom ispitana je primjenjivost odabranih standarda metapodataka za obradu nematerijalne kulturne baštine na primjeru Skokova sa Starog mosta u Mostaru koji predstavljaju nematerijalnu kulturnu baštinu Bosne i Hercegovine.

Rezultati: Rezultati istraživanja kroz istraživačka pitanja rada pokazuju da se od odabranih standarda metapodataka Dublin Core i MODS mogu koristiti za obradu nematerijalne kulturne baštine, što ilustruje primjer metapodatkovne obrade odabranim standardima metapodataka.

Diskusija: Primjenu Dublin Core i MODS standarda metapodataka za obradu nematerijalne kulturne baštine potvrđuju primjeri dobre prakse u ustanovama kulture u Evropi i svijetu. Oba standarda metapodataka kroz opis digitalnog objekta koji opisuju skupom opisnih elemenata omogućavaju kvalitetniju organizaciju i upravljanje digitalnim objektom na mreži. Osim što se koriste za opis različitih objekata i što su široko prihvatljivi, prednosti ovih standarda u odnosu na ostale standarde su što sadrže elemente koji nude bogat opis objekta nematerijalne kulturne baštine izražen u XML sintaksi. Također, jednostavnost za implementaciju i visoka interoperabilnost oba standarda olakšavaju metapretragu preko globalne mreže i pristup potrebnim informacijama u digitalnom okruženju.

Originalnost: Ovo istraživanje predstavlja prvo istraživanje ovog tipa koje daje komparativnu analizu odabranih standarda metapodataka za obradu nematerijalne kulturne baštine. Važnost postojanja standarda metapodataka ogleda se u ključnoj ulozi doprinosa očuvanja kulturne baštine, što se naročito odnosi na nematerijalnu kulturnu baštinu Bosne i Hercegovine za buduće generacije, i promicanju njezine važnosti u širem društvenom i kulturnom kontekstu.

Goal: Intangible cultural heritage represents “living” culture transmitted from previous to future generations, making it vital to preserve the cultural identity of a people. In this regard, and considering that no comparative analysis of metadata standards for the processing of intangible cultural heritage in the digital environment has been carried out, this work aims to offer metadata standards that will apply to the processing of this type of heritage.

Methodology: The research was performed by analyzing Dublin Core, CCO, VRA Core, CDWA, and MODS metadata standards. Along with the assessment of their quality using a descriptive method, and their comparative analysis, the applicability of selected metadata standards for the processing of intangible cultural heritage was examined on the example of the Jumps from the Old Bridge in Mostar, which represent the intangible cultural heritage of Bosnia and Herzegovina.

Results: The research results through the research questions of the work show that of the selected metadata standards, Dublin Core and MODS can be used for the processing of intangible cultural heritage, which illustrates an example of metadata processing with metadata chosen standards.

Discussion: The application of Dublin Core and MODS metadata standards for the processing of intangible cultural heritage is confirmed by examples of good practice in cultural institutions in Europe and the world. Both metadata standards, through the description of the digital object described by a set of descriptive elements, enable better organization and management of the digital object online. Besides being used to describe various objects and being widely acceptable, the advantages of these standards compared to other standards are that they contain elements that offer a detailed description of an object of intangible cultural heritage expressed in XML syntax. Also, the simplicity of implementation and high interoperability of both standards facilitate meta-search over the global network and access to the necessary information in the digital environment.

Originality: This research represents the first research of its kind that provides a comparative analysis of selected metadata standards for the processing of intangible cultural heritage. The importance of the existence of metadata standards is reflected in the key role in the contribution to the preservation of cultural heritage, which especially refers to the intangible cultural heritage of Bosnia and Herzegovina for future generations and the promotion of its importance in a wider social and cultural context.

1. Uvod

Razvojem informacijsko-komunikacijskih tehnologija (IKT) i Interneta de facto je omogućena interpretacija kulturne baštine na moderniji način, u digitalnom okruženju. Kulturni objekti se u takvom okruženju predstavljaju metapodacima – podacima o podacima, putem standarda metapodataka radi pronalaznja i razmjene informacija. Hajdarpašić, Dizdar i Khattab (2023: 108) tvrde da standardizacija osigurava razumljivost metapodataka, kako iz perspektive stvarnih korisnika, tako i iz aspekta softverskih aplikacija. Standardizacija olakšava razumijevanje, upotrebu i upravljanje kroz strukturirane, opisane i organizirane metapodatke.

American Library Association Committee on Cataloging: Description and Access Task Force on Metadata navodi da standard metapodataka pruža formalnu strukturu dizajniranu da identifikuje strukturu znanja date discipline i da poveže tu strukturu na informacije u disciplini kroz stvaranje informacionog sistema koji će pomoći identifikaciji, otkrivanju i korištenju informacija unutar te discipline (Mai Chan i Lei Zeng, 2006: 2).

Prema tome, cilj standarda je izložiti bogat sadržaj koji podržava izradu, deponovanje, razmjenu, vizualizaciju, ponovnu upotrebu i očuvanje resursa u digitalnom okruženju. Postoji veliki broj standarda metapodataka koje su specifični za određeno područje primjene.

U domenu obrade metapodataka kulturne baštine poseban izazov se odnosi na nematerijalnu kulturnu baštinu. UNESCO u *The Convention for the Safeguarding of the Intangible Cultural Heritage* (2003:

1. Introduction

The development of information and communication technologies (ICT) and the Internet has de facto enabled the interpretation of cultural heritage in a more modern way, in a digital environment. In such an environment, cultural objects are represented by metadata – data about data, through metadata standards for the purpose of finding and exchanging information. Hajdarpašić, Dizdar & Khattab (2023: 108) claim that standardization ensures the comprehensibility of metadata, both from the perspective of real users and from the perspective of software applications. Standardization facilitates understanding, use and management through structured, described and organized metadata.

The American Library Association Committee on Cataloging: Description and Access Task Force on Metadata states that a metadata standard provides a formal structure designed to identify the knowledge structure of a given discipline and to relate that structure to information in the discipline through the creation of an information system that will aid in the identification, discovery, and use of information within that discipline (Mai Chan & Lei Zeng, 2006: 2).

Therefore, the goal of the standard is to expose rich content that supports the creation, storage, exchange, visualization, reuse and preservation of resources in the digital environment. There are a number of application-specific metadata standards.

In the domain of cultural heritage metadata processing, a special challenge relates to intangible cultural heritage. UNESCO in *The Convention for the Safe-*

4) definiše da nematerijalna kulturna baština označava prakse, reprezentacije, izraze, znanje, vještine – kao i instrumente, predmete, artefakte i kulturne prostore povezane s njima – koje zajednice, grupe i, u nekim slučajevima, pojedinci prepoznaju kao dio svojih kulturnih baština. Bogata nematerijalna kulturna baština na primjeru Bosne i Hercegovine predstavlja kulturni identitet države, a obavezu građanstva da sačuva vrijednosti nematerijalnog kulturnog naslijeđa budućim generacijama.

Pregledom radova koji tematiziraju standarde metapodataka za obradu kulturnog naslijeđa identifikovan je problem nepostojanja istraživanja komparativne analize koji nude standarde metapodataka za obradu nematerijalne kulturne baštine. Stoga postoji potreba da se ponude standardi metapodataka koji će biti primjenjivi za obradu takve vrste naslijeđa. S tim u vezi, cilj ovog rada je predstaviti standarde metapodataka kulturnih objekata te njihovom komparativnom analizom procijeniti kvalitet i primjenjivost standarda metapodataka za obradu nematerijalne kulturne baštine. Sve to je ispitano deskriptivnom, a potom komparativnom analizom najčešće korištenih standarda metapodataka: Dublin Core, CCO, VRA Core, CDWA i MODS koji se koriste za opisivanje kulturnih objekata. Primjena odabranih standarda metapodataka ispitana je na primjeru metapodatkovne obrade Skokova sa Starog mosta u Mostaru koji se nalaze na Preliminarnoj otvorenoj listi nematerijalne kulturne baštine Bosne i Hercegovine.¹

Prema *The Dublin Core Metadata Initiative* “Dablinsko jezgro”, poznato i kao skup elemenata metapodataka Dublin Core,² opći je, međunarodno najviše primjenjiv, standard metapodataka u velikom broju modela koji se koristi za opisivanje različitih vrsta digitalnih resursa. Specifičan standard za detaljnije opisivanje kulturnih objekata je Cataloging Cultural Objects – CCO. Visual Resources Association navodi da je CCO priručnik koji će pomoći da se opišu, dokumentiraju i katalogiziraju kulturni artefakti (poput umjetnosti i arhitekture) i vizualni mediji koji ih predstavljaju.³ Visual Resources Association Core Categories – VRA Core je također specifičan standard metapodataka koji se koristi za detaljnije opisivanje vizualnih resursa. VRA Core

guarding of the Intangible Cultural Heritage (2003: 4) defines that intangible cultural heritage means practices, representations, expressions, knowledge, skills – as well as instruments, objects, artefacts and cultural spaces associated with them – which communities, groups and, in some cases, individuals recognize as part of their cultural heritage. Rich intangible cultural heritage on the example of Bosnia and Herzegovina represents the cultural identity of the state, and the obligation of citizens to preserve the values of intangible cultural heritage for future generations.

By reviewing the papers that thematize metadata standards for the processing of cultural heritage, the problem of the lack of comparative analysis research that offers metadata standards for the processing of intangible cultural heritage was identified. Based on the above, there is a need to offer metadata standards that will be applicable for the processing of this type of legacy. In this regard, the goal of this paper is to present the metadata standards of cultural objects, and through their comparative analysis to assess the quality and applicability of metadata standards for the processing of intangible cultural heritage. All of this was examined through a descriptive and then comparative analysis of the most commonly used metadata standards: Dublin Core, CCO, VRA Core, CDWA, and MODS, which are used to describe cultural objects. The application of selected metadata standards was examined on the example of metadata processing of Jumps from the Old Bridge in Mostar, which are on the Preliminary Open List of Intangible Cultural Heritage of Bosnia and Herzegovina.¹

According to The Dublin Core Metadata Initiative, also known as the set of Dublin Core metadata elements,² is a general, internationally most applicable, metadata standard in a large number of models used to describe different types of digital resources. A specific standard for describing cultural objects in more detail is Cataloging Cultural Objects – CCO. The Visual Resources Association states that CCO is a manual to help describe, document, and catalog cultural artifacts (such as art and architecture) and the visual media that represent them.³ Visual Re-

¹ Bosna i Hercegovina, Državna komisija za saradnju sa UNESCO-m. *Preliminarna lista nematerijalne kulturne baštine Bosne i Hercegovine*. <http://unescoibih.mcp.gov.ba/konkursi/?id=15125>.

² Vidjeti: *Dublin Core: DCMI Metadata Terms*. The Dublin Core Metadata Initiative. <https://www.dublincore.org/specifications/dublin-core/dcmi-terms/>.

³ Vidjeti: *Cataloging Cultural Objects (CCO)*. Visual Resources Association. <https://www.vraweb.org/cco>.

¹ Bosna i Hercegovina, Državna komisija za saradnju sa UNESCO-m. *Preliminarna lista nematerijalne kulturne baštine Bosne i Hercegovine*. (Bosnia and Herzegovina, The State Commission for UNESCO of Bosnia and Herzegovina. *Preliminary list of intangible cultural heritage of Bosnia and Herzegovina*.) <http://unescoibih.mcp.gov.ba/konkursi/?id=15125>.

² See: *Dublin Core: DCMI Metadata Terms*. The Dublin Core Metadata Initiative. <https://www.dublincore.org/specifications/dublin-core/dcmi-terms/>.

³ See: *Cataloging Cultural Objects (CCO)*. Visual Resources Association. <https://www.vraweb.org/cco>.

je standard podataka za opis djela vizuelne kulture kao i slika koje ih dokumentuju (An introduction to VRA Core, 2014: 1). Kako bi se osiguralo cjelovito opisivanje i dokumentiranje umjetničkih djela u kombinaciji s VRA Core često se koristio složeniji skup pod nazivom Categories for the Description of Works of Art – CDWA, koji sadrži skup smjernica za najbolju praksu u katalogizaciji i opisivanju (CDWA, 2022: 1). Detaljniji standard metapodataka je i Metadata Object Description Schema – MODS, koji se može koristiti u različite svrhe, a posebno za bibliotečke aplikacije.⁴ Predstavljani standardi služe za opisivanje kulturnih objekata, ali svi se međusobno razlikuju u opsegu podataka i iscrpnosti svog opisa.

U okviru toga u analizu se krenulo od istraživačkih pitanja:

- Koju vrstu digitalnih objekata opisuje standard?
- Koje elemente metapodataka sadrži standard?
- Kakav je opseg podataka?
- Kakva je sintaksa metapodataka?
- Da li je standard metapodataka interoperabilan s drugim standardima?
- Kakva je prihvaćenost standarda?
- Da li je standard jednostavan za implementaciju?
- Kako standard upravlja sigurnošću i zaštitom podataka?

U poglavlju Diskusija, ovaj će rad ponuditi odgovore na postavljena istraživačka pitanja, što će u konačnici rada predstaviti standarde metapodataka koji se mogu koristiti za obradu nematerijalne kulturne baštine.

2. Pregled literature

Traganjem za radovima koji tematiziraju primjenu standarda metapodataka za metapodatkovnu obradu nematerijalne kulturne baštine pronađeno je samo nekoliko istraživanja koja ilustruju primjenu odabranih standarda metapodataka, što ukazuje na neistraženost njihove primjene za obradu nematerijalne kulturne baštine.

Koautorski rad autora Giannoulakis, Tsapatsoulis i Grammalidis s Kipra i Grčke pod nazivom “Metadata for Intangible Cultural Heritage – The Case of Folk Dances” (2018) rad je koji metapodatkovno obrađuje narodni ples koji predstavlja pravi primjer nematerijalne kulturne baštine. Rad predlaže shemu metapodataka za opisivanje različitih ele-

sources Association Core Categories – VRA Core is also a specific metadata standard used to describe visual resources in more detail. VRA Core is a data standard for describing works of visual culture as well as the images that document them (An introduction to VRA Core, 2014: 1). In order to ensure a complete description and documentation of works of art in combination with VRA Core, a more complex set called Categories for the Description of Works of Art – CDWA was often used. It contains a set of guidelines for best practice in cataloging and description (CDWA, 2022; 1). A more detailed metadata standard is Metadata Object Description Schema – MODS, which can be used for various purposes, especially for library applications.⁴ The presented standards serve to describe cultural objects, but they all differ from each other in the scope of the data and the exhaustiveness of their description.

Within the framework of the above, the analysis started from research questions:

- What type of digital objects does the standard describe?
- What metadata elements do the standard contain?
- What is the scope of the data?
- What is the metadata syntax?
- Is the metadata standard interoperable with other standards?
- What is the acceptance of the standard?
- Is the standard easy to implement?
- How does the standard manage security and data protection?

In the Discussion chapter, this paper will offer answers to the research questions, which will ultimately present metadata standards that can be used for the processing of intangible cultural heritage.

2. Literature review

Searching for works that discuss the application of metadata standards for the metadata processing of intangible cultural heritage, only a few studies were found that illustrate the application of selected metadata standards, which indicates that their application for the processing of intangible cultural heritage has not been researched.

The co-authored work of the authors Giannoulakis, Tsapatsoulis, and Grammalidis from Cyprus and Greece entitled “Metadata for Intangible Cultural Heritage – The Case of Folk Dances” (2018) is a

⁴ Vidjeti: MODS, 2022a.

⁴ See: MODS, 2022a.

menata narodnog plesa, to jest digitalni koreografski model, koji je inspirisan glavnim standardima metapodataka za obradu kulturne baštine, između ostalih najčešće korištenim Dublin Core standardom metapodataka. Iako je rezultat projekta “Transforming Intangible Folkloric Performing Arts into Tangible Choreographic Digital Objects”,⁵ rad ističe još projekata Evropske komisije poput projekta “i-Treasures: intangible cultural heritage of the past available through advanced modern technologies”. Rezultat ovog projekta je otvorena i proširena platforma snimljenih nematerijalnih kulturnih izraza dostupnih u digitalnom obliku, nastala kombinacijom skupa elemenata metapodataka Dublin Corea, modela i-Treasures i ESE – Europeana Semantic Elements.⁶ Još jedan evropski projekt je *Wholodance* koji ima cilj zaštititi i očuvati plesne pokrete kao nematerijalnu kulturnu baštinu primjenom revolucionarnih tehnologija i Dublin Core standarda metapodataka, u učenju plesa.⁷ Kada je riječ o Dublin Core standardu metapodataka u kontekstu organizovanja nematerijalne kulturne baštine u digitalnom okruženju vrijedi istaći princip metapodataka “jedan na jedan” od strane Dublin Core Metadata Initiatives (DCMI) koji se koristi kao temeljni koncept modela pod nazivom Cultural Heritage in Digital Environments (CHDE), a koji je rezultat istraživanja “A Metadata Model to Organize Cultural Heritage Resources in Heterogeneous Information Environments” (2017) autora Wijesundara, Winda i Sugimoto iz Japana. S tim u vezi, istraživanje “Metadata Model for Organizing Digital Archives of Tangible and Intangible Cultural Heritage, and Linking Cultural Heritage Information in Digital Space” (2018) autora Wijesundara i Sugimoto prikazuje primjenu CHDE modela koji se odnosi na materijalnu i nematerijalnu kulturnu baštinu. Autori O’Neill & Stapleton iz Irske u radu “Digital cultural heritage standards: from silo to semantic web” (2022) ukazuju na fundamentalni pomak od tradicionalnog modeliranja zatvorenih sistema podataka na otvorene skupove podataka za semantičku mrežu evaluacijom standarda metapodataka, što uključuje razvoj proširenih verzija, interoperabilnosti između sistema te sposobnosti opisivanja širokog

work that metadata processes a folk dance that represents a true example of intangible cultural heritage. The paper proposes a metadata scheme for describing different elements of folk dance, i.e. a digital choreographic model, which is inspired by the main metadata standards for cultural heritage processing, among others the most commonly used Dublin Core metadata standard. Although the work is the result of the “Transforming Intangible Folkloric Performing Arts into Tangible Choreographic Digital Objects”⁵ project, the work highlights other projects of the European Commission such as the project “i-Treasures: the Intangible Cultural Heritage of the Past available through advanced modern technologies”. The result of this project is an open and expanded platform of recorded intangible cultural expressions available in digital form, created by the combination of a set of Dublin Core metadata elements, the i-Treasures model, and ESE – Europeana Semantic Elements.⁶ Another European project is *Wholodance*, which aims to protect and preserve dance movements as an intangible cultural heritage by applying revolutionary technologies and Dublin Core metadata standards, in learning dance.⁷ When it comes to the Dublin Core metadata standard in the context of organizing intangible cultural heritage in a digital environment, it is worth highlighting the one-to-one metadata principle by the Dublin Core Metadata Initiatives (DCMI), which is used as the basic concept of the model called Cultural Heritage in Digital Environments (CHDE), which is the result of the research “A Metadata Model to Organize Cultural Heritage Resources in Heterogeneous Information Environments” (2017) by Wijesundara, Wind and Sugimoto from Japan. In this regard, the research “Metadata Model for Organizing Digital Archives of Tangible and Intangible Cultural Heritage, and Linking Cultural Heritage Information in Digital Space” (2018) by Wijesundara and Sugimoto shows the application of the CHDE model related to tangible and intangible cultural heritage. Authors O’Neill & Stapleton from Ireland in the work “Digital cultural heritage standards: from silo to semantic web” (2022) indicate a fundamental shift from traditional modeling of closed data systems to open data

⁵ Više o projektu na: *Transforming Intangible Folkloric Performing Arts into Tangible Choreographic Digital Objects*. European Commission. <https://cordis.europa.eu/project/id/691218/en>.

⁶ Više o projektu na: *i-Treasures: intangible cultural heritage of the past available through advanced modern technologies*. European Commission. <https://digital-strategy.ec.europa.eu/en/news/i-treasures-intangible-cultural-heritage-past-available-through-advanced-modern-technologies>.

⁷ Više o projektu na: *Wholodance: Whole-Body Interaction Learning for Dance Education*. <http://www.wholodance.eu/>.

⁵ More about the project at: *Transforming Intangible Folkloric Performing Arts into Tangible Choreographic Digital Objects*. European Commission. <https://cordis.europa.eu/project/id/691218/en>.

⁶ More about the project at: *i-Treasures: intangible cultural heritage of the past available through advanced modern technologies*. European Commission. <https://digital-strategy.ec.europa.eu/en/news/i-treasures-intangible-cultural-heritage-past-available-through-advanced-modern-technologies>.

⁷ More about the project at: *Wholodance: Whole-Body Interaction Learning for Dance Education*. <http://www.wholodance.eu/>.

spektra stavki deskriptivnim, strukturnim i administrativnim metapodacima. Iako rad u fokus istraživanja stavlja Metadata Encoding and Transmission Standard (METS), ističe se da Dublin Core i MODS standardi metapodataka, posebno odnoseći se na MODS koji je kreirala Kongresna biblioteka inspirisana MARC formatom, kao i METS standard metapodataka, pružaju bogat opis materijalne i nematerijalne kulturne baštine.

Iako je primjena standarda metapodataka u obradi nematerijalne kulturne baštine neistražena, vidno je da postoje radovi koji tematiziraju neke od odabranih standarda metapodataka. S tim u vezi, u nastavku će biti ispitana primjena odabranih standarda metapodataka ovoga istraživanja za obradu nematerijalne kulturne baštine.

3. Metodologija

Istraživanje kombinuje kvalitativni pristup s deskriptivnom metodom te komparativnom analizom Dublin Core, CCO, VRA Core, CDWA i MODS standarda metapodataka, s ciljem da se ispita primjenjivost odabranih standarda metapodataka za obradu nematerijalne kulturne baštine. Za potrebe analize, kao primjer metapodatkovne obrade odabranim standardima metapodataka odabrani su Skokovi sa Starog mosta u Mostaru, koji predstavljaju nematerijalnu kulturnu baštinu Bosne i Hercegovine.

4. Rezultati

4.1. Odabrani standardi metapodataka

Jenn Riley (2010a) u *Glossary of metadata standards* navodi sveukupno 105 standarda koji se koriste za opisivanje kulturnih objekata/resursa u digitalnom okruženju. Jedan od međunarodno najpoznatijih standarda metapodataka je Dublin Core.

4.1.1. Dublin Core

Dublin Core (DC) predstavlja standard metapodataka koji se koristi za opis informacijskih izvora i pronalaženje resursa na mreži. Naziv "Dublin" je zbog njegovog porijekla s pozivne radionice u Dablinu u Ohaju 1995; "Core" jer su njegovi elementi široki i generički, upotrebljivi za opisivanje širokog spektra resursa (Dublin Core, 2012). Standard je u početku definirao trinaest elemenata, a taj broj je vremenom porastao na petnaest Dublin Core elemenata za opis različitih vrsta mrežnih izvora.

Petnaest elemenata "Dublin Core™" opisanih u ovom standardu dio je većeg skupa rječnika metapodataka i tehničkih specifikacija koje održava

sets for the semantic web by evaluating metadata standards that include the development of extended versions, interoperability between systems and the ability to describe a wide range of items with descriptive, structural and administrative metadata. Although the work focuses on the Metadata Encoding and Transmission Standard (METS), it is emphasized that the Dublin Core and MODS metadata standards, especially referring to the MODS created by the Library of Congress inspired by the MARC format as well as the METS metadata standard, provide a rich description of tangible and intangible cultural heritage.

Although the application of metadata standards in the processing of intangible cultural heritage is unexplored, it can be seen that there are works that thematize some of the selected metadata standards. In this regard, the following will examine the application of selected metadata standards of this research for the processing of intangible cultural heritage.

3. Methodology

The research combines a qualitative approach with a descriptive method, and a comparative analysis of Dublin Core, CCO, VRA Core, CDWA, and MODS metadata standards, to examine the applicability of selected metadata standards for the processing of intangible cultural heritage. For analysis, the Jumps from the Old Bridge in Mostar, which represent the intangible cultural heritage of Bosnia and Herzegovina, were selected as an example of metadata processing using selected metadata standards.

4. Results

4.1. Selected metadata standards

Jenn Riley (2010a) in *Glossary of metadata standards* lists a total of 105 standards used to describe cultural objects/resources in the digital environment. One of the most internationally known metadata standards is Dublin Core.

4.1.1. Dublin Core

Dublin Core (DC) is a metadata standard used to describe information sources and find resources online. The name "Dublin" owes its origin to an invitational workshop in Dublin, Ohio in 1995; "Core" because its elements are broad and generic, usable to describe a wide range of resources (Dublin Core, 2012). The standard initially defined thirteen elements, and that number grew over time to fifteen Dublin Core elements to describe different types of network resources.

Dublin Core™ Metadata Initiative (DCMI). Potpuni skup rječnika, termini DCMI metapodataka [DCMI-TERMS], također uključuje skupove klasa resursa (uključujući DCMI tip vokabulara [DCMI-TYPE]), šeme kodiranja rječnika i šeme kodiranja sintakse. Termini u DCMI vokabularima namijenjeni su da se koriste u kombinaciji s terminima iz drugih, kompatibilnih rječnika u kontekstu profila aplikacije i na osnovu DCMI apstraktnog modela [DCAM] (Dublin Core, 2012).

Elementi Dublin Core skupa elemenata metapodataka, verzije 1.1, koji su odobreni u standardima ISO standard 15836:2009, ANSI/NISO standard Z39.85-2012 i IETF RFC 5013 pod imenom *The Dublin Core metadata element set (DCMES)* su sljedeći:

- saradnik (subjekt odgovoran za davanje doprinosa resursu),
- obuhvat (pro storna ili vremenska tema izvora, prostorna primjenjivost izvora ili nadležnost pod kojom je resurs relevantan),
- kreator (subjekt primarno odgovoran za izradu resursa),
- datum (vremenski period povezan s događajem u životnom ciklusu resursa),
- opis (može uključivati, ali nije ograničen na: sažetak, sadržaj, grafički prikaz ili prikaz izvora u slobodnom tekstu),
- format (datoteke, fizički medij ili dimenzije resursa),
- identifikator (nedvosmislena referenca na izvor u datom kontekstu),
- jezik (izvora),
- izdavač (subjekt odgovoran za stavljanje resursa na raspolaganje),
- odnos (srodni resurs),
- prava (informacije o pravima u resursu i nad resursom),
- izvor (povezani resurs iz kojeg je izveden opisani resurs),
- predmet (tema izvora),
- naslov (ime dato izvoru) i
- tip (vrsta izvora).

Bitna odlika DC je što je svaki opisni element unutar zapisa moguće ponavljati po potrebi i što njihov redoslijed nije određen standardom, te nije obavezno navesti sve opisane elemente (Dizdar, 2011: 303). Upravo zbog njegovih podataka opisa i jednostavnosti, što je i bio cilj Dublin Corea, ovaj standard metapodataka je široko rasprostranjen već u ranoj fazi postojanja. Vremenom su implementatori metapodataka tražili strukturalniji opis. Da-

The fifteen “Dublin Core™” elements described in this standard are part of a larger set of metadata vocabularies and technical specifications maintained by the Dublin Core™ Metadata Initiative (DCMI). The full vocabulary set, DCMI Metadata Terms [DCMI-TERMS], also includes sets of resource classes (including DCMI Vocabulary Type [DCMI-TYPE]), dictionary encoding schemes, and syntax encoding schemes. Terms in DCMI vocabularies are intended to be used in combination with terms from other, compatible vocabularies in the context of an application profile and based on the DCMI Abstract Model [DCAM] (Dublin Core, 2012).

The elements of the Dublin Core metadata element set, version 1.1, which are approved in ISO standard 15836:2009, ANSI/NISO standard Z39.85-2012 and IETF RFC 5013 under the name The Dublin Core metadata element set (DCMES), are as follows:

- collaborator (subject responsible for contributing to the resource),
- scope (spatial or temporal theme of the resource, spatial applicability of the resource or jurisdiction under which the resource is relevant),
- creator (subject primarily responsible for creating resources),
- date (time period associated with an event in the life cycle of the resource),
- description (may include, but is not limited to: summary, table of contents, graphic display or free text display of sources),
- format (files, physical media or resource dimensions),
- identifier (unambiguous reference to the source in the given context),
- language (of source),
- publisher (entity responsible for making resources available),
- relationship (related resource),
- rights (information about rights in and over the resource),
- source (related resource from which the described resource was derived),
- subject (topic of source),
- title (name given to the source), and
- type (type of source).

An essential feature of DC is that each descriptive element within the record can be repeated as needed and that their order is not determined by the standard, so it is not mandatory to list all the described elements (Dizdar, 2011: 303). Precisely because of its data description and simplicity, which was the goal

blinska inicijativa za metapodatke jezgra (DCMI), koja održava vokabular, proširila je jednostavni DC “kvalifikatorima” kako bi pružila dodatno preciziranje ključnih elemenata. Ova proširena verzija sada je poznata kao DCTERMS.⁸ DC i DCTERMS su definirani i kao XML i RDF vokabulari (Riley, 2017: 24). Korisnost koju pruža složeniji Dublin Core, a koji može biti složen koliko je potrebno, pokazat će vremenom implementacija standarda u projektima.

U nastavku rada bit će predstavljena implementacija metapodatkovne obrade Dublin Core standardom metapodataka na primjeru Skokova sa starog mosta u Mostaru:

of Dublin Core, this metadata standard was widely distributed already in the early phase of its existence. Over time, metadata implementers sought a more structured description. The Dublin Core Metadata Initiative (DCMI), which maintains the vocabulary, has extended the simple DC with “qualifiers” to provide further refinement of key elements. This expanded version is now known as DCTERMS.⁸ DC and DCTERMS are defined as both XML and RDF vocabularies (Riley, 2017: 24). The utility provided by the more complex Dublin Core, which can be as complex as necessary, will be shown over time by the implementation of the standards in the projects.

In the continuation of the work, the implementation of metadata processing by the Dublin Core metadata standard will be presented on the example of Jumps from the Old Bridge in Mostar:

```
<metadata xmlns:dcterms="http://purl.org/dc/terms/" xmlns:dc="http://purl.org/dc/elements/1.1/">
<dc:title>Jumps from the Old Bridge in Mostar</dc:title>
<dc:creator>Club of diving "Mostari"</dc:creator>
<dc:subject>Mostar</dc:subject>
<dc:subject>Old Bridge</dc:subject>
<dc:subject>Jumps into the water</dc:subject>
<dc:subject>Sports tradition</dc:subject>
<dc:subject>Cultural Events</dc:subject>
<dc:subject>Bosnia and Herzegovina</dc:subject>
<dc:description>Jumps from the Old Bridge in Mostar are an annual sports and cultural event that gathers brave jumpers from all over the world. Jumpers compete in the categories of leg jumps and head jumps (swallow). This event is a symbol of courage, tradition and culture of Mostar.</dc:description>
<dc:publisher>Club of diving "Mostari"</dc:publisher>
<dc:contributor>Jumpers from around the world</dc:contributor>
<dc:contributor>Volunteers</dc:contributor>
<dc:contributor>Tourists</dc:contributor>
<dc:date>2024-07-28</dc:date>
<dc:type>Event</dc:type>
<dc:format>Video</dc:format>
<dc:format>Photos</dc:format>
<dc:format>Text</dc:format>
<dc:identifier>https://example.com/skokovi-mostar-2024</dc:identifier>
<dc:language>eng</dc:language>
<dc:coverage>Mostar, Bosnia and Herzegovina</dc:coverage>
<dc:rights>Protected rights of event organizers and media.</dc:rights>
</metadata>
```

⁸ Više o DCTERMS na: *Dublin Core: DCMI Metadata Terms*. The Dublin Core Metadata Initiative. <https://www.dublincore.org/specifications/dublin-core/dcmi-terms/>.

⁸ More about DCTERMS at: *Dublin Core: DCMI Metadata Terms*. The Dublin Core Metadata Initiative. <https://www.dublincore.org/specifications/dublin-core/dcmi-terms/>.

Od ukupno petnaest elemenata Dublin Corea, opisu nedostaju sljedeći metapodaci: *Source* koji daje izvor opisanog resursa i *Relation* koji identifikuje povezani resurs. U okviru toga vrijedi spomenuti da se neki elementi ponavljaju više puta, poput *Date* elementa, što je karakteristika DC.

Specifičan standard za detaljnije opisivanje kulturnih objekata je CCO.

4.1.2. CCO – Cataloging Cultural Objects

Cataloging Cultural Objects: A Guide to Describing Cultural Works and Their Images (CCO) iz 2006. godine je standard sadržaja za opisivanje, dokumentiranje i katalogiziranje kulturnih djela i njihovih slika. Razvijen je u partnerstvu između Visual Resources Association i the Getty Foundation, i kao takav pokušava da zadovolji potrebe i vizuelnih resursa (često vezanih za biblioteke) i muzejskih zajednica (Riley, 2010b); kroz smjernice i preporuke o popisu relevantnih informacija o svakom kulturnom objektu.

Baca objašnjava da je CCO osmišljena posebno za članove zajednica koje se bave opisivanjem i dokumentiranjem umjetničkih djela, arhitekture, kulturnih artefakata i slika koje se odnose na njih – specijaliste za muzejsku dokumentaciju, kustose vizuelnih resursa, arhiviste, bibliotekare ili bilo koga ko dokumentira kulturne predmete i njihove slike (Baca et al., 2006: xii). U okviru toga, Visual Resources Association navodi da se CCO koristi za:⁹ kreiranje djeljivih metapodataka; izgradnju uobičajene prakse za muzeje, digitalne biblioteke i arhive; dopunjavanje različitih struktura podataka i standarda vrijednosti u bilo kojem sistemu i poboljšanje otkrivanja i pristupa kulturnim djelima. Prema tome, osnovni cilj CCO je putem standardizirane metode katalogizacije dodjeljivanjem metapodataka koje se mogu razmjenjivati među različitim institucijama omogućiti unaprijeđen pristup i razumijevanje informacija o kulturnim objektima. Sve navedeno CCO postiže putem skupina, odnosno elemenata opisa koji će biti predstavljeni u nastavku:¹⁰

Out of a total of fifteen Dublin Core elements, the description lacks the following metadata: *Source* which gives the source of the described resource and *Relation* which identifies the related resource. Within that, it is worth mentioning that some elements are repeated more than once, like the *Date* element, which is a characteristic of DC that elements are repeated.

A specific standard for describing cultural objects in more detail is CCO.

4.1.2. CCO – Cataloging Cultural Objects

Cataloging Cultural Objects: A Guide to Describing Cultural Works and Their Images (CCO) from 2006 is a content standard for describing, documenting and cataloging cultural works and their images. It was developed in partnership between the Visual Resources Association and the Getty Foundation, and as such attempts to meet the needs of both the visual resources (often related to libraries) and museum communities (Riley, 2010b) through guidelines and recommendations on the list of relevant information about each cultural object.

Baca explains that CCO is designed specifically for members of the communities involved in describing and documenting works of art, architecture, cultural artefacts and related images – museum documentation specialists, curators of visual resources, archivists, librarians or anyone who documents cultural objects, and their images (Baca et al., 2006: xii). Within this, the Visual Resources Association states that CCO is used to:⁹ create shareable metadata; building common practice for museums, digital libraries and archives; supplementing different data structures and value standards in any system and improving discovery and access to cultural works. Therefore, the main goal of the CCO is to enable improved access and understanding of information about cultural objects through a standardized method of cataloging by assigning metadata that can be exchanged between different institutions. All of the above CCO achieves through groups or elements of the description that will be presented below:¹⁰

⁹ Vidjeti: *Cataloging Cultural Objects (CCO)*. Visual Resources Association. <https://www.vraweb.org/cco>.

¹⁰ Više o definicijama CCO elemenata na: Baca et al., 2006.

⁹ See: *Cataloging Cultural Objects (CCO)*. Visual Resources Association. <https://www.vraweb.org/cco>.

¹⁰ More about the definitions of CCO elements at: Baca et al., 2006.

<p><i>I – Imenovanje predmeta: Vrsta djela</i> <i>I – Naming the subject: Type of work</i></p> <ul style="list-style-type: none"> - Naslov / Title - Vrsta naslova / Title type - Jezik / Language - Izvor / Source 	<p><i>II – Informacije o stvaratelju: Prikaz stvaratelja</i> <i>II – Information about the creator: Creator view</i></p> <ul style="list-style-type: none"> - Kontrolirani stvaratelj / Controlled creator - Uloga / Role - Opseg stvaratelja / Creator range - Atribucija (Pripisivanje) / Attribution
<p><i>III – Fizičke karakteristike</i> <i>III – Physical characteristics</i></p> <p><i>Prikaz mjerenja / Display of measurements</i></p> <ul style="list-style-type: none"> - Vrijednost / Value - Jedinica / Unit - Vrsta / Kind - Opseg / Scope - Kvalifikator / Qualifier - Oblik / Shape - Format / Format <p><i>Prikaz materijala i tehnika / Presentation of materials and techniques</i></p> <ul style="list-style-type: none"> - Materijal / Material - Vrsta materijala / Type of material - Tehnika / Technique - Boja / Color - Mjesto oznake / Mark location - Opseg / Scope - Kvalifikator / Qualifier <p><i>Prikaz izdanja / Release view</i></p> <ul style="list-style-type: none"> - Broj impresuma / Imprint number - Veličina izdanja / Issue size - Broj izdanja / Issue number <p><i>Prikaz stanja / Status display</i></p> <ul style="list-style-type: none"> - Identifikacija stanja / State identification - Pozbata stanja / Known conditions - Izvor stanja / State source <p><i>Natpis / Caption</i></p> <ul style="list-style-type: none"> - Vrsta natpisa / Type of inscription - Mjesto natpisa / Place of inscription - Autor natpisa / The author of the inscription <p><i>Izvedba / Performance</i></p> <p><i>Fizički opis / Physical description</i></p> <p><i>Stanje i historija pregleda / View status and history</i></p> <p><i>Historija konzervacije i tretmana / History of conservation and treatment</i></p>	<p><i>IV – Stilske kulturne i kronološke informacije</i> <i>IV – Stylistic, cultural and chronological information</i></p> <p><i>Stil / Style</i></p> <p><i>Kultura / Culture</i></p> <p><i>Datum / Date</i></p> <ul style="list-style-type: none"> - Najraniji datum / Earliest date - Najkasniji datum / Latest date - Kvalifikator datuma / Date qualifier <p><i>V – Lokacija i geografski položaj</i> <i>V – Location and geographic location</i></p> <p><i>Prikaz trenutne lokacije / View current location</i></p> <ul style="list-style-type: none"> - Trenutna lokacija / Current location - Jedinstveni ID repozitorija / Unique ID of the repository <p><i>Prikaz lokacije nastanka / Display of origin location</i></p> <ul style="list-style-type: none"> - Lokacija nastanka / Location of origin <p><i>Prikaz lokacije otkrića / Discovery location display</i></p> <ul style="list-style-type: none"> - Lokacija otkrića / Discovery location <p><i>Prikaz prijašnjih lokacija / View previous locations</i></p> <ul style="list-style-type: none"> - Prijašnja lokacija / Previous location <p><i>VI – Predmet</i> <i>VI – Subject</i></p> <p><i>Prikaz predmeta / Item display</i></p> <ul style="list-style-type: none"> - Kontrolisanje polje predmeta / Controlled subject field <p><i>Opseg / Scope</i></p> <p><i>Vrsta predmeta / Item type</i></p> <p><i>VII – Razred</i> <i>VII – Grade</i></p> <p><i>Prikaz razreda / Class view</i></p> <p><i>Kontrolisano polje razreda / Controlled class field</i></p> <p><i>VIII – Opis</i> <i>VIII – Description</i></p> <p><i>Opis (opisna napomena) / Description (descriptive note)</i></p> <ul style="list-style-type: none"> - Izvori / Sources <p><i>Druge opisne bilješke / Other descriptive notes</i></p> <ul style="list-style-type: none"> - Izvori / Sources
	<p><i>IX – Informacije prikaza</i> <i>IX – Display Information:</i></p> <p><i>Opis prikaza / Display description</i></p> <p><i>Vrsta prikaza / Display type</i></p> <p><i>Predmet prikaza / Display subject</i></p> <ul style="list-style-type: none"> - Kontrolisano polje prikaza / Controlled display field <p><i>Datum prikaza / Display date</i></p> <ul style="list-style-type: none"> - Najraniji datum / The earliest date - Najkasniji datum / The most recent date

Od predstavljenih, obavezni elementi opisa koje zapis treba imati istaknuti su u kurzivu. Nijedan ostali navedeni element opisa nije nužan u zapisu objekta. Odluka o tome donosi se lokalno, odnosno po primjenjivosti elemenata opisa na objekat koji se opisuje. Također, od objekta će zavisi sintaksa CCO standarda metapodataka, koja se može izraziti u raznim formatima po potrebi, a najčešće je to XML i/ili RDF.

Iako se, kako je navedeno, CCO standard metapodataka koristi za obradu kulturnih djela i njihovih slika, pokušaj metapodatkovne obrade primjera nematerijalne kulturne baštine ovoga rada CCO standardom metapodataka dat je u nastavku:

Of those presented, the mandatory description elements that the record should be highlighted in italics. All other listed elements of the description are not necessarily owned by the object record. The decision on this is made locally, i.e. according to the applicability of the elements of the description to the object being described. Also, the syntax of the CCO metadata standard will depend on the object, which can be expressed in various formats as needed, most often XML and/or RDF.

Although, as stated, the CCO metadata standard is used for the processing of cultural works and their images, an attempt at metadata processing of examples of intangible cultural heritage of this work using the CCO metadata standard is given below:

```
<cco:record xmlns:cco="http://www.getty.edu/research/publications/electronic_publications/cco/vocabularies">
  <cco:recordID>SM-2024-001</cco:recordID>

  <cco:titleSet>
    <cco:title>
      <cco:titleText>Jumps from the Old Bridge in Mostar</cco:titleText>
    </cco:title>
  </cco:titleSet>

  <cco:descriptiveNoteSet>
    <cco:descriptiveNote>
      <cco:descriptiveNoteValue>
        Jumping from the Old Bridge in Mostar is an annual sports and cultural event that attracts jumpers from all over the world. The competition takes place in two main categories: jumps on the feet and jumps on the head (swallow). This event is known for its tradition and cultural significance in the city of Mostar.
      </cco:descriptiveNoteValue>
    </cco:descriptiveNote>
  </cco:descriptiveNoteSet>

  <cco:agentSet>
    <cco:agent>
      <cco:name>Club of diving "Mostari"</cco:name>
      <cco:role>Organizer</cco:role>
    </cco:agent>
  </cco:agentSet>

  <cco:dateSet>
    <cco:date>
      <cco:dateSingle>2024-07-28</cco:dateSingle>
    </cco:date>
  </cco:dateSet>

  <cco:locationSet>
    <cco:location>
      <cco:locationName>
        <cco:namePart>Old Bridge</cco:namePart>
        <cco:namePart>Mostar</cco:namePart>
        <cco:namePart>Bosnia and Herzegovina</cco:namePart>
      </cco:locationName>
    </cco:location>
  </cco:locationSet>
</cco:record>
```

```

</cco:locationSet>

<cco:classification>
<cco:term>Sports manifestation</cco:term>
</cco:classification>

<cco:materialSet>
<cco:material>
<cco:term>Video</cco:term>
</cco:material>
<cco:material>
<cco:term>Photos</cco:term>
</cco:material>
<cco:material>
<cco:term>Text reports</cco:term>
</cco:material>
</cco:materialSet>

<cco:relationSet>
<cco:relation>
<cco:relationshipType>Relationship with UNESCO World Heritage Site</cco:relationshipType>
<cco:work>
<cco:titleSet>
<cco:title>Old Bridge, Mostar, Bosnia and Herzegovina</cco:title>
</cco:titleSet>
<cco:id type="external">UNESCO-946</cco:id>
</cco:work>
</cco:relation>
</cco:relationSet>

<cco:rightsSet>
<cco:rights>
<cco:rightsHolder>Diving Club "Mostari"</cco:rightsHolder>
<cco:rightsType>Video and media copyrights</cco:rightsType>
</cco:rights>
</cco:rightsSet>

</cco:record>

```

Vidno je da zapis CCO standardom metapodataka pruža suštinske informacije o Skokovima sa Starog mosta u Mostaru, ali da od ukupno devet skupina elemenata opisa CCO standard metapodataka ne može pružiti niti obavezne elemente zapisu nematerijalne kulturne baštine.

Osim CCO, za opisivanje kulturnih djela i njihovih slika koriste se dobro uspostavljeni skupovi elemenata, odnosno standardi strukture: VRA Core i CDWA.

4.1.3. VRA Core – Visual Resources Association Core Categories

VRA Core je također specifičan standard metapodataka koji je nastao kao potreba profesionalne zajednice za standardom metapodataka koji će se koristiti za detaljnije opisivanje vizuelnih resursa. Djela vi-

It can be seen that the CCO metadata standard record provides essential information about the Jumps from the Old Bridge in Mostar, but that out of a total of nine groups of description elements, the CCO metadata standard cannot provide even mandatory elements for the intangible cultural heritage record.

In addition to CCO, well-established sets of elements or structure standards are used to describe cultural works and their images: VRA Core and CDWA.

4.1.3. VRA Core – Visual Resources Association Core Categories

VRA Core is also a specific metadata standard that arose out of the need of the professional community for a metadata standard to be used to describe

zuelne kulture mogu uključivati predmete ili događaje kao što su slike, crteži, skulpture, arhitektura, fotografije, kao i knjige, dekorativne i izvedbene umjetnosti (An introduction to VRA Core, 2014: 1). Razvijen je 1996. godine od strane Visual Resources Association u partnerstvu sa Network Development i MARC standardom Kongresne biblioteke. VRA Core je prvobitno izgrađen na bazi Dublin Core, dodajući karakteristike potrebne za opis i upravljanje vizuelnim resursima (Riley, 2010b); a tek u verziji 4.0 postao je shema zasnovana na XML-u (Miller, 2022: 273). Trenutna dostupna VRA Core 4.0 shema objavljena je 2007. godine i ima dvije verzije za implementaciju: verzija neograničeno specificira osnovnu strukturu sheme, dok verzija ograničeno proširuje neograničenu shemu dodavanjem kontroliranih lista tipova i formata datuma.

Karakteristična karakteristika VRA Core je razdvajanje metapodataka o samom umjetničkom djelu i metapodataka o slikama tih djela (Riley, 2017: 34). To znači da pružajući odvojeni opis VRA Core elementima standard omogućava upravljanje podacima o djelu i slici (vizualnom resursu), koji se mogu grupisati u kolekcije. VRA Core sadrži devetnaest elemenata opisa koji će u nastavku biti prikazani s podelementima i atributima u zagradi:¹¹

visual resources in more detail. Works of visual culture can include objects or events such as paintings, drawings, sculptures, architecture, photographs, as well as books, decorative and performing arts (An introduction to VRA Core, 2014: 1). It was developed in 1996 by the Visual Resources Association in partnership with Network Development and the MARC standard of the Library of Congress. VRA Core was originally built on top of Dublin Core, adding features needed to describe and manage visual resources (Riley, 2010b), and only in version 4.0 did it become an XML-based schema (Miller, 2022: 273). The currently available VRA Core 4.0 scheme was released in 2007 and has two implementation versions: the unlimited version specifies the basic structure of the schema, and the limited version extends the unlimited schema by adding controlled lists of date types and formats.

A distinctive feature of VRA Core is the separation of metadata about the artwork itself and metadata about the images of those works (Riley, 2017: 34). This means that by providing a separate description to the VRA Core elements, the standard enables the management of work and image (visual resource) data, which can be grouped into collections. VRA Core contains nineteen description elements which will be shown below with sub-elements and attributes in parentheses:¹¹

djelo, kolekcija ili slika (id) / work, collection or image (id)	materijal / vrsta / material (type)
agent / agent	mjere (vrsta, jedinica) / measures (type, unit)
- atribucija / attribution	odnos (tip, relids) / relation (type, relids)
- kultura / culture	prava (vrsta) / right (type)
- datumi (vrsta) / dates (type)	- nosilac prava / the right holder
najraniji datum (otprilike) / earliest date (approx.)	- tekst / text
zadnji datum (otprilike) / last date (approx.)	izvor / source
- naziv (vrsta) / name (species)	- naziv (vrsta) / name (species)
- uloga / role	- refid (tip) / refid (type)
kulturni kontekst / cultural context	državno izdanje (broj, broj, vrsta) / government issue (number, number, type)
datum (vrsta) / date (type)	- opis / description
- najraniji datum (otprilike) / earliest date (approx.)	- ime / name
- zadnji datum (otprilike) / latest date (approx.)	stilski period / style period
opis / description	predmet / subject
natpis / inscription	- termin (vrsta) / term (type)
- autor / the author	tehnika / technique
- pozicija / position	textref / textref
- tekst (vrsta) / text (type)	- naziv (vrsta) / name (species)
lokacija (vrsta) / location (type)	- refid (tip) / refid (type)
- naziv (vrsta) / name (species)	naslov (vrsta) / title (type)
- refid (tip) / refid (type)	radni tip / working type

¹¹ Više o VRA Core elementima na: Miller, 2022; više o definicijama na: *VRA Core 4.0 Element Description*. https://www.loc.gov/standards/vracore/VRA_Core4_Element_Description.pdf.

¹¹ More about VRA Core elements at: Miller, 2022; more about definitions at: *VRA Core 4.0 Element Description*. https://www.loc.gov/standards/vracore/VRA_Core4_Element_Description.pdf.

Schema također uključuje sljedeće globalne atribute koji se mogu koristiti s bilo kojim elementom ili podelementom: dataDate, extent, href (Hypertext REFERENCE URL), pref (preferirana vrijednost), refid (veza na interne identifikatore), pravila, izvor, vocab, xml:lang (Miller, 2022: 277). VRA Core strukturni standard metapodataka uz globalne XML atribute, elemente, podelemente i atribute stvara konzistentan opis vizuelnog resursa te njihovih digitalnih kolekcija. Prema tome, VRA Core izražen je u XML sintaksi, ali je pored toga moguće transformisati podatke u RDF.

Primjer metapodatkovne obrade VRA Core standardom metapodataka Skokova sa Starog mosta u Mostaru dat je u nastavku:

The schema also includes the following global attributes that can be used with any element or subelement: dataDate, extent, href (Hypertext REFERENCE URL), pref (preferred value), refid (link to internal identifiers), rules, source, vocab, xml:lang (Miller, 2022: 277). VRA Core metadata structure standard with global XML attributes, elements, sub-elements and attributes creates a consistent description of visual resources and their digital collections. Therefore, VRA Core is expressed in XML syntax, but in addition it is possible to transform the data into RDF.

An example of metadata processing of VRA Core using the metadata standard Jumps from the Old Bridge in Mostar is given below:

```
<vra:workset xmlns:vra="http://www.vraweb.org/vracore3.htm">
  <vra:work>
    <vra:id type="local">SM-2024-001</vra:id>

    <vra:titleSet>
    <vra:title>Jumps from the Old Bridge in Mostar</vra:title>
    </vra:titleSet>

    <vra:descriptionSet>
    <vra:description>
    Jumping from the Old Bridge in Mostar is an annual sports and cultural event. The competition gathers jumpers from all over the world, who compete in two main categories: leg jumps and head jumps (swallow). This event is a symbol of the tradition and culture of the city of Mostar.
    </vra:description>
    </vra:descriptionSet>

    <vra:category>Sports manifestation</vra:category>

    <vra:agentSet>
    <vra:agent>
    <vra:name type="corporate">Club of diving "Mostari"</vra:name>
    <vra:role>Organizer</vra:role>
    </vra:agent>
    </vra:agentSet>

    <vra:dateSet>
    <vra:date>
    <vra:dateSingle>2024-07-28</vra:dateSingle>
    </vra:date>
    </vra:dateSet>

    <vra:locationSet>
    <vra:location>
    <vra:name>Old Bridge, Mostar, Bosnia and Herzegovina</vra:name>
    </vra:location>
    </vra:locationSet>

    <vra:materialSet>
    <vra:material>
```

```

<vra:term>Video</vra:term>
</vra:material>
<vra:material>
<vra:term>Photos</vra:term>
</vra:material>
<vra:material>
<vra:term>Text reports</vra:term>
</vra:material>
</vra:materialSet>

<vra:relationSet>
<vra:relation>
<vra:relationshipType>Relationship with UNESCO World Heritage</vra:relationshipType>
<vra:work>
<vra:titleSet>
<vra:title>Old Bridge, Mostar, Bosnia and Herzegovina</vra:title>
</vra:titleSet>
<vra:id type="external">UNESCO-946</vra:id>
</vra:work>
</vra:relation>
</vra:relationSet>

<vra:rightsSet>
<vra:rights>
<vra:rightsHolder>Diving Club "Mostari"</vra:rightsHolder>
<vra:rightsType>Video and media copyrights</vra:rightsType>
</vra:rights>
</vra:rightsSet>

</vra:work>
</vra:workset>

```

Poput CCO standarda metapodataka, zapis VRA standardom metapodataka pruža samo suštinske informacije o Skokovima sa Starog mosta u Mostaru. Metapodatkovni zapis VRA standardom metapodataka ne može pružiti metapodatkovni opis elemenata nematerijalne kulturne baštine budući da je eksplicitno osmišljen za obradu djela vizuelne kulture. Kako bi se osiguralo cjelovito opisivanje i dokumentiranje umjetničkih djela u kombinaciji s VRA Core često se koristio CDWA.

4.1.4. CDWA – Categories for the Description of Works of Art

CDWA predstavlja složeniji strukturni skup elemenata / kategorija od VRA Core. Categories for the Description of Works of Art (CDWA) sadrže skup smjernica za najbolju praksu u katalogizaciji i opisanju umjetničkih djela, arhitekture, druge materijalne kulture, grupa i zbirke djela i povezanih slika (CDWA, 2022: 1). CDWA se razvijao postepeno, a pokrenut je 1990-ih dogovorom profesionalne zajednice umjetnika i Information Task Force (AITF)

Like the CCO metadata standard, the VRA metadata standard record provides only essential information about Jumps from the Old Bridge in Mostar. The metadata record of the VRA metadata standard cannot provide a metadata description of elements of intangible cultural heritage since it is explicitly designed for the processing of works of visual culture.

In order to ensure a complete description and documentation of artworks in combination with VRA Core, CDWA was often used.

4.1.4. CDWA – Categories for the Description of Works of Art

CDWA represents a more complex structural set of elements/categories than VRA Core. The Categories for the Description of Works of Art (CDWA) contain a set of guidelines for best practice in cataloging and describing works of art, architecture, other material culture, groups and collections of works and related images (CDWA, 2022: 1). CDWA developed gradually, and was launched in the 1990s by an agreement of the professional artist community and the

koju održava Getty Foundation Art. Rad AITF-a je finansirao J. Paul Getty Trust, s dvogodišnjim odgovarajućim grantom National Endowment for the Humanities (NEH) za College Art Association (CAA) (CDWA, 2022: 2). CDWA predstavlja konceptualni okvir koji daje upute za stvaranje kvalitetnog opisa, to jest baze podataka o resursu, te pruža nje djelotvornih informacija o njemu.

Smjernice za upotrebu razlikuju elemente podataka namijenjene za prikaz i one namijenjene indeksiranju (Riley, 2010b) kako bi se omogućilo efikasnije pretraživanje dok se istovremeno korisnicima prikazuju koherentne informacije (Riley, 2017: 34). Na taj način, CDWA savjetuje da takvo indeksiranje trebaju obavljati obrazovani katalogizatori. Također promoviraju upotrebu mjerodavnih izvora za detalje zabilježene u opisu CDWA, ponekad čak sugerirajući specifične izvore za korištenje u prikupljanju informacija u datoj kategoriji (Riley, 2017: 34). Uz to, smjernice CDWA ukazuju na značaj specifičnosti i iscrpnosti opisa resursa, na neizvjesnost i dvosmislenost, nepoznatost i neutvrđenost, informacije koje se mogu znati naspram nepoznatih, neslaganje među izvorima, indeksiranje važnih informacija i poznavanje izvora informacija.

CDWA skup sastoji se od oko 540 opisnih elemenata / kategorija i potkategorija. Od toga, trenutno sadrži trideset i jednu kategoriju koja daje minimalne informacije o resursu:¹²

Information Task Force (AITF) maintained by the Getty Foundation Art. AITF's work was funded by the J. Paul Getty Trust, with a two-year matching grant from the National Endowment for the Humanities (NEH) to the College Art Association (CAA) (CDWA, 2022: 2). CDWA represents a conceptual framework that provides instructions for creating a quality description, that is, a resource database, and providing effective information about it.

Usage guidelines distinguish between data elements intended for display and those intended for indexing (Riley, 2010b) to enable more efficient browsing while simultaneously presenting coherent information to users (Riley, 2017: 34). Thus, CDWA advises that such indexing should be performed by trained catalogers. It also promotes the use of authoritative sources for the details recorded in the CDWA description, sometimes even suggesting specific sources to use in gathering information in a given category (Riley, 2017: 34). In addition, the CDWA guidelines point to the importance of specificity and completeness in resource descriptions, uncertainty and ambiguity, unfamiliarity and indeterminacy, knowable versus unknown information, disagreement among sources, indexing of important information, and knowledge of information sources.

The CDWA set consists of about 540 descriptive elements/categories and subcategories. Of these, it currently contains thirty-one categories that provide minimal information about the resource:¹²

Za objekt, arhitekturu ili grupu / For an object, architecture or group	Za lice/korporativno tijelo / For a person/corporate body
Razina kataloga / Catalog level	Ime / Name
Vrsta objekta/djela / Type of object/work	Biografija / Biography
Pojam klasifikacije / The concept of classification	Datum rođenja / Date of birth
Naslov ili ime / Title or name	Datum smrti / Date of death
Opis mjerenja / Description of measurements	Nacionalnost/kultura/rasa / Nationality/culture/race
Opis materijala i tehnika / Description of materials and techniques	Životne uloge / Life roles
Opis kreatora / Creator description	Povezani ljudi/korporativna tijela (ako su hijerarhijski) / Related people/corporate bodies (if hierarchical)
Identitet kreatora / Creator identity	
Uloga kreatora / The role of the creator	Za upravu za mjesto/lokaciju / For site/location management
Datum kreiranja / Creation date	Ime mjesta / Place name
Uslovi indeksiranja predmeta / Subject indexing conditions	Vrsta mjesta / Type of place
Trenutni repozitorij/geografska lokacija / Current repository/geo location	Povezana mjesta (hijerarhijski) / Related places (hierarchical)
Trenutni brojevi repozitorija / Current repository numbers	
Za autoritet za generičke koncepte / For authority on generic concepts	Za autoritet subjekta / For subject authority
Termin / Term	Naziv subjekta / Subject name
Povezani generički koncepti (hijerarhijski) / Related generic concepts (hierarchical)	Povezani predmeti (ako su hijerarhijski) / Related items (if hierarchical)
Opseg napomena / Range note	

¹² Više o definicijama CDWA elemenata na: CDWA, 2022.

¹² More on CDWA element definitions at: CDWA, 2022.

Predstavljene kategorije sadrže veliki broj opisnih potkategorija koje detaljnije opisuju resurs. Bitno je naglasiti da se CDWA redovno ažurira kako bi bio aktuelan, te je zbog toga broj kategorija skupa podložan promjenama. Također, CDWA koristi XML shemu za izražavanje elemenata opisa.

Zapis metapodatkovne obrade Skokova sa Starog mosta u Mostaru CDWA standardom metapodataka dat je u nastavku:

The presented categories contain a large number of descriptive subcategories that describe the resource in more detail. It is important to emphasize that the CDWA is regularly updated in order to be current, and therefore the number of set categories is subject to change. Also, CDWA uses an XML schema to express description elements.

The record of the metadata processing of Jumps from the Old Bridge in Mostar by the CDWA metadata standard is given below:

```
<cdwa:record xmlns:cdwa="http://www.getty.edu/research/publications/electronic_publications/cdwa/vocabularies">
  <cdwa:identifier>
    <cdwa:id>SM-2024-001</cdwa:id>
  </cdwa:identifier>
  <cdwa:title>
    <cdwa:titleText>Jumps from the Old Bridge in Mostar</cdwa:titleText>
  </cdwa:title>
  <cdwa:creator>
    <cdwa:creatorName>Club of diving "Mostari"</cdwa:creatorName>
    <cdwa:role>Organizer</cdwa:role>
  </cdwa:creator>
  <cdwa:date>
    <cdwa:dateDate>2024-07-28</cdwa:dateDate>
  </cdwa:date>
  <cdwa:location>
    <cdwa:locationName>Old Bridge</cdwa:locationName>
    <cdwa:locationPlace>Mostar, Bosnia and Herzegovina</cdwa:locationPlace>
  </cdwa:location>
  <cdwa:description>
    Jumping from the Old Bridge in Mostar is a traditional sporting and cultural event that gathers jumpers from all over the world. This event includes foot jumps and head jumps (swallow), and symbolizes the cultural heritage and traditions of Mostar.
  </cdwa:description>
  <cdwa:type>
    <cdwa:typeTerm>Sports event</cdwa:typeTerm>
  </cdwa:type>
  <cdwa:physicalDescription>
    <cdwa:form>Video</cdwa:form>
    <cdwa:extent>1 video (3 minutes)</cdwa:extent>
    <cdwa:form>Photos</cdwa:form>
    <cdwa:form>Text reports</cdwa:form>
  </cdwa:physicalDescription>
  <cdwa:relatedWork>
    <cdwa:relatedWorkTitle>Old Bridge, Mostar, Bosnia and Herzegovina</cdwa:relatedWorkTitle>
    <cdwa:relatedWorkIdentifier type="external">UNESCO-946</cdwa:relatedWorkIdentifier>
    <cdwa:relationshipType>Relationship with UNESCO World Heritage Site</cdwa:relationshipType>
  </cdwa:relatedWork>
  <cdwa:rights>
    <cdwa:rightsHolder>Club of diving "Mostari"</cdwa:rightsHolder>
  </cdwa:rights>
</cdwa:record>
```

```
<cdwa:rightsDescription>Video and media copyrights</cdwa:rightsDescription>
</cdwa:rights>

</cdwa:record>
```

Potpuno je isto kao slučaj s opisom CCO i VRA standardima metapodataka: pokušaj zapisa CDWA standardom metapodataka pruža samo osnovne informacije o Skokovima sa Starog mosta u Mostaru. CDWA standard metapodataka namijenjen je materijalnim objektima kulturne baštine te se kao takav ne može koristiti za metapodatkovnu obradu elemenata nematerijalne kulturne baštine.

Napokon, detaljniji standard metapodataka koji se koristi za opisivanje različitih vrsta resursa je MODS.

4.1.5. MODS – Metadata Object Description Schema

MODS je standard metapodataka koji se koristi za opis različitih vrsta digitalnih resursa, a ne samo za određenu vrstu objekata ili disciplina. MODS je nastao kao skraćena XML verzija MARC 21 formata za bibliografske podatke (Miller, 2022: 206), i kao takav uključuje podskup MARC polja, koristeći jezične oznake umjesto numeričkih. MARC i MODS imaju visoku razinu kompatibilnosti te istu svrhu – da bibliografski opišu resurs. Iz tog razloga su od posebnog interesa za biblioteke koje ih naširoko koriste. Zato je Kongresna biblioteka i razvila MODS 2002. godine; standard održava The Network Development i ured za MARC standard Kongresne biblioteke (MODS, 2022a). Najnovija verzija MODS standarda metapodataka je MODS 3.8.

XML shema MODS sastoji se elemenata, podelementa i atributa. MODS elementi su sljedeći: naslov, naziv, vrsta izvora, žanr, izvor, jezik, fizički opis, sažetak, sadržaj, ciljana publika, bilješka, predmet, klasifikacija, srodna stavka, identifikator, lokacija, pristupni uvjeti, dio, ekstenzija i zapis.¹³ Prikazani elementi, njih ukupno dvadeset, predstavljaju elemente najviše razine. Nijedan element nije obavezan u MODS zapisu, međutim, svaki MODS zapis zahtijeva barem jedan element (MODS, 2022b), koji zajedno s podelementima i atributima MODS standarda metapodataka grupišu povezane dijelove bibliografskog opisa.

MODS shema ima značajnu karakteristiku označenu kao MODS imenski prostor. Element proširenja

Exactly the same as the case with the description of CCO and VRA metadata standards, an attempt to record the CDWA metadata standard provides only basic information about the Jumps from the Old Bridge in Mostar. The CDWA metadata standard is intended for material objects of cultural heritage and as such cannot be used for metadata processing of elements of intangible cultural heritage.

And, a more detailed metadata standard used to describe different types of resources is MODS.

4.1.5. MODS – Metadata Object Description Schema

MODS is a metadata standard used to describe different types of digital resources, not just a specific type of object or discipline. MODS was created as a shortened XML version of the MARC 21 format for bibliographic data (Miller, 2022: 206), and as such includes a subset of MARC fields, using language labels instead of numeric ones. MARC and MODS have a high level of compatibility and the same purpose to bibliographically describe a resource. For this reason, they are of particular interest to libraries that use them widely. Actually, MODS was developed by the Library of Congress in 2002; the standard is maintained by the Network Development and MARC Standards Office of the Library of Congress (MODS, 2022a). The latest version of the MODS metadata standard is MODS 3.8.

The MODS XML schema consists of elements, sub-elements and attributes. The MODS elements are as follows: title, name, source type, genre, source, language, physical description, abstract, content, target audience, note, subject, classification, related item, identifier, location, access terms, part, extension, and record.¹³ Shown, a total of twenty of them represent the elements of the highest level. No element is mandatory in a MODS record; however, every MODS record requires at least one element (MODS, 2022b) which, together with sub-elements and attributes of the MODS metadata standard, group related parts of the bibliographic description.

The MODS schema has an important feature denoted as the MODS namespace. The extension element is

¹³ Više o MODS elementima, podelementima i njihovim atributima s definicijama na: MODS, 2022b.

¹³ More about MODS elements, sub-elements and their attributes with definitions at: MODS, 2022b.

posebna je značajka MODS-a, koja omogućuje ume-tanje dodatnih metapodataka u bilo kojem prostoru imena XML u MODS zapis (Riley, 2017: 31). Uloga MODS imenskog prostora jeste da se zapis proširi dodatnim elementom ukoliko je potreban, a sve s ciljem stvaranja što boljeg opisa resursa, odnosno im-plementacije MODS standarda metapodataka.

Zapis metapodatkovne obrade MODS standardom metapodataka na primjeru Skokova sa Starog mosta u Mostaru predstavljen je u nastavku rada:

a special feature of MODS, which enables the inser-tion of additional metadata in any XML namespace in a MODS record (Riley, 2017: 31). The role of the MODS namespace is to expand the record with an additional element if needed, all with the aim of cre-ating the best possible description of the resource, i.e. the implementation of the MODS metadata standard.

The record of metadata processing by the MODS metadata standard on the example of Jumps from the Old Bridge in Mostar is presented in the contin-uation of the paper:

```
<mods xmlns="http://www.loc.gov/mods/v3" version="3.7">
  <titleInfo>
    <title>Jumps from the Old Bridge in Mostar</title>
  </titleInfo>
  <name type="corporate">
    <namePart>"Mostari Diving Club"</namePart>
    <role>
      <roleTerm type="text">Organizer</roleTerm>
    </role>
  </name>
  <subject>
    <topic>Mostar</topic>
    <topic>Old Bridge</topic>
    <topic>Jumps into the water</topic>
    <topic>Sports manifestation</topic>
    <topic>Cultural events</topic>
    <geographic>Bosnia and Herzegovina</geographic>
  </subject>
  <abstract>
    Jumping from the Old Bridge in Mostar is an annual sports and cultural event that gathers jumpers from all over the world. The competition includes leg jumps and head jumps (swallow). This event symbolizes the courage, tradition and cultural heritage of the city of Mostar.
  </abstract>
  <originInfo>
    <publisher>Club of diving "Mostari"</publisher>
    <dateIssued>2024-07-28</dateIssued>
  </originInfo>
  <typeOfResource>event</typeOfResource>
  <physicalDescription>
    <form authority="marcform">video</form>
    <internetMediaType>video/mp4</internetMediaType>
    <extent>1 video (3 minutes)</extent>
  </physicalDescription>
  <identifier type="uri">https://example.com/skokovi-mostar-2024</identifier>
  <location>
```

```

<physicalLocation>Mostar, Old Bridge</physicalLocation>
<url>https://example.com/skokovi-mostar-2024</url>
</location>

<language>
<languageTerm authority="iso639-2b" type="code">eng</languageTerm>
</language>

<relatedItem>
<titleInfo>
<title>Old Bridge - UNESCO World Heritage</title>
</titleInfo>
<identifier type="uri">https://whc.unesco.org/en/list/946</identifier>
</relatedItem>

<subject>
<geographic>Mostar, Bosnia and Herzegovina</geographic>
<temporal encoding="w3cdtf">2024</temporal>
</subject>

<accessCondition type="useAndReproduction">Protected right of event organizers and media.</accessCondition>

</mods>

```

Od ukupno dvadeset MODS elementa s njihovim podelementima, predstavljenom zapisu nedostaju metapodaci: *genre* što označava kategoriju, *tableOfContents* koji se odnosi na sadržaj za resurs, *targetAudience* koji daje opis intelektualnog nivoa publike kojoj je resurs napravljen, *note* koji daje opće informacije koje se odnose na izvor, *classification* što označava predmet primjenom sistema kodiranja, *part* koji opisuje dio resursa, *extension* što pruža dodatne informacije koje MODS ne pokriva te *recordingInfo* koji daje informacije o zapisu.

Summa summarum, implementacija metapodatkovne obrade na primjeru Skokova sa Starog mosta u Mostaru pokazuje da su određeni standardi metapodataka primjenjivi za obradu nematerijalne kulturne baštine. To će biti dodatno ispitano i predstavljeno u nastavku odgovorima na istraživačka pitanja rada.

5. Komparativna analiza i diskusija

Uvidom u dosadašnje prakse uočeno je da se za opisanje kulturnih objekata najčešće koriste Dublin Core, CCO, VRA Core, CDWA i MODS standardi metapodataka koji su predstavljeni. Konsultiranjem postojeće literature o standardima metapodataka za metapodatkovnu obradu nematerijalne kulturne baštine definisana su istraživačka pitanja rada. Postavljeno je osam istraživačkih pitanja za komparativnu analizu odabranih standarda metapodataka. Na svako pitanje dat je odgovor posebno za svaki standard metapodataka. Odgovori na pitanja dali su kompa-

From a total of twenty MODS elements with their sub-elements, the presented record lacks metadata: a *genre* which indicates the category, *tableOfContents* which refers to the content for the resource, *targetAudience* which describes the intellectual level of the audience for which the resource was created, *notes* which give general information related to the source, *classification*, which indicates the object by applying the coding system, *part*, which describes a part of the resource, *extension*, which provides additional information not covered by MODS, and *recording*, which provides information about the record.

Summa summarum, that the implementation of metadata processing on the example of Jumps from the Old Bridge in Mostar shows that certain metadata standards are applicable for the processing of intangible cultural heritage. The above will be further examined and presented in the following answers to the research questions of the work.

5. Comparative analysis and discussion

This paper is qualitative in nature. By looking at current practices, it was observed that Dublin Core, CCO, VRA Core, CDWA and MODS metadata standards are most often used to describe cultural objects, which are presented above using the descriptive method. By consulting the existing literature on metadata standards, the research questions of the paper were defined. Eight research questions

rativnu sliku i ujedno diskusiju između odabranih standarda metapodataka, čime je izvršena njihova komparativna analiza. Na taj način procijenjen je kvalitet i primjenjivost standarda metapodataka za obradu nematerijalne kulturne baštine, što je cilj ovoga istraživanja.

U nastavku su data pitanja te odgovori na njih:

- Koju vrstu digitalnih objekata opisuje standard?

Dublin Core standard metapodataka koristi se za opisivanje različitih vrsta digitalnih objekata. DCMI za tip vokabulara navodi sljedeće:¹⁴

kolekcije (agregacija resursa), dataset (podaci kodirani u definisanoj strukturi koji se odnose na liste, tabele i baze podataka), događaj (pružanje deskriptivnih informacija za npr. izložbu, webcast, konferenciju, radionicu, dan otvorenih vrata, performans, bitku, suđenje, vjenčanje i sl.), slike (vizuelni prikaz npr. slike i fotografije fizičkih objekata, crteži, druge slike i grafike, animacije i pokretne slike, filmovi, dijagrami, karte, notni zapisi, elektronske i fizičke reprezentacije), interaktivni resurs (obraci na web-stranicama, apleti, multimedijalni objekti za učenje, usluge okruženja virtualne stvarnosti), pokretna slika (animacije, filmovi, televizijski programi, videozapisi, zoetropi), sve vrste fizičkih objekata, servise, servere (usluga fotokopiranja, bankarska usluga, usluga provjere autentičnosti, međubiblioteka pozajmica, web-server), softvere (C izvorna datoteka, MS-Windows .exe izvršna datoteka ili Perl skripta), zvuk (audiozvukovi), fotografije bez pokreta (slike, crteži, grafički dizajni, planovi i karte) i tekst (knjige, pisma, disertacije, pjesme, novine, članci, arhive mailing lista).

CCO se primarno odnosi na kulturne objekte umjetnosti i arhitekture; također pokriva mnoge druge vrste kulturnih djela, uključujući arheološka nalazišta, artefakte i funkcionalne objekte iz područja materijalne kulture.¹⁵ Kulturna djela uključuju sve vrste opipljive kulturne baštine:

arhitekturu, pejzažnu arhitekturu, druga građevinska djela, predmete kao što su slike, skulpture, murali, crteži, grafike, fotografije,

were asked for the comparative analysis of selected metadata standards. Each question is answered separately for each metadata standard. The answers to the questions gave a comparative picture and at the same time a discussion between the selected metadata standards, which made their comparative analysis. In this way, the quality and applicability of metadata standards for the processing of intangible cultural heritage were assessed, which is the goal of this research.

Below are the questions and their answers:

- What type of digital objects does the standard describe?

The Dublin Core metadata standard is used to describe different types of digital objects. The DCMI for the vocabulary type states the following:¹⁴

collection (aggregation of resources), dataset (data encoded in a defined structure referring to lists, tables and databases), event (providing descriptive information for e.g. exhibition, webcast, conference, workshop, open house, performance, battle, trial, wedding, etc.), images (visual representation, e.g. images and photographs of physical objects, drawings, other images and graphics, animations and motion pictures, films, diagrams, maps, sheet music, electronic and physical representations), interactive resource (forms on web pages, applets, multimedia learning objects, virtual reality environment services), moving images (animations, movies, television programs, videos, zoetropes), all kinds of physical objects, services, servers (copying service, banking service, authentication service, interlibrary loan, web server), software (C source file, MS-Windows .exe executable or Perl script), sound (audio sounds), still images (pictures, drawings, graphic designs, plans and maps) and text (books, letters, dissertations, poems, newspapers, articles, mailing list archives).

CCO primarily refers to cultural objects of art and architecture; it also covers many other types of cultural works, including archaeological sites, artefacts and functional objects from the field of material culture.¹⁵ Cultural works include all types of tangible cultural heritage:

¹⁴ Više o tipovima vokabulara u Section 7: DCMI Type Vocabulary na: *Dublin Core: DCMI Metadata Terms*. The Dublin Core Metadata Initiative. <https://www.dublincore.org/specifications/dublin-core/demi-terms/>.

¹⁵ Vidjeti: *Cataloging Cultural Objects (CCO)*. Visual Resources Association. <https://www.vraweb.org/cco>.

¹⁴ More about vocabulary types in Section 7: DCMI Type Vocabulary at: *Dublin Core: DCMI Metadata Terms*. The Dublin Core Metadata Initiative. <https://www.dublincore.org/specifications/dublin-core/demi-terms/>.

¹⁵ See: *Cataloging Cultural Objects (CCO)*. Visual Resources Association. <https://www.vraweb.org/cco>.

namještaj, keramiku, alate, kostime, tekstil, druge ukrasne ili utilitarne predmete ili bilo koje druge od hiljada vrsta umjetničkog stvaralaštva i drugih kulturnih ostataka. Uključena su umjetnost performansa, instalacije i radovi specifični za lokaciju. Isključeni su književna djela, muzika, scenska umjetnost, jezička umjetnost, kulinarska umjetnost, nauka, religija, filozofija i druga nematerijalna kultura (Baca et al., 2006: 5).

Prema tome, CCO se ne primjenjuje za obradu nematerijalne kulturne baštine koja je tema ovoga rada. VRA Core poput CCO razvila je Visual Resources Association koja se bazira na opisivanje objekata vizuelne kulture podržavajući discipline umjetnosti i arhitekture. Budući da zasebno opisuju djelo i sliku djela, može se koristiti, odnosno prilagoditi i za opisivanje nematerijalne kulturne baštine, ali to nije praksa. Isti je slučaj i s CDWA, koji je također osmišljen za opisivanje umjetničkih djela i materijalne kulture baštine, prvenstveno za zajednicu muzeja umjetnosti. Za razliku od njih, MODS poput Dublin Core standarda metapodataka koristi se za opisivanje različitih vrsta digitalnih objekata.

Pregledom vrsta digitalnih objekata koje predstavljani standardi metapodataka opisuju, evidentno je da se od odabranih Dublin Core i MODS standardi metapodataka mogu koristiti za obradu nematerijalne kulturne baštine, što je ilustrovano metapodatkovnim zapisima Skokova sa Starog mosta u Mostaru.

- Koje elemente metapodataka sadrži standard?

Dublin Core standard metapodataka sastoji se od petnaest elemenata. CCO standard sadržaja sastoji se od devet skupina elemenata opisa. VRA Core sadrži devetnaest elemenata zajedno s podelementima i atributima, uključujući i globalne attribute. CDWA se sastoji od oko 540 elemenata / kategorija i potkategorija. MODS se sastoji od dvadeset elemenata koji imaju svoje podelemente i attribute.

Vidno je da CDWA standard metapodataka sadrži najveći broj elemenata. MODS po broju elemenata ima jedan više od VRA Core koji ima devetnaest, a pet manje od Dublin Core. Najmanji broj elemenata ima CCO. Svi elementi pobrojanih standarda metapodataka detaljnije su predstavljeni u gornjem poglavlju rada; a oni s brojem vlastitih podelemenata i atributa koje sadrže daju opis resursa koji obrađuju. Važnost broja elemenata metapodataka koje sadrže standardi ogleđa se u opsegu podataka i iscrpnosti opisa resursa koji opisuju. To je naročito važno za

architecture, landscape architecture, other works of construction, objects such as paintings, sculptures, murals, drawings, prints, photographs, furniture, ceramics, tools, costumes, textiles, other decorative or utilitarian objects or any other of thousands of artistic creations and other cultural remains. Performance art, installations and site-specific works are included. Literary works, music, performing arts, language arts, culinary arts, science, religion, philosophy and other intangible culture are excluded (Baca et al., 2006: 5).

Therefore, CCO is not applied for the processing of intangible cultural heritage, which is the subject of this paper. VRA Core like CCO was developed by the Visual Resources Association which is based on describing objects of visual culture supporting the disciplines of art and architecture. Since it separately describes the work and the image of the work, it can be used or adapted to describe intangible cultural heritage, but this is not a practice. The same is the case with CDWA, which is also designed to describe works of art and material culture of heritage, primarily for the art museum community. In contrast, MODS like the Dublin Core metadata standard is used to describe different types of digital objects.

By reviewing the types of digital objects that the presented metadata standards describe, it is evident that the selected Dublin Core and MODS metadata standards can be used for the processing of intangible cultural heritage, which is illustrated by the metadata records of Jumps from the Old Bridge in Mostar.

- What metadata elements does the standard contain?

The Dublin Core metadata standard consists of fifteen elements. The CCO content standard consists of nine groups of description elements. VRA Core contains nineteen elements along with sub-elements and attributes, including global attributes. CDWA consists of about 540 elements/categories and sub-categories. MODS consists of twenty elements that have their own sub-elements and attributes.

It is obvious that the CDWA metadata standard contains the largest number of elements. MODS by number of elements has one more than VRA Core which has nineteen, and five less than Dublin Core. CCO has the least number of elements. All elements of the listed metadata standards are presented in more detail in the above chapter of the paper, and

nematerijalnu kulturnu baštinu zbog specifičnosti izazova iscrpnosti njenog opisa koja ne sadrži fizički, to jest materijalni opis resursa, za razliku od materijalne baštine.

- Kakav je opseg podataka?

Dublin Core standard metapodataka pruža metapodatke koje se mogu proširiti kvalifikatorima kako bi se dobio složeniji informacijski opis izvora. CCO pruža podatke kroz obavezne elemente opisa. Dodjeljujući zapisu ostale elemente opisa skupina koje nudi standard, pruža se veoma detaljan opseg podataka objekta. VRA Core strukturni standard metapodataka sadrži više generičke elemente za kulturni materijal koji u cijelosti opisuje resurs. CDWA putem elemenata / kategorija daje minimalne podatke, a uz opis potkategorija daje veoma detaljan opseg podataka. MODS standard metapodataka kroz elemente, podelemente i atribut daje detaljan opis digitalnog objekta te mu se daje prednost naspram Dublin Core standarda zbog kapaciteta koji nudi bogatiji opis.

Primjetno je da cijeli korpus standarda metapodataka može ponuditi opsežne podatke o resursu koji opisno obrađuje, a odluku o iscrpnosti podataka koji se nude donosi implementator, odnosno institucija, rukovodeći se svojim ciljevima i principima te potrebama korisnika.

- Kakva je sintaksa metapodataka?

Metapodatke Dublin Core moguće je implementirati u različitim formatima i jezicima za opsivnanje. DC najčešće koristi HTML (Hypertext Markup Language), te sheme XML (eXtensible Markup Language)¹⁶ i RDF (Resource Description Framework).¹⁷ Resurs, kao i tehnologija koja se koristi za implementaciju, odredit će sintaksu Dublin Core standarda metapodataka. CCO XML sintaksa se prilagođava potrebama elementa opisa objekta koji se katalogizira. Vodič CCO preporučuje da se pojmovi zabilježe dosljedno, jasno, prirodnim putem, a ne obrnuto, gramatički ispravno te da se ne koristi interpunkcija, osim crtica po potrebi. VRA Core je izražen u XML sintaksi. VRA Core sadrži strukturu pravila za korištenje metapodataka elemenata. Iako je CDWA konceptualni okvir, CDWA definira samo oznake kategorija i definicije – ne

with the number of their own sub-elements and their attributes they contain, they give a description of the resource they process. The importance of the number of metadata elements contained in the standards is reflected in the scope of the data and the comprehensiveness of the description of the resource they describe. This is especially important for intangible cultural heritage due to the specificity of the challenge of exhaustiveness of its description, which does not contain a physical, i.e. material description of resources, unlike material heritage.

- What is the data range?

The Dublin Core metadata standard provides metadata that can be extended with qualifiers to provide a more complex informational description of the resource. CCO provides data through mandatory description elements. By assigning to the record other elements of the group description offered by the standard, a very detailed scope of the object's data is provided. The VRA Core metadata structural standard contains multiple generic elements for cultural material that fully describe the resource. CDWA provides minimum data through elements/categories, and with the description of subcategories it provides a very detailed range of data. The MODS metadata standard provides a detailed description of a digital object through elements, sub-elements and attributes, and is preferred over the Dublin Core standard due to its capacity to offer a richer description.

It is noticeable that the entire corpus of metadata standards can offer extensive data on the resource it descriptively processes, and the decision on the completeness of the data offered is made by the implementer, i.e. the institution, guided by its goals and policies, and the needs of users.

- What is the metadata syntax?

Dublin Core metadata can be implemented in a variety of formats and annotation languages. DC most often uses HTML (Hypertext Markup Language), and schemas XML (eXtensible Markup Language)¹⁶ and RDF (Resource Description Framework).¹⁷ The resource as well as the technology used for implementation will determine the syntax of the Dublin Core metadata standard. The CCO XML syntax adapts to the needs of the object description element

¹⁶ Više o Dublin Core XML shemama na: *Dublin Core: XML schemas to support the Guidelines for implementing Dublin Core™ in XML*. The Dublin Core Metadata Initiative. <https://www.dublincore.org/schemas/xmls/>.

¹⁷ Više o Dublin Core RDF shemama na: *Dublin Core: DCMI Metadata expressed in RDF Schema Language*. The Dublin Core Metadata Initiative. <https://www.dublincore.org/schemas/rdfs/>.

¹⁶ More about Dublin Core XML Schemas at: *Dublin Core: XML schemas to support the Guidelines for implementing Dublin Core™ in XML*. The Dublin Core Metadata Initiative. <https://www.dublincore.org/schemas/xmls/>.

¹⁷ More about Dublin Core RDF Schemas at: *Dublin Core: DCMI Metadata expressed in RDF Schema Language*. The Dublin Core Metadata Initiative. <https://www.dublincore.org/schemas/rdfs/>.

definira specifičnu sintaksu za njihovo kodiranje, iako smjernice CDWA predlažu relacionu strukturu koja omogućava jednostavnu ponovnu upotrebu ovlaštenih zapisa (Riley, 2010b). Radi po principu da podatke implementira u softver institucije, te tako nudi informacije za prikaz koje korisnici lako čitaju i razumiju. MODS je zamišljen kao shema koja može predstavljati većinu semantike MARC-a (Riley, 2017: 206), a MODS izražava elemente u XML sintaksi. MODS daje XML strukturu i pravila s definicijama opisa elementima, podelementima i atributima.

Iako imaju određena pravila, sintaksu standarda metapodataka diktira digitalni objekt koji se obrađuje, što je u slučaju ovoga rada nematerijalna kulturna baština te njene specifičnosti, ali ujedno i implementator te tehnologija koja se koristi.

- Da li je standard metapodataka interoperabilan s drugim standardima?

Pokazatelje interoperabilnosti Dublin Corea čini jednostavnost implementacije skupa elemenata metapodataka i fleksibilnost na različite vrste resursa koji se opisuju. Izražavanje Dublin Core metapodataka HTML jezikom te XML i RDF shemama pokazuje semantičku interoperabilnost, dok sintaktičku interoperabilnost pokazuje korištenje strukturiranog DCMI skupa opisa. Stoga navedena kompatibilnost formata i jezika omogućava integraciju DC standarda metapodataka u različite tehnologije, čime se omogućava interoperabilnost s drugim standardima metapodataka.

CCO je napravljen s ciljem interoperabilnosti zapisa s drugim standardima. Elementi koje pokriva odnose se na područja informacija u kataloškom zapisu koji se mogu mapirati u različite skupove metapodataka kao što su VRA Core, CDWA i CDWA Lite (i, prema proširenju, na MARC i Dublin Core, i slično, jer se ti skupovi elemenata mogu mapirati na VRA i CDWA) (Baca et al., 2006: 1).

Prema tome, CCO se može implementirati ne samo na vlasničke Visual Resources Association i the Getty Foundation već i na druge standarde metapodataka. Poput CCO, i VRA Core koristi XML shemu radi interoperabilnosti i razmjene zapisa. Osim toga, mapiranja se vrše i sa shemama metapodataka:¹⁸ CDWA, CCO, CONA, CDWA Lite, VRA Core, MARC/AACR, MODS, Dublin Core, DACS, EAD i drugim. Iz ovoga, vidno je da je CDWA također

being cataloged. The CCO guide recommends that terms be recorded consistently, clearly, naturally, not the other way around, grammatically correct, and that punctuation is not used, except for hyphens when necessary. VRA Core is expressed in XML syntax. VRA Core contains a rule structure for using element metadata. Although CDWA is a conceptual framework, it only defines category labels and definitions – it does not define a specific syntax for encoding them, although the CDWA guidelines suggest a relational structure that allows easy reuse of authority records (Riley, 2010b). It works according to the principle of implementing data into the institution's software, thus offering display information that users can easily read and understand. MODS is intended as a schema that can represent most of the semantics of MARC (Riley, 2017: 206), and expresses elements in XML syntax. MODS provides XML structure and rules with description definitions of elements, sub-elements and attributes.

Although they have certain rules, the syntax of metadata standards is dictated by the digital object being processed, which in the case of this paper is the intangible cultural heritage and its specificities, but also the implementer and the technology used.

- Is the metadata standard interoperable with other standards?

The interoperability indicators of Dublin Core are the simplicity of implementing a set of metadata elements and the flexibility for different types of resources to be described. The expression of Dublin Core metadata in HTML and XML and RDF schemas demonstrates semantic interoperability, while syntactic interoperability is demonstrated by the use of the structured DCMI set of descriptions. Therefore, the specified compatibility of formats and languages enables the integration of DC metadata standards into different technologies, thus enabling interoperability with other metadata standards. CCO was created with the goal of interoperability of records with other standards. The elements it covers refer to areas of information in a catalog record that can be mapped to various metadata sets such as VRA Core, CDWA and CDWA Lite (and, by extension, to MARC and Dublin Core, and the like, because those element sets can map to VRA and CDWA) (Baca et al., 2006: 1).

Therefore, CCO can be implemented not only with the proprietary Visual Resources Association and the Getty Foundation, but also with other metadata standards. Like CCO, VRA Core uses XML Schema for interoperability and record exchange. In addi-

¹⁸ Više o mapiranju standarda metapodataka: *Metadata Standards Crosswalk*. https://www.getty.edu/research/publications/electronic_publications/intrometadata/crosswalks.html.

interoperabilan s drugim standardima metapodataka. CDWA je mapiran u Cultural Objects Name Authority (CONA)¹⁹ i može se preslikati u druge standarde podataka.

CDWA se često kombinira sa standardima metapodataka i modelima podataka. Također, prateći strukturu i pravila XML sheme, MODS je interoperabilan s drugim standardima metapodataka, te je i dizajniran s tom potrebom u svrhu mapiranja zapisa iz MARC-a 21 prema MODS-u.

Prema svemu navedenom, svi predstavljeni standardi metapodataka su interoperabilni. Za interoperabilnost veliki značaj ima popularnost, odnosno prihvaćenost od različitih institucija i implementatora obrade, kao i jednostavnost standarda, a o svemu tome će nadalje biti više riječi. Osim toga, interoperabilnost je važna zbog semantičkog weba i tehnologije zbog ponovne obrade, automatizacije i integracije metapodataka u različitim aplikacijama.

- Kakva je prihvaćenost standarda?

Dublin Core je najpopularniji standard metapodataka, što nije čudno budući da opisuje različite vrste resursa. U prilog tome ide i međunarodna podrška od strane World Wide Weba, IFLA-e i prihvaćenih standarda ISO, ANSI/NISO i IETF. CCO je međunarodno prihvaćen od strane raznih organizacija poput International Council of Museums (ICOM); izdat je od strane American Library Association (ALA), a uključen je kao standard za sadržaj podataka u NISO A Framework of Guidance for Building Good Digital Collections.²⁰ Danas standard podataka koriste širom svijeta umjetničke i arhitektonske škole, biblioteke, muzeji, arhivi i organizacije koje upravljaju informacijama o djelima kulturnog naslijeđa i njihovim slikama i omogućuju im pristup. Registar implementacije je odabrana lista nekih institucija²¹ koje su usvojile VRA Core (An introduction to VRA Core, 2014: 1). Ovaj strukturni standard metapodataka široko je prihvaćen u muzejima, bibliotekama i digitalnim repozitorijima. CDWA je također široko prihvaćen standard metapodataka, pogotovo u zajednici muzeja za koju je i kreiran, ali koristi se i u galerijama, arhivima, raznim kulturnim institucijama i informacijskim ustanovama, često u kombinaciji s drugim standardima metapodataka. Brojne digitalne biblioteke odlučile su se za MODS

tion to the above mapping, they are also performed with metadata schemes:¹⁸ CDWA, CCO, CONA, CDWA Lite, VRA Core, MARC/AACR, MODS, Dublin Core, DACS, EAD, and others. From this, it can be seen that CDWA is also interoperable with other metadata standards. CDWA is mapped to the Cultural Objects Name Authority (CONA)¹⁹ and can be mapped to other data standards.

CDWA is often combined with metadata standards and data models. Also, following the structure and rules of the XML schema, MODS is interoperable with other metadata standards, and was designed with that need in mind for the purpose of mapping records from MARC 21 to MODS.

According to all the above, all presented metadata standards are interoperable. Popularity, i.e. acceptance by various institutions and processing implementers, as well as the simplicity of the standard, is of great importance for interoperability, and more will be said about all of this. In addition, interoperability is important due to the Semantic Web and technology due to the reprocessing, automation and integration of metadata in different applications.

- What is the acceptance of the standard?

Dublin Core is the most popular metadata standard, which is not surprising since it describes different types of resources. This is supported by international support from the World Wide Web, IFLA and accepted standards ISO, ANSI/NISO and IETF. The CCO is internationally accepted by various organizations such as the International Council of Museums (ICOM). It was issued by the American Library Association (ALA), and is included as a data content standard in NISO's A Framework of Guidance for Building Good Digital Collections.²⁰ Today, the data standard is widely used worldwide by art and architecture schools, libraries, museums, archives and organizations that need to manage and provide access to information about cultural heritage works and their images. The Implementation Register is a selected list of some of the institutions²¹ that have adopted VRA Core (An introduction to VRA Core, 2014: 1). This structural standard of metadata is

¹⁹ CONA prikuplja naslove, atribucije, prikazane subjekte i druge metapodatke o umjetničkim djelima, arhitekturi i kulturnoj baštini, postojećoj i povijesnoj. CONA je povezana s AAT, TGN, ULAN i Getty Iconography Authority (IA)... CDWA, 2022: 2.

²⁰ Više na: NISO, 2007.

²¹ Vidjeti: *VRA Core: Implementation Registry*. http://core.vrweb.org/vracore_registry.html.

¹⁸ More on metadata standards mapping: *Metadata Standards Crosswalk*. https://www.getty.edu/research/publications/electronic_publications/intrometadata/crosswalks.html.

¹⁹ CONA collects titles, attributions, depicted subjects, and other metadata about works of art, architecture, and cultural heritage, both existing and historical. CONA is affiliated with AAT, TGN, ULAN, and the Getty Iconography Authority (IA)... CDWA, 2022: 2.

²⁰ More at: NISO, 2007.

²¹ See: *VRA Core: Implementation Registry*. http://core.vrweb.org/vracore_registry.html.

radije nego Dublin Core zbog bogatog opisa digitalnog objekta koji nudi MODS. Registar implementacije MODS²² daje popis institucija i projekata koje ga koriste, a najveći broj korisnika su akademske i istraživačke biblioteke u Sjedinjenim Američkim Državama. Također, veoma često se koristi u bibliotekama, arhivima, informacijskim i drugim ustanovama širom svijeta.

Iz svega toga može se potvrditi da su prikazani standardi metapodataka široko prihvaćeni.

- Da li je standard jednostavan za implementaciju?

Dublin Core standard je jednostavan za implementaciju zbog pružanja elementarnih informacija o resursu, što ne zahtijeva dublju analizu i vrijeme od strane implementatora. CCO vodič navodi da metoda katalogiziranja koju pruža može biti složenija zbog alata, upravljačkog sistema i tehnološke infrastrukture, kao i samog objekta, ali da su deskriptorski elementi opisa jednostavni za katalogiziranje. Budući da pruža jasnu strukturu i elemente metapodataka, implementacija VRA Core je jednostavna, ali može biti i kompleksna, u zavisnosti od resursa i potreba institucija. CDWA je strukturni standard koji je jednostavan za implementaciju iz razloga što nudi strukturne upute za opis resursa. Isti je slučaj i sa MODS standardom metapodataka.

Generalno, svi standardi su jednostavni za implementaciju ukoliko postoji znanje, vještine te volja za potrebom cjeloživotnog učenja informacijskih stručnjaka, odnosno implementatora, što se posebno odnosi na prilagođavanje tehnologiji i specifičnim potrebama koje iziskuje digitalni objekt koji se obrađuje, odnosno opisuje.

- Kako standard upravlja sigurnošću i zaštitom podataka?

Dublin Core standard metapodataka kroz elemente opisa metapodataka pruža osnovu za zaštitu podataka pružajući informacije o pravima u resursu i nad resursom izdavaču, to jest subjektu odgovornom za stavljanje resursa na raspolaganje, a zatim izvoru, odnosno povezanom resursu iz kojeg je izveden opisani resurs. CCO standard ne upravlja sigurnošću i zaštitom podataka. Skupovi opisa koje nudi čak ne sadrže ni elemente koji osiguravaju neku vrstu zaštite. Na implementatorima CCO standarda je da provedu odgovarajuće mjere sigurnosti i zaštite privatnosti podataka objekta. Potpuno isto se odnosi i na VRA Core standard metapodataka. CDWA

widely accepted in museums, libraries and digital repositories. CDWA is also a widely accepted metadata standard, especially in the museum community for which it was created, but it is also used in galleries, archives, various cultural institutions and information institutions, often in combination with other metadata standards. Many digital libraries have opted for MODS over Dublin Core because of the rich digital object description that MODS offers. The MODS Implementation Registry²² provides a list of institutions and projects that use it, and the largest number of users are academic and research libraries in the United States of America. Also, it is very often used in libraries, archives, information and other institutions around the world.

From all the above, it can be confirmed that the presented metadata standards are widely accepted.

- Is the standard easy to implement?

The Dublin Core standard is easy to implement because it provides elementary information about the resource, which does not require deep analysis and time on the part of the implementer. The CCO Guide states that the cataloging method it provides may be more complex due to the tools, management system and technology infrastructure, as well as the object itself, but that the descriptive elements of the description are easy to catalog. Because it provides a clear structure and metadata elements, the implementation of VRA Core is simple, but it can also be complex depending on the resources and needs of the institutions. CDWA is a structural standard that is easy to implement because it offers structural instructions for describing resources. The same is the case with the MODS metadata standard.

In general, all standards are easy to implement if there is knowledge, skills and the will for the need for lifelong learning of information experts, i.e. implementers, which especially refers to adaptation to technology and specific needs required by the digital object being processed or described.

- How does the standard manage security and data protection?

The Dublin Core metadata standard through metadata description elements provides a basis for data protection by providing information about rights in and over the resource, to the publisher, i.e. the entity responsible for making the resource available, then to the source, i.e. the associated resource from which the described resource is derived. The CCO

²² Vidjeti: MODS, 2022c.

²² See: MODS, 2022c.

standard kroz smjernice, odnosno kategorije 22. Autorska prava / Ograničenja i 23. Vlasništvo / Povijest prikupljanja nudi osnovu za sigurnost i zaštitu podataka, ali, kao što je već spomenuto, na institucijama je da provedu potrebne sigurnosne mjere zaštite. Poput CCO i VRA Core, isti je slučaj i s MODS standardom metapodataka.

Uzimajući u obzir sve to, vidno je da Dublin Core i MODS standardi metapodataka sadrže elemente i podelemente s atributima za metapodatkovnu obradu koja može ponuditi dosljedne i specifične metapodatke za kulturne objekte koji sadrže elemente ili su oblik i pojava nematerijalne kulturne baštine. Da su Dublin Core i MODS standardi metapodataka primjenjivi za metapodatkovnu obradu nematerijalne kulturne baštine pokazuju i primjeri dobre prakse ustanova kulture u Evropi i svijetu, što uz iznesenu prihvaćenost standarda daje konkretniju sliku u kontekstu zaštite i očuvanja nematerijalne kulturne baštine. Najpoznatiji primjer dobre prakse metapodatkovne obrade Dublin Core standardom metapodataka je zasigurno *Europeana*,²³ digitalna platforma evropske kulturne baštine koja od nematerijalne kulturne baštine metapodatkovno obrađuje tradicionalne običaje, prakse, muziku, ples, zanate i usmeno naslijeđe. UNESCO inicijativom *Memory of the World Register*²⁴ baštini također tradicionalne plesove, festivale i obrede. Primjeri dobre prakse biblioteka su *Digital Public Library of America (DPLA)*²⁵ sa zapisima tradicionalnih pjesama američkih Indijanaca te British Library s projektom *Save Our Sounds*²⁶ koji baštini snimke narodne muzike i priče iz različitih dijelova Velike Britanije. Vrijedi spomenuti i digitalni arhiv *The Digital Repository of Ireland (DRI)*²⁷ koji baštini irsku narodnu muziku i tradicionalne običaje, potom španski digitalni agregator pod nazivom *Hispana* koji baštini zbirke o flamenco muzici i španskim narodnim običajima te digitalnu platformu Nacionalne biblioteke Australije pod nazivom *Trove*²⁸ koja sadrži zbirke aboridžinskih pjesama i priča. S obzirom na bogatu kulturnu baštinu, ustanove kulture u regionu također se ističu s primjerima dobre prakse metapodatkovne obrade nematerijalne kulturne baštine Dublin Core standardom metapodataka. Tako Nacionalna i univer-

standard does not govern security and data protection. The sets of descriptions it offers do not even contain elements that provide some kind of protection. It is up to the implementers of the CCO standard to implement appropriate security and data privacy protection measures of the facility. The exact same applies to the VRA Core metadata standard. The CDWA standard through guidelines i.e. categories 22. Copyright/Restrictions and 23. Ownership/Collection History offers a basis for data security and protection, but as already mentioned, it is up to the institutions to implement the necessary security protection measures. Like CCO and VRA Core, the same is the case with the MODS metadata standard.

Considering all the above, it can be seen that the Dublin Core and MODS metadata standards contain elements and sub-elements with attributes for metadata processing that can offer consistent and specific metadata for cultural objects that contain elements or are the form and appearance of intangible cultural heritage. That the Dublin Core and MODS metadata standards are applicable for the metadata processing of intangible cultural heritage is also shown by examples of good practices of cultural institutions in Europe and the world, which, along with the acceptance of the standards presented above, gives a more concrete picture in the context of the protection and preservation of intangible cultural heritage. The best-known example of good practice of metadata processing with the Dublin Core metadata standard is certainly *Europeana*,²³ the digital platform of European cultural heritage; which metadata processes traditional customs, practices, music, dance, crafts, and oral heritage from the intangible cultural heritage. Through UNESCO's *Memory of the World Register*²⁴ initiative, heritage also includes traditional dances, festivals, and rituals. Examples of good library practice are *the Digital Public Library of America (DPLA)*²⁵ with recordings of traditional American Indian songs and the British Library with *the Save Our Sounds*²⁶ project, which inherits recordings of folk music and stories from different parts of Great Britain. It is also worth mentioning the digital archive *The Digital Repository of Ireland (DRI)*,²⁷ which inherits Irish folk music and tradi-

²³ Vidjeti: *Europeana*. <https://www.europeana.eu/en>.

²⁴ Vidjeti: *UNESCO Memory of the World Register*. <https://www.unesco.org/en/memory-world/register2023>.

²⁵ Vidjeti: *Digital Public Library of America (DPLA)*. <https://dp.la/>.

²⁶ Vidjeti: *The British Library: Saving our Sounds*. <https://music.britishcouncil.org/news-and-features/2023-01-30/british-library-saving-our-sounds>.

²⁷ Vidjeti: *Digital Repository of Ireland. Home*. <https://dri.ie/>.

²⁸ Vidjeti: *Trove. Home*. <https://trove.nla.gov.au/>.

²³ See: *Europeana*. <https://www.europeana.eu/en>.

²⁴ See: *UNESCO Memory of the World Register*. <https://www.unesco.org/en/memory-world/register2023>.

²⁵ See: *Digital Public Library of America (DPLA)*. <https://dp.la/>.

²⁶ See: *The British Library: Saving our Sounds*. <https://music.britishcouncil.org/news-and-features/2023-01-30/british-library-saving-our-sounds>.

²⁷ See: *Digital Repository of Ireland. Home*. <https://dri.ie/>.

zitetska biblioteka Bosne i Hercegovine projektom *Digitalne kolekcije*²⁹ baštini tradicionalne pjesme koje potječu iz različitih dijelova BiH. Nacionalna biblioteka Srbije projektom *Digitalna NBS*³⁰ baštini stare zapise narodnih pjesama, običaje i festivale iz različitih regija Srbije. Još jedan primjer dobre prakse iz Srbije je i digitalna zbirka zapisa narodne književnosti Biblioteke Matice srpske u Novom Sadu. Nacionalna i sveučilišna knjižnica u Zagrebu također baštini digitalne zbirke narodnih pjesama, plesova, običaja i festivala na području Hrvatske. Vođene istim ciljem zaštite i očuvanja, treba spomenuti i digitalne zapise Narodne biblioteke Crne Gore “Đurđe Crnojević”, Makedonske nacionalne biblioteke “St. Kliment Ohridski” i Narodne biblioteke Albanije, kao primjere dobre prakse zaštite i očuvanja nematerijalne kulturne baštine Dublin Core standardom metapodataka.

Kada je riječ o metapodatkovnoj obradi nematerijalne kulturne baštine MODS standardom metapodataka u Evropi i svijetu, kao primjer dobre prakse neminovno je navesti *Europeanu*, koja koristi MODS standard metapodataka za obradu videozapisa, audiozapisa, ali i fotografija. Veoma značajan primjer dobre prakse je projekt Australije pod nazivom *AustLit: The Australian Literature Resource*.³¹ Projekt predstavlja nacionalnu bio-bibliografsku bazu podataka o australskoj književnosti koja koristi MODS standard metapodataka za kategorizaciju i metapodatkovnu obradu usmene književnosti, tradicionalnih priča i pjesama autohtonih zajednica. Postoji nekoliko primjera dobre prakse primjene MODS standarda metapodataka u bibliotekama. Tako se s digitalnim zbirkama nematerijalne kulturne baštine izdvajaju Nacionalna biblioteka Norveške, de facto nacionalna biblioteka SAD-a, Kongresna biblioteka i Francuska nacionalna biblioteka s digitalnim portalom *Gallica*.³² U regionu, već spomenute Nacionalna i univerzitetska biblioteka Bosne i Hercegovine, Nacionalna biblioteka Srbije i Biblioteka Matice srpske primjenjuju MODS polja za povezivanje najčešće audiozapisa i videozapisa ili transkripta, dok se Nacionalna i sveučilišna knjižnica u Zagrebu nalazi na listi institucija koje implementiraju MODS standard metapodataka.

Na kraju, pretpostavka je da će ovo istraživanje poslužiti u daljnjim istraživanjima Dublin Core i

tional customs; then the Spanish digital aggregator called *Hispana*, which inherits collections on flamenco music and Spanish folk customs, and the National Library of Australia’s digital platform called *Trove*,²⁸ which contains collections of Aboriginal songs and stories. Considering the rich cultural heritage of cultural institutions in the region, they also stand out with examples of good practice of metadata processing of intangible cultural heritage with the Dublin Core metadata standard. Thus, the National and University Library of Bosnia and Herzegovina is inheriting traditional songs originating from different parts of Bosnia and Herzegovina through the *Digital Collection*²⁹ project. With the *Digital NBS*³⁰ project, the National Library of Serbia inherits old records of folk songs, customs, and festivals from different regions of Serbia. Another example of good practice from Serbia is the digital collection of folk literature records at the Matica Srpska Library in Novi Sad. The National and University Library in Zagreb also owns a digital collection of folk songs, dances, customs, and festivals in Croatia. Guided by the same goal of protection and preservation, we should also mention the digital records of the National Library of Montenegro “Đurđe Crnojević”, the Macedonian National Library “St. Kliment Ohridski” and the National Library of Albania, as examples of good practice in the protection and preservation of intangible cultural heritage with the Dublin Core metadata standard.

When it comes to metadata processing of intangible cultural heritage with the MODS metadata standard in Europe and the world, it is inevitable to cite *Europeana* as an example of good practice, which uses the MODS metadata standard for processing videos, audio recordings, and photos. A very significant example of good practice is the Australian project called *AustLit: The Australian Literature Resource*.³¹ The project is a national bio-bibliographic database of Australian literature that uses the MODS metadata standard for the categorization and metadata processing of oral literature, traditional stories, and songs of Indigenous communities. There are several examples of good practice in the application of the MODS metadata standard in libraries. Thus, with digital collections of intangible cultural heritage, the National Library of Norway, the de facto national library of the USA, the Library

²⁹ Vidjeti: *Digitalne kolekcije*. <https://kolekcije.nub.ba/>.

³⁰ Vidjeti: *Digitalna NBS*. <https://digitalna.nb.rs/>.

³¹ Vidjeti: *AustLit. The Australian Literature Resource*. <https://www.austlit.edu.au/>.

³² Vidjeti: *Gallica*. <https://gallica.bnf.fr/accueil/en/content/accueil-en?mode=desktop>.

²⁸ See: *Trove. Home*. <https://trove.nla.gov.au/>.

²⁹ See: *Digitalne kolekcije*. <https://kolekcije.nub.ba/>.

³⁰ See: *Digitalna NBS*. <https://digitalna.nb.rs/>.

³¹ See: *AustLit. The Australian Literature Resource*. <https://www.austlit.edu.au/>.

MODS standarda metapodataka za obradu nematerijalne kulturne baštine. Pogotovo, istraživanje bi potencijalno moglo biti korišteno kao vid potrebe za razvojem novih standarda metapodataka namijenjenih isključivo za metapodatkovnu obradu nematerijalne kulturne baštine, što bi bibliotekama, arhivima i muzejima kao čuvarima znanja u praksi znatno pomoglo u zadaći zaštite i očuvanja nacionalnog identiteta metapodacima u digitalnom okruženju.

6. Zaključak

U nedostatku istraživanja koja se bave komparativnom analizom standarda metapodataka za obradu nematerijalne kulturne baštine, cilj rada bio je da se ponude standardi metapodataka koji će biti primjenjivi za obradu takve vrste resursa. Prema tome, izvršena je analiza Dublin Core, CCO, VRA Core, CDWA i MODS standarda metapodataka.

Analiza odabranih standarda metapodataka pokazala je da su predstavljeni standardi visoko kvalitetni, ali da se od korpusa za obradu nematerijalne kulturne baštine mogu koristiti Dublin Core i MODS standardi metapodataka. Pored toga, oba standarda se koriste za opisivanje različitih vrsta digitalnih objekata. Dublin Core kroz petnaest elemenata opisuje pruža opis digitalnog objekta i obogaćujući ga svojim klasifikatorima može ponuditi strukturalniji opis. Za razliku od njega, MODS standard kroz dvadeset elemenata, podelemenata i atributa daje primarno bogatiji opis; zbog toga se daje prednost MODS naspram Dublin Core standardu metapodataka. Oba standarda se izražavaju u XML sintaksi, dajući strukture i pravila kroz definicije opisa elemenata i klasifikatora, odnosno podelemenata i njihovih atributa. Široka prihvaćenost standarda, pogotovo u bibliotekama, i njihova jednostavnost za implementaciju rezultirale su visokom interoperabilnošću oba standarda metapodataka. Rezultat toga je metapretraga metapodataka kodiranih u Dublin Core, odnosno MODS shemi metapodataka. Posljedično, to omogućava bolju pretragu i pronalaznje digitalnog objekta, što je i krajnji cilj standarda metapodataka: uz dobar opis olakšati organizaciju objekta na mreži. Kada je riječ o sigurnosti i privatnosti podataka, Dublin Core u odnosu na MODS osigurava osnovu njihove zaštite, ali teret obaveze zaštite zasigurno ostaje na instituciji kao implementatoru.

Analiza primjene Dublin Core i MODS standarda metapodataka na primjeru Skokova sa Starog mosta u Mostaru pokazuje da su standardi primjenjivi u metapodatkovnoj obradi. Njihovu primjenu potvr-

de of Congress, and the French National Library with *the Gallica*³² digital portal stand out. In the region, the already mentioned National and University Library of Bosnia and Herzegovina, National Library of Serbia, and Library of Matica Srpska use MODS fields to connect mostly audio recordings and videos or transcripts, while the National and University Library in Zagreb is on the list of institutions that implement the MODS metadata standard.

Finally, it is assumed that this research will serve in further research on Dublin Core and MODS metadata standards for the processing of intangible cultural heritage. In particular, the research could potentially be used as a form of need for the development of new metadata standards intended exclusively for the metadata processing of intangible cultural heritage, which would in practice significantly help libraries, archives, and museums as guardians of knowledge in the task of protecting and preserving national identity with metadata in the digital environment.

6. Conclusion

In the absence of research dealing with the comparative analysis of metadata standards for the processing of intangible cultural heritage, the work aimed to offer metadata standards that will apply to the processing of this type of resource. Therefore, an analysis of Dublin Core, CCO, VRA Core, CDWA, and MODS metadata standards was performed.

The analysis of the selected metadata standards showed that the presented standards are of high quality, but that Dublin Core and MODS metadata standards can be used from the corpus for the processing of intangible cultural heritage. In addition, both standards are used to describe different types of digital objects. Through fifteen description elements, Dublin Core provides a description of a digital object, which, by enriching it with its classifiers, can offer a more structured description. In contrast, the MODS standard primarily provides a richer description through twenty elements, sub-elements, and attributes; this is why MODS is preferred over the Dublin Core metadata standard. Both standards are expressed in XML syntax, providing structures and rules through definitions of element descriptions and classifiers, or sub-elements and their attributes. Wide acceptance of the standards, especially in libraries, and their ease of implementation resulted in high interoperability of both metadata standards. The result is a meta-search of metadata encoded in

³² See: *Gallica*. <https://gallica.bnf.fr/accueil/en/content/accueil-en?mode=desktop>.

đuju i primjeri dobre prakse u ustanovama kulture u Evropi i svijetu. Međutim, analiza ukazuje i na to da postoji potreba daljnjeg istraživanja standarda metapodataka za obradu nematerijalne kulturne baštine, te da bi ovaj rad mogao biti od velike koristi za istraživanja, ali i za razvoj standarda metapodataka za nematerijalnu kulturnu baštinu.

Na kraju, primjena Dublin Core i/ili MODS standarda metapodataka doprinijet će kvalitetnijem upravljanju izvorima na mreži od strane korisnika. Od potreba, koje funkcije metapodataka trebaju služiti za opis predmetnog izvora, kao i infrastrukture institucije i uveliko znanja implementatora, zavisit će odluka o odabiru standarda metapodataka.

the Dublin Core or MODS metadata scheme. Consequently, it enables better search and retrieval of a digital object, which is the ultimate goal of a metadata standard with a good description to facilitate the organization of the object online. When it comes to data security and privacy, Dublin Core about MODS ensures the basis of their protection, but the burden of the duty of protection certainly remains on the institution as the implementer.

Analysis of the application of Dublin Core and MODS metadata standards on the example of Jumps from the Old Bridge in Mostar shows that the standards are applicable in metadata processing. Their application is also confirmed by examples of good practice in cultural institutions in Europe and the world. However, the analysis also indicates that there is a need for further research into metadata standards for the processing of intangible cultural heritage and that this work could be of great use for research, but also for the development of metadata standards for intangible cultural heritage.

Finally, the application of Dublin Core and/or MODS metadata standards will contribute to better management of online resources by users. Starting from the needs of which functions metadata should serve to describe the source in question, as well as the infrastructure of the institution and the extensive knowledge of the implementer, the decision on the selection of metadata standards will depend.

Bibliografija / Bibliography

- An introduction to VRA Core*. (2014). https://www.loc.gov/standards/vracore/VRA_Core4_Intro.pdf.
- AustLit. *The Australian Literature Resource*. <https://www.austlit.edu.au/>.
- Baca, M., Harping, P., Lanzi, E., McRae, L., & Whiteside, A. (eds). (2006). *Cataloging Cultural Objects: A Guide to Describing Cultural Works and Their Images*. American Library Association: Chicago. <https://static1.squarespace.com/static/64839bcb007bd907faf40da2/t/648682731ae85c00320c7d13/1686536835929/CatalogingCulturalObjects-Fullv2.pdf>.
- Bosna i Hercegovina, Državna komisija za saradnju sa UNESCO-m. *Preliminarna lista nematerijalne kulturne baštine Bosne i Hercegovine*. <http://unescoibih.mcp.gov.ba/konkursi/?id=15125>
- Cataloging Cultural Objects (CCO)*. Visual Resources Association. <https://www.vraweb.org/cco>.
- CDWA. (2022). *Categories for the Description of Works of Art (CDWA)*. Getty. https://www.getty.edu/research/publications/electronic_publications/cdwa/definitions.pdf.
- CC:DA (ALCTS/CCS/Committee on Cataloging: Description and Access). (2000). *Task Force on Metadata: Final report*. <https://alcts.ala.org/ccdablog/?cat=32>.
- Digital Public Library of America (DPLA)*. <https://dp.la/>.
- Digital Repository of Ireland. *Home*. <https://dri.ie/>.
- Digitalna NBS*. <https://digitalna.nb.rs/>.
- Digitalne kolekcije*. <https://kolekcije.nub.ba/>.
- Dizdar, S. (2011). *Od podatka do metapodatka*. Sarajevo: Nacionalna i univerzitetska biblioteka Bosne i Hercegovine.
- Dublin Core. (2012). *DCMI Metadata Terms*. <https://www.dublincore.org/specifications/dublin-core/dcmi-terms/2012-06-14/>.
- Dublin Core*. <https://www.dublincore.org/specifications/dublin-core/dces/>.
- Dublin Core: DCMI Metadata expressed in RDF Schema Language*. The Dublin Core Metadata Initiative. <https://www.dublincore.org/schemas/rdfs/>.
- Dublin Core: DCMI Metadata Terms*. The Dublin Core Metadata Initiative. <https://www.dublincore.org/specifications/dublin-core/dcmi-terms/>.
- Dublin Core: XML schemas to support the Guidelines for implementing Dublin Core™ in XML*. The Dublin Core Metadata Initiative. <https://www.dublincore.org/schemas/xmls/>.
- Europeana*. <https://www.europeana.eu/en>.
- Gallica*. <https://gallica.bnf.fr/accueil/en/content/accueil-en?mode=desktop>.
- Giannoulakis, S., Tsapatsoulis, N., & Grammalidis, N. (2018). Metadata for Intangible Cultural Heritage – The Case of Folk Dances. *Proceedings of the 13th International Joint Conference on Computer Vision, Imaging and Computer Graphics Theory and Applications (VISAPP 2018)*. https://www.researchgate.net/publication/323635642_Metadata_for_Intangible_Cultural_Heritage_-_The_Case_of_Folk_Dances.
- Hajdarpašić, L., Khattab, Dž., & Dizdar, S. (2023). Uloga metapodataka u prezentaciji turbeta u digitalnom okruženju. *Bosniaca* 28, 107-126.
- i-Treasures: intangible cultural heritage of the past available through advanced modern technologies*. European Commission. <https://digital-strategy.ec.europa.eu/en/news/i-treasures-intangible-cultural-heritage-past-available-through-advanced-modern-technologies>.
- Mai Chan, L., & Lei Zeng, M. (2006). Metadata Interoperability and Standardization – A Study of Methodology Part I. *D-Lib Magazine* 12(6). https://www.researchgate.net/publication/28117661_Metadata_Interoperability_and_Standardization_-_A_Study_of_Methodology_Part_I.
- Metadata Object Description Schema (MODS). (2022a). *Introduction and Implementation*. <https://www.loc.gov/standards/mods/userguide/introduction.html>.
- Metadata Object Description Schema (MODS). (2022b). *MODS Elements and Attributes*. <https://www.loc.gov/standards/mods/userguide/generalapp.html>.
- Metadata Object Description Schema (MODS). (2022c). *MODS Implementation Registry*. <https://www.loc.gov/standards/mods/registry.php>.
- Metadata Standards Crosswalk*. https://www.getty.edu/research/publications/electronic_publications/intro-metadata/crosswalks.html.
- Miller, S. J. (2022). *Metadata for Digital Collections*. Chicago: ALA Neal-Schuman. <https://web.p.ebscohost.com/ehost/ebookviewer/ebook/TAWMH-h3d19fMzY1NjYxNV9fQU41?sid=75616267-e4c3-4363-9bf8-85360d274375@redis&vid=4&format=EB&rid=16>.
- National Information Standards Organization (NISO). (2007). *A Framework of Guidance for Building Good Digital Collections*. <https://niso.org/publications/framework-guidance-building-good-digital-collections>
- O'Neill, B., & Stapleton, L. (2022). Digital cultural heritage standards: from silo to semantic web. *AI & Society: Journal of Knowledge, Culture and Communication* 37(37), 891-903. <https://doi.org/10.1007/s00146-021-01371-1>.
- Riley, J. (2010a). *Glossary of metadata standards*. https://jennriley.com/metadatamap/seeingstandards_glossary_pamphlet.pdf.
- Riley, J. (2010b). *Seeing Standards: A visualization of the Metadata Universe*. <https://jennriley.com/metadatamap/seeingstandards.pdf>.
- Riley, J. (2017). *Understanding Metadata: What is metadata, and what is it for?*. National Information Standards Organization (NISO). <https://groups.niso.org/higherlogic/ws/public/download/17446/Understanding%20Metadata.pdf>.

- The British Library: Saving our Sounds*. <https://music.britishcouncil.org/news-and-features/2023-01-30/british-library-saving-our-sounds>.
- Transforming Intangible Folkloric Performing Arts into Tangible Choreographic Digital Objects*. European Commission. <https://cordis.europa.eu/project/id/691218/en>.
- Trove. *Home*. <https://trove.nla.gov.au/>.
- UNESCO Memory of the World Register*. <https://www.unesco.org/en/memory-world/register2023>.
- UNESCO. (2003). *The Convention for the Safeguarding of the Intangible Cultural Heritage*. Paris. <https://ich.unesco.org/doc/src/01852-EN.pdf>.
- VRA Core 4.0 Element Description*. https://www.loc.gov/standards/vracore/VRA_Core4_Element_Description.pdf.
- VRA Core*. <https://www.loc.gov/standards/vracore/>.
- VRA Core: Implementation Registry*. http://core.vraweb.org/vracore_registry.html.
- Wholodance: Whole-Body Interaction Learning for Dance Education*. <http://www.wholodance.eu/>.
- Wijesundara, C., & Sugimoto, S. (2018). Metadata model for organizing digital archives of tangible and intangible cultural heritage, and linking cultural heritage information in digital space. *LIBRES 28(2)*, 58-80. <https://doi.org/10.32655/LIBRES.2018.2.2>.
- Wijesundara, C., Monika, W., & Sugimoto, S. (2017). A Metadata Model to Organize Cultural Heritage Resources in Heterogeneous Information Environments. In: Choemprayong, S., Crestani F., & Cunningham, S. (eds). *Digital Libraries: Data, Information, and Knowledge for Digital Lives. ICADL 2017. Lecture Notes in Computer Science, 10647* (pp. 81-94). Cham: Springer. https://doi.org/10.1007/978-3-319-70232-2_7.